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Led by CEO Lin Chin-Lon, the Tzu Chi Medical Foundation team established the "Vegetarian Nutrition Cohort Research Database" in 2005 to study the relationship between vegetarian diets, genetics, and disease development. To date, the research team has published 20 papers, scientifically confirming that vegetarian diets benefit physical and mental health while protecting the earth and natural ecosystems.

- A cardiology authority with 40 years of vegetarian experience leads a medical team studying the relationship between vegetarians versus meat-eaters and disease. After nearly 20 years of big data research from Taiwan's "Vegetarian Nutrition Cohort Database," findings show that vegetarian diets indeed help prevent and improve 10 major chronic conditions including stroke, cardiovascular disease, dementia, depression, cataracts, diabetes, fatty liver, gallstones, gout, urinary tract infections, and delay the progression of severe COVID-19 complications.
(This book is suitable for lacto-ovo vegetarians and vegans)

Vegetarian diet Helps Reduce Risk of 10 Major Chronic Diseases
Scientifically validated through big data evidence

Scientific Evidence for Vegetarianism
Sustainable Diet for Disease Treatment and Prevention
CEO Dr. Lin Chin-Lon
& others of Buddhist Tzu Chi Medical Foundation

Scientific Evidence for Vegetarianism

Sustainable Diet for Disease Treatment and Prevention

- Nutritional Guidelines and Recipes for Preventing 10 Major Chronic Conditions
- Evidence-based health guide from 14 vegetarian physicians with personal experience 40 delicious and healthy recipes designed by professional nutritionists for specific conditions

Authors
CEO Dr. Lin Chin-Lon
& others of Buddhist Tzu Chi Medical Foundation

Special Recommendation by
Yen Po-Wen,
CEO of Buddhist Tzu Chi Charity Foundation

Scientific Evidence for Vegetarianism

Sustainable Diet for Disease Treatment and Prevention

Authors
CEO Dr. Lin Chin-Lon
& others of Buddhist Tzu Chi Medical Foundation

About the main author

Dr. Lin Chin-Lon, M.D.

- 2008/10-present
  Chief Executive Officer, Buddhist Tzu Chi Medical Foundation
- 1998- present
  Chief Executive Officer, Tzu Chi International Medical Association
- 2011/9-present
  President, Taiwan Society of Health Promoting Hospitals
- 2015-present
  Executive council member of Taiwan Society of Health Promoting Hospitals
- 2009-2016
  President, Taiwan Vegetarian Nutrition Society
- 2016-present
  Honorary Chairman, Taiwan Vegetarian Nutrition Society

Professional Appointments

- 1976-1977
  Instructor in Medicine, State University of New York at Stony Brook.
- 1980-1985
  Director, Non-invasive cardiology laboratory, Northridge Hospital Medical Center
- 1981-1985
  Chairman, Cardiology Committee, Northridge Hospital Medical Center.
- 1986-1987
  President of Medical Staff, Northridge Hospital Medical Center
- 1988-1993
  President, Northridge Community Medical Group.
- 1993-1995
  Clinical assistant professor, University of California, Los Angeles
- 1995-present
  Clinical Associate Professor of Medicine, Tzu Chi University, Taiwan

Yen Po-Wen, CEO of Buddhist Tzu Chi Charity Foundation

Author Profiles

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Dr. Yu Cheng-Chan / General Surgeon & Deputy Superintendent, Taichung Tzu Chi Hospital
Dr. Wu Sheng-Teng / Nephrologist & Deputy Superintendent of Kuanshan Tzu Chi Hospital
Dr. Wang Yi-Chun / Nephrologist, Taipei Tzu Chi Hospital
Dr. Chang Shun-Chin / Geriatric Medicine Department, Dalin Tzu Chi Hospital
Dr. Chang Chun-Ming / General Surgeon, Hualien Tzu Chi Hospital
Dr. Yeh Ming-Hsien / Director of Chinese Medicine Department, Dalin Tzu Chi Hospital
Dr. Chang Huai-Ren / Cardiologist, Hualien Tzu Chi Hospital
Dr. Chen Yen-Chang / Anatomical Pathologist, Hualien Tzu Chi Hospital
Dr. Chang You-Kang / Radiation Oncologist, Taipei Tzu Chi Hospital
Dr. Chen Ching-Yuan / Director of Nuclear Medicine Department, Taichung Tzu Chi Hospital
Dr. Chang Wei-Chiao / Chinese Medicine Department, Dalin Tzu Chi Hospital
Dr. Chen Chin-Cheng / Neurosurgeon & Deputy Superintendent of Dalin Tzu Chi Hospital
Dr. Lin Ming-Nan / Family Medicine Department & Deputy Superintendent of Dalin Tzu Chi Hospital

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Nutritional Information for All Recipes

Recipe designed by: Division of Dietetics & Nutrition, Hualien Tzu Chi Medical Center

Whole Grains

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
82 High-Fiber Curry Fried Rice	432.2	20.9	13.9	2.4	60.3	4.2	552.6	9.7

[Nutrition Facts] Per serving (360g), this recipe yields 1 serving.

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
100 Oatmeal Walnut Liver-Protecting Porridge	250	7	10	1.8	33	2	1128	6

[Nutritional Analysis] Per serving of 502g, this recipe contains 1 serving

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Potassium
118 Whole Tomato Rice	353.9	7.8	7.1	1.29	66.7	3.9	92	525.7

Phosphorus	Calcium	Iron
248.1	25.0	1.6

[Nutritional Analysis] Per serving of 320g, this recipe contains 1 serving

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Purine
132 Shell Ginger Leaf Rice Packet	106.5	3	2.1	0.4	18.8	0.4	179	10.7

[Nutritional Analysis] Per serving ?? grams, this recipe contains 3 servings

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
148 Buckwheat Noodle Dumplings	237.58	7.6	1.1	0.2	48.9	0	229.8

[Nutritional Analysis] Per serving 120g, this recipe contains 3 servings

Whole Grains

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
164 Vegetarian Scallop Pesto Pasta	480.4	16.8	18.6	3.4	66.6	3.0	262	5.3

[Nutritional Analysis] Per serving 300g, this recipe contains 4 servings

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin A (IU)
176 Quinoa Rice Balls	82	2	1	0.2	15.9	0	360	102.2

[Nutritional Analysis] Per serving 40g, this recipe contains 10 servings

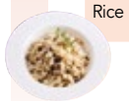
Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
192 Avocado Pita Bread	232	11.1	9.5	2.8	26.5	0	432

[Nutritional Analysis] Per serving of 150g, this recipe contains 1 serving

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
214 Japanese Mixed Rice	456.1	22.6	8.8	1.9	75.4	11.0	955.6	7.0

[Nutritional Analysis] Per serving 210g, this recipe contains 2 servings

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
226 Truffle Mushroom Rice	252	5.7	7.2	1.9	41.4	0.88	777

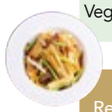


[Nutritional analysis] Per serving of 160g, this recipe contains 1 serving

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
84	Stuffed Tofu Skin and Green Soy Beans Triangles	250	22.7	14.6	2.2	11	2.5	667.6	4.4

[Nutrition Facts] Per serving (170g), this recipe yields 1 serving

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
102	Tofu Skin with Fresh Vegetables	146.1	12.1	7.9	1.3	10.1	2.6	431.2	4.9



[Nutritional Analysis] Per serving of 160g, this recipe contains 3 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Potassium
120	Tofu Okonomiyaki	231.8	12.9	14.3	3.2	13.7	0.6	264	267.9

Phosphorus	Calcium	Iron
174.1	167.5	2.7

[Nutritional Analysis] Per serving of 170g, this recipe contains 2 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin C
134	Lemon-Pickled Purple Cabbage and White Radish Duo	31.3	0.7	0.2	0	7.3	5.3	253.6	21.1

[Nutritional Analysis] Per serving 65 grams, this recipe contains 5 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
150	Natto Vegetable Roll	117.8	13.5	5.7	1.4	19.7	2.4	101.9

[Nutritional Analysis] Per serving 130g, this recipe contains 2 servings

Sish Dish

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin C (mg)
166	Bell Pepper Stuffed with Eggs	133.2	8.6	6.0	1.8	12.8	0.1	250	134.2

[Nutritional Analysis] Per serving 180g, this recipe contains 4 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin A (IU)
178	Garlic Butter Wild Mushroom Roasted Bell Peppers	82.5	2.7	3.5	1.7	13.1	1.1	466.8	1283.75

[Nutritional Analysis] Per serving 200g, this recipe contains 4 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
194	Golden Sand Peas	102	5.7	3.8	0.8	15.4	0	300

[Nutritional Analysis] Per serving of 105g, this recipe contains 2 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
216	Warm Salad	209.9	5.4	13.6	2.4	19.4	8.4	237.1	2.4

Vitamin C (mg)
40.4

[Nutritional Analysis] Per serving 176g, this recipe contains 2 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
228	Mediterranean Fruit and Vegetable Salad	215	7.0	4.3	1.29	43.4	13.8	717

[Nutritional analysis] Per serving of 145g, this recipe contains 1 serving

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
86	Fresh Mushroom and Lotus Root Soup	94	3.2	2.9	0.5	17.7	5.4	532.3	5.5

[Nutritional Analysis] Per serving of 450g, recipe contains 4 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
104	Golden Liver-Protecting Soup	102	10.4	2.8	0.46	10.2	2.8	1082

Nutritional Analysis] Per serving of 206g, this recipe contains 1 serving

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Potassium
122	Fresh Vegetable Egg Drop Soup	108.6	9.4	6.2	1.9	6.6	2.4	516	414.8

Phosphorus	Calcium	Iron
162.2	126	2.4

[Nutritional Analysis] Per serving of 250g, this recipe contains 1 serving

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
152	Classic Middle Eastern Lentil Soup	152.9	8.9	3.4	0.7	26.9	5.3	521

[Nutritional Analysis] Per serving 208g, this recipe contains 2 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
168	Italian Vegetable Stew	89.0	3.5	2.8	0.4	14.5	1.1	136.4	2.4

[Nutritional Analysis] Per serving 420g, this recipe contains 4 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin A (IU)
180	Eye-Protecting Thick Soup	325	10.8	12.9	3.7	42	11	807	9469

[Nutritional Analysis] Per serving 450g, this recipe contains 1 serving

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
196	Energizing Vegetable Soup	33	0.6	2.2	0.4	3.3	0	223	1.5

[Nutritional Analysis] Per serving of 150g, this recipe contains 1 serving

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Potassium (mg)
220	Basil Green Zucchini Walnut Soup	196	6.5	16	2	12.5	1	62	957

Alpha-linolenic acid (18:3) (mg)
1015

[Nutritional Analysis] Per serving of 350g, this recipe contains 3 servings

	Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin B6 (mg)
230	Burdock Root, Red Date, and Goji Berry Soup	261	5.3	4.3	22.9	17.4	6.7	3.16	0.4

[Nutritional analysis] Per serving of 600g, this recipe contains 1 serving

Snack

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
88 Grain and Nut Crisp Biscuits	84.1	16	5.1	0.7	8.1	0.3	16.8

[Nutritional Analysis] Per serving of 18g, recipe contains 15 servings

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
106 Chickpea Deviled Egg Snack	143.2	8.6	10.6	2.7	4.2	0.1	278.7

[Nutritional Analysis] Per serving of 60g, this recipe contains 4 servings

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
124 Walnut Sweet Potato Pie	75.4	1.1	1.2	0.1	15.6	3.1	115.9	1.2

[Nutritional Analysis] This recipe makes 16 servings, each serving 45g

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Calcium
136 Golden Jade Steamed Dumplings	154.4	6	3.3	0.6	25.1	0.9	464.4	158.1

[Nutritional Analysis] Per serving 106 grams, this recipe contains 2 servings

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
154 Fennel Olive Oil Cookies	45	1.1	1.4	0.2	7.2	1.3	29	0.7

[Nutritional Analysis] Per serving 12g, this recipe contains 24 servings

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
170 Yogurt Tiramisu	275.8	7.1	20.4	3.9	20.0	12.7	70.2

[Nutritional Analysis] Per serving 165g, this recipe contains 2 servings

Snack

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Beta-carotene (μg)
182 Nut and Pumpkin Parent-Child Balls	84	3.2	5	0.6	11	1.5	10	455

[Nutritional Analysis] Per serving 30g, this recipe contains 10 servings

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
198 Banana Berry Smoothie	236	8.5	8.1	0.04	35	0	120	2

[Nutritional Analysis] Per serving of 320g, this recipe contains 1 serving

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin C (mg)
218 Green Tea Fruit Jelly Cake	172.3	0.6	0.2	0.0	42.6	7.4	3.3	34.0

[Nutritional Analysis] Per serving of 220g, this recipe contains 3 servings

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Cocoa Polyphenols (mg)
232 Red Berry Dark Chocolate	261	5.3	4.3	22.9	17.4	6.7	3.16	200~250

[Nutritional analysis] Per serving of 48g, this recipe contains 1 serving

Beverage

Recipe title	Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Calcium
138 Ginger Milk Curd	142.7	7.2	2.9	2	22.4	24.3	84.7	227.8

[Nutritional Analysis] Per serving 172 grams, this recipe contains 1 serving

※Data Source for Purine Content Calculation：Shmeul Halevi. Gout and Purine content in foods

[Recommendation Preface]

Environmental Protection and Simplicity: Vegetarianism to Save the Earth

By Yen Po-Wen, CEO of Tzu Chi Charity Foundation

My career had always been in the semiconductor industry. After joining Tzu Chi, deeply affected by frequent global disasters, I resolutely retired in June 2017, determined to follow Master Cheng Yen and devote myself fully to Tzu Chi, contributing to the sustainability of the Earth.

Looking back over the past three years, the COVID-19 pandemic, natural disasters, political conflicts, trade wars, and the Russia-Ukraine war have come one after another. Continuous global disasters have severely affected economic development and people's livelihoods. Inflation, in particular, has become a heavy burden on economically vulnerable countries and the lower strata of society following the pandemic. The Global Risk Report is released annually in January by the World Economic Forum (WEF), which gathers leaders from global business, politics, academia, and media. This report had alarmingly apt themes for three consecutive years from 2020 to 2022: "Unsettled World," "Fragmented Future," and "Worlds Apart." In retrospect, these annual forecasts were remarkably accurate and fitting.

The ranking of key global risks for the future by severity in the World Economic Forum report is worth noting. Among the top ten risks for the next decade, six are environmental risks: "Failure to mitigate climate change," "Failure to adapt to climate change," "Natural disasters and extreme weather," "Biodiversity collapse," "Natural resource crisis," and "Large-scale environmental damage." The environment that nurtures all life is at a critical moment, crying out for help and threatening all of humanity. The only solution now is to strengthen international cooperation and, more importantly, to demonstrate a more unified consensus and action on climate change. Moreover, each of us must start with ourselves: adopting vegetarianism, environmental protection, and a simple lifestyle. If everyone contributes, we can move towards sustainable development goals and restore vitality to the Earth.

To introduce more general public to the concept of vegetarianism for Earth protection and to lead the younger generation towards the vegetarian trend, Tzu Chi has created an all-vegetarian center called “Plantarium Complex Concept Hall” next to the busy Songshan Train Station. We hope that the opening of ‘Plantarium’ will provide a space where people can explore exhibitions, enjoy books, savor fresh food, relax, attend lec-

tures, and learn cooking. This will offer an immersive experience of the diversity, flavor, health benefits, and richness of vegetarian food, engaging all the senses and attracting individuals from all walks of life, ultimately growing the vegetarian community.

Bill Gates, in his book "How to Avoid a Climate Disaster," examines greenhouse gas emissions from major industries and finds that electricity accounts for 25% of emissions, ranking first. Agriculture follows closely at 24%, with the livestock industry responsible for meat supply accounting for 14.5%. Next are manufacturing at 21% and transportation at 14%. If we were to consider the number of cattle and their carbon emissions as a country, this "cattle nation" would rank third globally in greenhouse gas emissions, behind only China and the United States, and surpassing India (Source: UNFCCC, European Commission, UNFAO).

The book mentions that "the global climate has reached a point where we must properly manage methane emissions from livestock farming." What gives rise to the livestock industry? It's due to human appetite. These data make us more aware of the enormous impact of our daily meals on the Earth's health! Through vegetarianism, each of us can make decisions and contributions to net-zero carbon emissions every day. A vegetarian diet habit is a harmonious state of balance between humans and all living things in the ecosystem. Not only can it reduce many health risks that enter through the mouth, but it also proves that vegetarianism can protect the Earth's environment and coexist with nature. The urgency of environmental protection and promoting vegetarianism is relevant to every inhabitant of the Earth.

I remember when I was in graduate school and starting work, I began to explore Buddhism and spiritual issues. Over time, I naturally developed the idea of "not creating bad karma with animals." Later, due to busy work, I consulted a doctor for gastrointestinal discomfort. The doctor's answer left a deep impression on me. He told me that the solution to my symptoms had three parts: medication only accounted for one-third, one-third was psychological, and the remaining one-third relied on diet for fundamental improvement.

This opportunity prompted my wife and I to be proactive in trying out vegetarianism. Unexpectedly, after several vegetarian meals I always felt great in my body, particularly the digestive system. From then on, I took the initiative and decided not to eat meat anymore, and asked my wife to cook vegetarian meals, and tried to choose vegan or lacto-vegetarian food when dining out. Gradually, we transitioned to a fully vegetarian diet, fundamentally taking care of the whole family's health from body, mind, and spirit.

The Tzu Chi Medical Mission's purpose is to "protect life, protect health, and protect love." CEO Lin Chin-Lon, with his more than 40 years of clinical experience, realized that modern medicine can only treat the symptoms of cardiovascular diseases. After in-depth investigation, he found that vegetarianism is the healthiest diet, and therefore actively pro-

motes the concept of vegetarianism. He leads the Tzu Chi medical team to explore the relationship between vegetarianism and health using scientific methods. In papers published in international journals, they carefully explain that vegetarians have lower risks of cardiovascular diseases, gout, cholesterol and gallstones, depression, diabetes, and other conditions, and have reduced healthcare expenditure. The publication of this book is a collection and integration of international journal publications from the "Tzu Chi Vegetarian Cohort Database," allowing all friends who care about health, diet, and the Earth to read, verify, and use substantial research and data to firmly establish and promote vegetarianism.

In 2020, the appearance of the coronavirus caused global panic. Master Cheng Yen, unwilling to see all beings suffer from the epidemic, traced the root cause to human hearts and appetites. She then compassionately instructed that “great enlightenment” should replace “great disaster.” Reverently receiving this “great enlightenment education,” her audience appreciates that only environmental protection and simplicity are the best prescriptions for the Earth; only sincerity and vegetarianism are the best remedies for humanity.

[Author's Preface]

Scientific Research Validates the Benefits of Vegetarianism

By Dr. Lin Chin-Lon,
CEO of Buddhist Tzu Chi Medical Foundation and Cardiology Specialist

My medical career began in the United States. During my practice, I encountered many patients with coronary heart disease due to cardiovascular blockages. Their conditions kept recurring. After extensively reviewing literature, I discovered that a vegetarian diet was the solution. To convince patients to change their dietary habits, I took the lead and started a vegetarian diet myself. Upon trying it, I found that vegetarianism reduced the body’s burden without affecting my busy daily medical work. I’ve continued this diet to this day, for over 40 years now.

▲ CEO Dr. Lin Chin-Lon leads the Tzu Chi medical team in participating in the WHO "International Network of Health Promoting Hospitals and Health Services (HPH)," receiving numerous awards and recognition.

At that time, I noticed that much of the vegetarian-related literature came from the Seventh-day Adventist health research institutions. In Loma Linda, California, where many Seventh-day Adventists reside, 75% of the population is vegetarian.

Supermarkets and convenience stores there offer vegetarian versions of everything from burgers to hot dogs. You could say the residents have influenced and shaped a vegetarian-friendly city through their own dietary habits. It's also home to the world's largest vegetarian research database.

Inspired by Master Cheng Yen in 1995, I returned to Taiwan to serve as the vice superintendent of Hualien Tzu Chi Hospital. Despite the busy clinical work, I never neglected research. In 2000, I was appointed as the inaugural superintendent of Dalin Tzu Chi Hospital. There, I continued to lead the team in related research and established Tzu Chi's vegetarian cohort database, comparing vegetarians with non-vegetarians in relation to diseases, accumulating evidence-based results on vegetarian research in Taiwan.

◀The "World's Top 2% Scientists" list is jointly published by Stanford University and Elsevier. The 2022 list of scientists was announced at the end of 2023.

In the past 20 years, the World Health Organization (WHO) has given "health" a new definition. It's not merely the absence of disease or infirmity, but a state of complete physical, mental, and social well-being, enabling one to contribute positively to society. As written in the "Yellow Emperor's Inner Canon": "The inferior physician treats existing illness, the mediocre physician treats impending illness, and the superior physician prevents illness." This aligns with our three-step approach in healthcare. "Preventing illness" is proactive preventive medicine, or "health promotion." Through our years of scientific research, we have indeed confirmed that a vegetarian diet is an excellent method for health promotion.

I'm grateful to the colleagues in the Humanities and Communications Office for their efforts in compiling this book, making the results of complex research papers understandable to a wider audience. Using easy-to-understand graphics and text, it presents the current vegetarian research findings of Tzu Chi Medical Foundation. Vegetarianism can help reduce the risk of ten major categories of diseases listed in this book. Some diseases, such as stroke, were selected after discussions and found feasible. Others were chosen to dispel social myths, like gout. Many people used to say that gout patients couldn't eat vegetarian because beans are high in purines. So we conducted specific research, and the results clearly showed that vegetarians have lower uric acid levels in their blood compared to non-vegetarians. Gout is not the fault of bean-based foods.

Cataracts are an eye disease caused by oxidation, which makes the lens cloudy. A vegetarian diet relatively slows down the body's oxidation

process, so vegetarians have a lower incidence of cataracts compared to non-vegetarians. Research in the UK has also shown that vegetarians have a lower incidence of cataracts.

As for urinary tract infections, vegetarians also have a lower incidence. This is mainly due to intestinal bacteria, as the human genitals are close to the anus, and cleaning may cause intestinal bacteria to enter the urinary tract. I simply put it this way: "The E. coli in vegetarians are benign; in meat-eaters, they are more aggressive." So, unfavorable intestinal bacteria can cause urinary tract infections.

The relationship between depression and vegetarianism is also related to intestinal bacteria. The "gut-brain axis" theory is gradually being proven. Intestinal bacteria affect the communication between the gut and the brain, influencing overall health. Therefore, the composition of intestinal flora is the second major topic in our ongoing research. We hope to study the relationship between vegetarians, non-vegetarians, and different intestinal flora compositions in the future.

A British cohort study on the correlation between IQ and social status unexpectedly found that people with higher IQs were more likely to be vegetarian. This prompted us to consider researching the relationship between vegetarianism and genetics, leading to our collaboration with Academia Sinica on vegetarian gene sequencing research.

In recent years, the COVID-19 pandemic has disrupted the world's rhythm. During this time, research has shown that vegetarians have a much lower rate of developing severe symptoms when infected. This research includes evidence from a paper by the Taipei Tzu Chi Hospital team. Also recognized is that meat consumption requires the raising of large numbers of animals. The entire livestock industry cycle has already caused global greenhouse effects and extreme climate events, and has also destroyed biodiversity on Earth, with species disappearing daily. If one more person becomes vegetarian and stops eating meat, there's a chance to save one more species. Vegetarianism is closely related to protecting life. The compassion that makes us unable to bear harming others motivates us to work harder in promoting vegetarianism.

Looking back, my life's direction changed when I received my first copy of "Master Cheng Yen's Tzu Chi World," a small yellow-covered booklet. After my first visit to the Jing Si Abode in Hualien and personally seeking advice from Master Cheng Yen, I became more certain that Tzu Chi represents "Buddhism in Action," fully aligning with the Buddhist spirit and form I had been seeking in my years of studying Buddhism. Master Cheng Yen's transformation of compassionate relief ideals into concrete actions deeply moved me as a pragmatic person.

Before joining Tzu Chi, I had already been vegetarian for many years, providing a good example to my patients of healthy living. After joining Tzu Chi, I followed in the footsteps of the Master, fulfilling my duties in free clinics and medical care, while also putting more effort into promoting vegetarianism and expanding scientific research. In the future, my wish is to sustainably promote vegetarianism and scientific research, improve the medical well-being of people in Hualien and Taitung, promote good health promotion concepts, optimize medical information, and

benefit others while also benefiting ourselves.

I would like to thank all the doctors, scholars, researchers, statistical analysts, IT engineers, and nutritionists who participated in the research and publication of papers, jointly presenting Taiwan's vegetarian research results in internationally renowned journals. I also take this opportunity to thank Professor Chiu Hui-Ting, Secretary-General of the Taiwan Vegetarian Nutrition Society, for her long-term research cooperation. I'm grateful to Yan Bo-Wen, CEO of the Tzu Chi Foundation, for contributing to this book amidst his busy schedule, and to Jing Si Publications for their assistance in publishing.

I'm thankful to the vegetarian doctors from various Tzu Chi hospitals for their personal testimonies, though space limitations prevent us from sharing the dietary and life experiences of all Tzu Chi vegetarian doctors. I'm grateful to the nutritionists at Hualien Tzu Chi Hospital for designing recipes and explaining ingredient components. Thanks to the Yuan-Liou Publishing editorial team for photographing the beautiful recipes, encouraging the preparation of nutritious vegetarian meals at home for the whole family to enjoy vegetarianism and good health together.

Promoting good health is actually quite simple. Readers only need to adopt correct dietary methods, coupled with good lifestyle habits, appropriate exercise, and sufficient leisure and sleep. Countless doctors worldwide have invested in scientific research and published papers proving the health benefits of vegetarianism. We will continue to accumulate scientific evidence and promote vegetarianism.

▲ Dr. Lin Chin-Lon was invited to participate in the Legislative Yuan's public hearing on promoting sustainable healthy diets and carbon reduction benefits, where he promoted three major benefits of a vegetarian diet.

PART 1

Vegetarianism Safeguards Cardiovascular Health

Vegetarianism as a Cure for Coronary Heart Disease, Initiating Evidence-Based Research in Taiwan

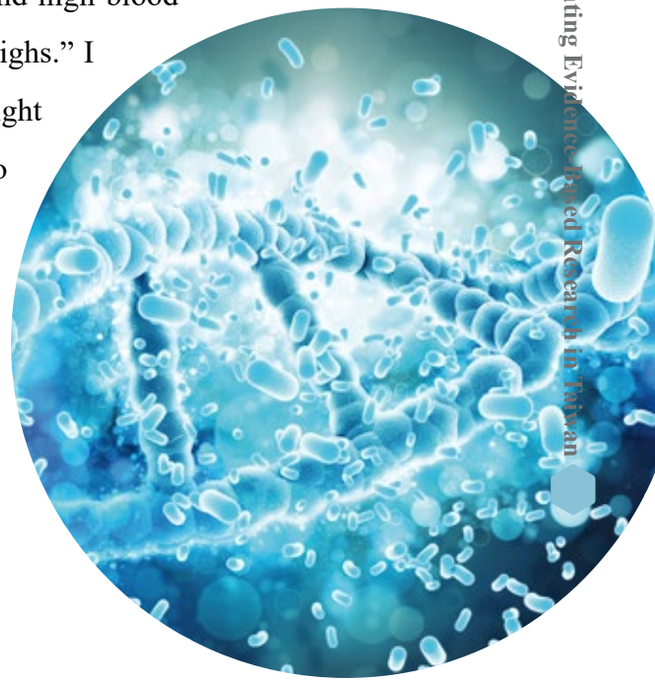
I have been a cardiologist for over 45 years. Heart disease occurrence has not decreased; instead, it has gradually increased with economic prosperity. The severity of the disease hasn't diminished either. This is because people are eating too richly, with the establishment of various all-you-can-eat restaurants causing nutritional excess, especially the over-consumption of meat, sugar, and starch. These factors have contributed significantly to cardiovascular diseases and diabetes consistently ranking among the top ten causes of death.

Looking back at Taiwan's top ten causes of death in 2022, cancer and heart disease dominate the top two spots, as they have for many years. Cerebrovascular disease and diabetes, ranked fifth and sixth respectively, slipped one spot in the ranking due to COVID-19, but their annual growth rates are among the highest. Hypertensive diseases, ranked second, increased by 10.6%, while heart disease, ranked third, increased by 8.3%, and diabetes, ranked fourth, increased by 7.3%. (Source: 2021 National Cause of Death Statistics)

There are many types of heart disease, including congenital heart disease, rheumatic heart disease, and coronary artery disease. In the past 40-50 years, cases of congenital heart disease have decreased. With the invention of antibiotics, rheumatic heart disease became curable, and cases have also decreased. The majority of remaining cases are coronary artery disease.

Coronary artery disease is mainly caused by atherosclerosis. When I practiced in the United States 50 years ago, before the advent of stent placement and balloon angioplasty, the only treatment for coronary heart disease was surgery. However, patients would relapse after a few years, requiring repeated surgeries. Eventually, they would run out of usable blood vessels from their arms and legs for coronary bypass, yet still suffer from recurrence...

The root causes of cardiovascular disease are high cholesterol (hyperlipidemia), high blood sugar, and high blood pressure - the well-known "three highs." I would add a fourth: "high body weight obesity." These "four highs" lead to patients repeatedly seeking treatment for the same cardiovascular problems, which made me consider whether there might be a better solution. I first understood



that surgery only treats the symptoms, not the root cause. So I went to the library to search for information and literature, discovering that the solution starts with diet.

Many international research studies support the undoubted fact that vegetarianism is the best method to treat coronary heart disease. I began teaching my patients to eat vegetarian both before and after surgery, adopting a "three low, one high" dietary pattern - low salt, low oil, low sugar, and high fiber. The results were quite good, with patients' recurrence rates decreasing. So when I returned to Taiwan from the United States in 1996, I brought this concept back, promoting vegetarianism to patients in the cardiology clinic, and began using scientific methods to prove the beneficial effects of a vegetarian diet.

In 2000, when I became the superintendent of Dalin Tzu Chi Hospital, research on vegetarian diet papers continued unabated. In 2005, we began establishing a vegetarian cohort database and successively launched a series of vegetarian cohort studies. By linking with the national health insurance database for more in-depth analysis, we had published 17 papers by March 2022. Doctors from various Tzu Chi Medical Foundation hospitals have also successively engaged in vegetarian research, publishing excellent results.

The latest advance in the Tzu Chi vegetarian cohort database research is collaborating with Academia Sinica to collect Taiwan's gene bank data for genetic sequencing, aiming to understand the relationship between vegetarianism, genes, and disease development. One major theme is research on gut bacteria, hoping to classify bacterial flora through bacterial DNA and then conduct genetic mapping to prove that the bacterial flora of vegetarians may cultivate "probiotics" that are beneficial to the body.

A vegetarian diet helps maintain physical, mental, and spiritual health, as well as protect the Earth and natural ecosystems. Through scientific evidence, we aim to guide more people, perhaps everyone in the world, to choose a vegetarian diet as a normal lifestyle, so that the lives of all animals no longer become food for human consumption. This is our ultimate goal.

Before establishing the Tzu Chi vegetarian cohort database, I completed and published three vegetarian research papers. Atherosclerosis was the first vegetarian research topic I worked on after returning to Taiwan, resulting in two published research papers. The first research paper was accepted by the journal "Atherosclerosis" in December 2000 and published in 2001, titled "Vascular dilatory functions of ovo-lactovegetarians compared with omnivores."

Another paper, "Insulin sensitivity in Chinese ovo-lactovegetarians compared with omnivores," was published in the "European Journal of Clinical Nutrition" in 2004, focusing on diabetes research.

Vegetarians' blood vessel elasticity is four times higher than that of meat-eaters

The main cause of atherosclerosis is deterioration of endothelial cell function. Originally soft and elastic blood vessels gradually harden, with cholesterol in the body accumulating under the endothelial cells, causing buildup. The elasticity of the blood vessel walls worsens, eventually becoming blocked, which is medically termed “cardiovascular thrombosis,” easily leading to myocardial infarction.

We invited 40 medical volunteers on duty at Hualien Tzu Chi Hospital to participate in our study: 20 vegetarians and 20 non-vegetarians, with an equal number of males and females of the same age group. They signed consent forms to participate in the research, which aimed to compare the differences in endothelial cell function between meat-eaters and vegetarians.

Some might question how a sample size of 20 people per group can represent billions of people on Earth. Statistics tell us that as long as there is a significant statistical difference, a sample size of 20 is sufficient.

I applied a method used abroad to examine endothelial cell function. Using a blood pressure cuff to tightly constrict the arm, blocking blood flow, and then releasing it, the blood vessels would dilate. Measuring the difference in blood vessel diameter before and after constriction represents the quality of endothelial cell function.

When the blood pressure cuff tightly constricts the arm and blood flow temporarily stops, an ultrasound is taken. After 3 minutes of release, when the blood vessels regain elasticity, another ultrasound is taken. Measuring the thickness of the blood vessel diameter in the ultrasound images before and after, a greater difference in diameter indicates better blood vessel elasticity and better endothelial cell function. Each participant underwent this research process once, taking about half a day. We are very grateful for their assistance and cooperation.

The research results showed that vegetarians’ blood vessel elasticity was four times better than that of meat-eaters, and the longer they had been vegetarian, the better the elasticity. These results are encouraging, showing the undoubted benefits of vegetarianism. “Vascular dilatory functions of ovo-lactovegetarians compared with omnivores” was my first-hand, first scientific evidence-based vegetarian paper obtained from clinical research in Taiwan.

[ACADEMIC PAPER]

Vascular dilatory functions of ovo-lactovegetarians compared with omnivores

PUBLICATION Atherosclerosis 158 (2001) 247251

doi 10.1016/S0021-9150 (01) 00429-4

Authors Chin-Lon Lin (then Supt. of Dalin Tzu Chi Hospital), Te-Chao Fang, Mein-Kai Gueng

[Abstract]

Vegetarians have lower blood pressure and lower cardiovascular mortality. Vegetarian diets may have lower cardiovascular risks through positive influence on endothelium-dependent relaxation and related functions. The objectives of this study were to assess the differences of vascular dilatory functions between middle-aged vegetarians and sex and age-matched omnivores before they develop any clinical manifestations of atherosclerosis. Twenty healthy vegetarians over the age of 50 and 20 healthy omnivores over the age of 50 were recruited for this study. Subjects with known risk factors for atherosclerosis such as hypertension, diabetes, obesity, hypercholesteremia, cigarette smoking, family history of vascular diseases, or taking any regular medication were excluded. Medical history, body weight, height, and duration of vegetarian diet were recorded. Baseline CBC, urinalysis and biochemical data such as fasting blood glucose, thyroid function, blood urea nitrogen, creatinine, serum electrolytes (sodium, potassium, chloride, calcium and magnesium), lipid profiles [total cholesterol, triglycerides, high density lipoprotein (HDL) cholesterol, low density lipoprotein (LDL) cholesterol] were obtained after a 14 h fast. Blood pressures and heart rate were recorded in supine position. Vascular dilatory functions, both flow-mediated (endothelium-dependent) and nitroglycerin-induced (endothelium-independent), were evaluated by using a non-invasive ultrasonographic method. The results show that there were no significant differences in the baseline characteristic between the vegetarians and the omnivores. There were also no significant differences in serum glucose, lipid profiles and thyroid function between these two groups. However, vasodilatation responses (both flow-mediated and nitroglycerin-induced) were significantly better in the vegetarian group and the degree of vasodilatation appeared to be correlated with years on vegetarian diets. Our findings suggest that vegetarian diets, by themselves, have a direct beneficial effect on vascular endothelial and smooth muscle function and may help to account for the lower incidence of atherosclerosis and cardiovascular mortality. 2001 Elsevier Science Ireland Ltd. All rights reserved.

Insulin Resistance Sensitivity: Vegetarianism Keeps Diabetes at Bay

For my second vegetarian research paper, I chose diabetes as the topic.

There are two types of diabetes. Type 1 diabetes is congenital and characterized by insufficient insulin production. Most people, however, develop Type 2 diabetes later in life.

Generally, people only perceive that diabetes is caused by high blood sugar levels. In fact, diabetes develops due to the body's insufficient sensitivity to insulin. Insulin's function is to lower blood sugar. Type 2 diabetics don't lack insulin in their blood; rather, their bodies are not sensitive enough to insulin, making it unable to eliminate excess blood sugar. Therefore, the treatment for diabetics is to provide them with several times the normal amount of insulin, making the concentration high enough to activate the insulin in the cells to process blood sugar.

For example, if two people have the same amount of insulin, a diabetic person who is insensitive to insulin will not respond well to it, resulting in high blood sugar levels. So we compared fasting and post-insulin injection blood test data between vegetarian and non-vegetarian control groups to observe the differences.

The research results were also very encouraging. Vegetarians showed higher insulin sensitivity compared to non-vegetarians, and the longer they had been vegetarian, the better their sensitivity.

[ACADEMIC PAPER]

Insulin sensitivity in Chinese ovo-lactovegetarians compared with omnivores

PUBLICATION European Journal of Clinical Nutrition (2004) 58,312316.

doi 10.1038/sj.ejcn.1601783

Authors Chin-Lon Lin (then Supt.of Dalin Tzu Chi Hospital) , Chin-Sung Kuo (then Director of Endocrinology and Metabolism Dept., Dalin Tzu Chi Hospital), Ning-Sheng Lai (Supt.of Dalin Tzu Chi Hospital), Low-Tone Ho (Dr. of Endocrinology and Metabolism Dept., Taipei Veterans General Hospital)

[Abstract]

Aim To compare the insulin sensitivity indices between Chinese vegetarians and omnivores.

Methods The study included 36 healthy volunteers (vegetarian, n19; omnivore, n17) who had normal fasting plasma glucose levels. Each participant completed an insulin suppression test. We compared steady-state plasma glucose (SSPG), fasting insulin, the homeostasis model assessment for insulin sensitivity (HOMA-IR and HOMA %S) and β-cell function (HOMA %β) between the groups. We also tested the correlation of SSPG with years on a vegetarian diet.

Results The omnivore subjects were younger than the vegetarians (55.7±3.7 vs 58.6±3.6 year of age, P = 0.022). There was no difference between the two groups in sex, blood pressure, renal function tests and lipid profiles. The omnivores had higher se-

rum uric acid levels than vegetarians (5.25±0.84 vs 4.54±0.75 mg/dl, P = 0.011). The results of the indices were different between omnivores and vegetarians (SSPG (mean±s. d.) 105.4±10.2 vs 80.3±11.3 mg/dl, P < 0.001; fasting insulin, 4.06±0.77 vs 3.02±1.19 μU/ml, P = 0.004; HOMA-IR, 6.75±1.31 vs 4.78±2.07, P = 0.002; HOMA %S, 159.2±31.7 vs 264.3±171.7%, P = 0.018) except insulin secretion index, HOMA %β (65.6±18.0 vs 58.6±14.8%, P = 0.208). We found a clear linear relation between years on a vegetarian diet and SSPG (r = -0.541, P = 0.017).

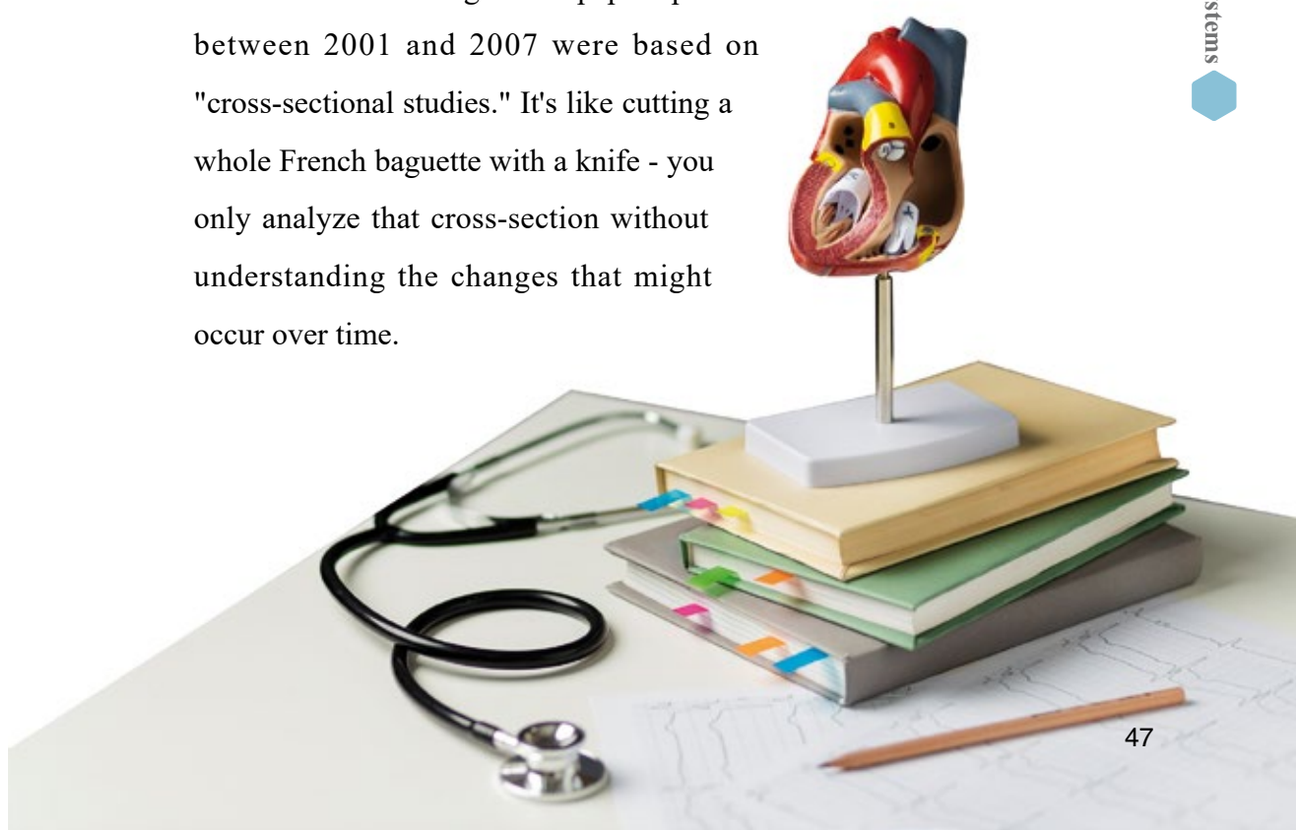
★ Conclusions ★

The vegetarians were more insulin sensitive than the omnivore counterparts. The degree of insulin sensitivity appeared to be correlated with years on a vegetarian diet.

Taiwanese Vegetarians Have Healthier Cardiovascular Systems

The third research paper was published in 2007, focusing on cardiovascular disease risk, and like the second paper, it was published in the European Journal of Clinical Nutrition. We invited 200 participants at Dalin Tzu Chi Hospital; two were later disqualified, leaving us with 198 participants, evenly split between vegetarians and non-vegetarians for comparison. We measured fasting blood pressure, low-density and high-density cholesterol, and triglyceride levels as baseline indicators for comparing cardiovascular conditions. Overall results showed that vegetarians had a lower risk of cardiovascular disease.

The first three vegetarian papers published between 2001 and 2007 were based on "cross-sectional studies." It's like cutting a whole French baguette with a knife - you only analyze that cross-section without understanding the changes that might occur over time.



Through these three papers, we discovered that longer periods of vegetarianism might lead to better health. So I conceived of establishing a vegetarian cohort research database. This database could contain accumulated data from the same research subjects over ten or twenty years, allowing research results to withstand the test of time. This would make the verification more meaningful and provide an opportunity to identify correlations between causes and effects.

[ACADEMIC PAPER]

Total cardiovascular risk profile of Taiwanese vegetarians

PUBLICATION European Journal of Clinical Nutrition

doi 10.1038/sj.ejcn.1602689

Authors C-W Chen, Y-L Lin, T-K Lin, C-T Lin, B-C Chen and C-L Lin

[Abstract]

Background Although the health benefits of vegetarian diets have been well documented among Western population, there are geographic differences of vegetarian diets and the health benefits of the Taiwanese vegetarian diet have not been studied extensively. In addition to conventional risk factors, homocysteine and high-sensitivity C-reactive protein (hs-CRP) levels have been found to predict first atherothrombotic events. We undertook this study to examine the total risk profile of Taiwanese vegetarians.

Methods A total of 198 healthy subjects (99 vegetarians and 99 omnivores) were recruited. Fasting blood samples were analyzed for glucose, cholesterol, triglyceride, high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), white blood cell count, hs-CRP and homocysteine.

Results There was no significant difference in age, body mass index, blood glucose, white blood cell count, triglyceride and HDL-C between the two groups. The vegetarian group had significantly more females (65.7 vs 46.5%); lower body weight (58.66711.13 vs 62.88712.24 kg); shorter height

(159.1477.88 vs 162.5378.14 cm); lower total cholesterol (184.74733.23 vs 202.01741.05 mg/dl); and lower LDL-C (119.63731.59 vs 135.89739.50 mg/dl). Hs-CRP was significantly lower (0.1470.23 vs 0.2370.44 mg/dl, P0.025), whereas homocysteine was significantly higher (10.9776.69 vs 8.4472.50 mmol/l, P0.001) in vegetarians than omnivores.

Conclusions

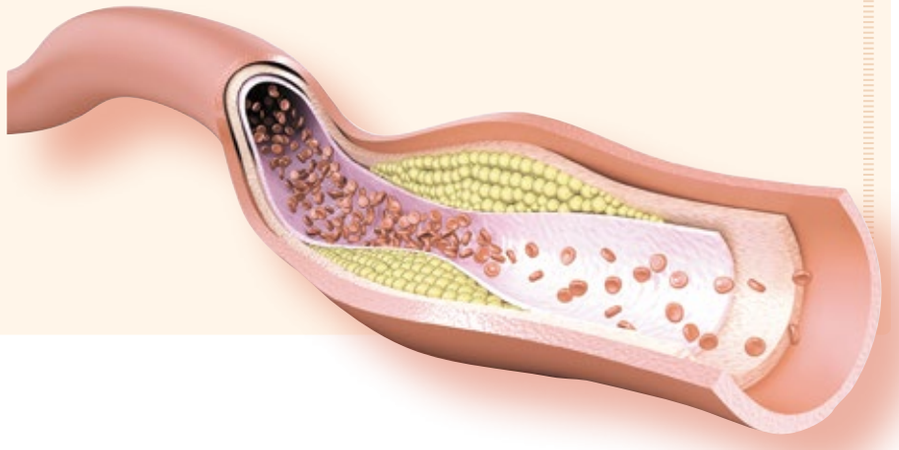
Taiwanese vegetarians have lower total cholesterol, LDL-C and hs-CRP levels, and higher homocysteine levels than omnivores. Owing to different predictive value of each risk factor, the Taiwanese vegetarians had a better cardiovascular risk profile than omnivores. Whether the Taiwanese vegetarian diet should be supplemented with vitamin B12 to lower serum homocysteine level remains to be addressed.

Atherothrombosis

In the human circulatory system, the walls of arteries thicken and gradually lose elasticity with age. If fat intake is too high, cholesterol accumulates on the inner walls of arteries, forming "atherosclerotic plaques" that resemble sticky porridge. This causes the arteries to narrow, leading to blockages, a condition known as "atherosclerosis."

If the hardened plaques in the arteries rupture, platelets rush to accumulate in large numbers at the site of damage within the blood vessel, forming a blood clot. This can completely block the blood vessel in a very short time, potentially causing sudden death. Atherothrombosis can lead to the occurrence of various cerebrovascular or cardiovascular diseases.

When a narrowed part of an artery is suddenly completely blocked by a blood clot, it reduces the heart's ability to pump blood, causing heart muscle cells to die from lack of oxygen. Patients may experience severe chest pain, angina, cold sweats, and other symptoms - this is what we call a "myocardial infarction" or heart attack.



A Doctor's Best Choice Without Regrets

By Yu Cheng-Chan,

Director of General Surgery & Deputy Supt., Taichung Tzu Chi Hospital

As I grew older and became more aware, a thought occurred to me: animals, like humans, have brains and nervous systems. If humans feel pain when injured and fear death, animals probably do too. So, in my first year of high school, I decided to become vegetarian and stop eating meat.

At that time, my parents strongly opposed this decision. They were worried about my nutrition as I was still growing and studying hard. Unable to change my mind, they agreed to let me eat a "flexitarian" diet at first. Initially, I struggled with the transition, even dreaming about eating chicken legs.

As a general surgeon, my expertise lies in digestive tract and hepatobiliary pancreatic surgery, laparoscopic surgery, and specialized treatments for breast, thyroid, and hernia conditions. Many people worry that not eating meat will lead to insufficient strength, but I've been vegetarian

for over 30 years. Even during long, strenuous surgeries where I need to stand for extended periods, I don't experience any lack of strength. In fact, I can concentrate better. The truth is, vegetarians who maintain a balanced diet don't suffer from malnutrition.

Previously, there were misconceptions about vegetarian diets, assumptions that they consisted of rice porridge with pickles or lots of processed mock meats. These are very unhealthy choices. Instead, if one chooses a variety of colorful vegetables and fruits, many medical studies have proven their benefits for detoxification, antioxidation, and cancer prevention.

For example, among dark green vegetables, I enjoy sweet potato leaves, water spinach, and asparagus lettuce. I also eat purple eggplants, taro, white yams; balancing vegetables and fruits of various colors. Soy milk and tofu are excellent sources of protein.

In recent years at Taichung Tzu Chi Hospital, I've performed surgeries on many gastric cancer patients in their 80s and 90s, encouraging them to adopt a vegetarian diet. Cancer is the leading cause of death, and many carcinogenic factors are related to the westernization of diets, such as excessive intake of animal fats and proteins.

Medical research has found that when cancer cells grow to about the size of a pen tip, they start to "connect to utilities," continuously proliferating blood vessels to grow larger. At this stage, doctors prescribe "angiogenesis inhibitors" to suppress the growth of new blood vessels in cancer cells, causing them to wither due to lack of nutrition. Many nutrients found in vegetables and fruits have angiogenesis inhibiting effects, such as soy isoflavones in soybeans, resveratrol in grapes, lycopene in tomatoes, and catechins in green tea. Moreover, the fiber in fruits and vegetables is crucial for the growth of good bacteria in our bodies, improving gut flora and enhancing overall health. Eating more plant-based meals is the best anti-cancer medicine, "cutting off the utilities" of cancer cells and boosting the body's immune system.

Plants contain many phytochemicals and high levels of antioxidants, which have numerous health benefits. On the other hand, meat contains many carcinogens, increases the risk of atherosclerosis, causes chronic inflammation in the body, and can lead to gut flora imbalance. Therefore, a plant-based diet is medically recognized as the healthiest diet.

Although I initially chose vegetarianism out of love for animals, after joining the vegetarian work environment at Tzu Chi Hospital, I discovered even more health benefits of a vegetarian diet. This has strengthened my belief that vegetarianism is the best choice I've made, both as a doctor and personally, and I have no regrets about my choice.

PART 2

The World's Third Largest Vegetarian Cohort Database

Tzu Chi Vegetarian Cohort Database, Linked to National Health Insurance Big Data

In 2005, we applied for a research project from the Department of Health to understand the relationship between vegetarian diets and cancer incidence. I invited Dr. Lin Ming-Nan, who started working at Dalin Tzu Chi Hospital on March 1st, to take on this task and lead the research project.

At that time, Professor Chen Kuan-Ju from the Department of Food and Nutrition at Chung Hwa University of Medical Technology was a doctoral student under the guidance of Professor Pan Wen-Han, a research fellow at Academia Sinica and an expert on Taiwan's dietary research. We thank Professor Chen for providing the "Food Frequency Questionnaire" (FFQ). After adjusting the questionnaire design, we began the survey. We sent 20,000 paper questionnaires to Tzu Chi offices across Taiwan and received 12,062 valid responses from Tzu Chi volunteers, their families, and Tzu Chi members.

Designing the "Food Frequency Questionnaire" for Voluntary Completion

Willing participants filled out the questionnaire and mailed it back. The basic information in the questionnaire included: national ID number, basic health status (presence of chronic diseases), medication status, family history, etc. Additionally, the questionnaire covered lifestyle habits such as exercise, smoking, drinking, and betel nut chewing to understand cancer risk factors. The dietary survey questions included: vegetarian or non-vegetarian diet, types of vegetables and fruits consumed, and frequency of consumption of various foods over the past month.

2005 First Database	2007-2009 Second Database
Tzu Chi Vegetarian Study (TCVS)	**Tzu Chi Health Study** (TCHS)
Sample size: **12,062** people	Sample size: **6,002** people

One-on-One Interviews, Linking Health Examination Data with National Health Insurance Database

From 2007 to 2009, there were 6,002 valid interviewees, 77% of whom were Tzu Chi volunteers and 23% were from the general public. The subjects were those who came to Dalin Tzu Chi Hospital for health examinations. Certified Tzu Chi volunteers can register for free health check-ups at four major Tzu Chi hospitals every two to three years. Tzu Chi volunteers follow precepts that include abstaining from smoking and alcohol, and they are encouraged to follow a vegetarian diet due to compassion for life and environmental protection.

All health examination participants underwent a two-day, one-night check-up. Height was measured using the same instrument, weight and body fat were measured using bioelectrical impedance analysis, and venous blood was drawn the following morning after fasting to record fasting blood glucose levels.

This large-scale research project targeted 6,002 people with an average age of 53 from the hospital's health examination center. It first established each person's height, weight, body fat, bone density, and examination reports including colonoscopy, gastroscopy, ultrasound, and blood tests. It also included basic information such as education level, dietary habits, and family history. Research assistants with nutrition backgrounds helped with the "Food Frequency Questionnaire," thoroughly investigating each person's dietary patterns through more than 70 questions.

The Tzu Chi database is characterized by high homogeneity among participants, such as non-smoking and similar lifestyles, with the main difference being vegetarian or non-vegetarian diets. This allows for more credible comparisons of vegetarian and non-vegetarian diets as the main exposure risk factor, better demonstrating the impact and relationship of diet on health.

Professional nutritionists conducted one-on-one interviews with each subject, covering demographics, lifestyle, diet, leisure and exercise habits, and medical history. They also identified whether subjects had a family history of diabetes. Dietary habits were assessed using a 64-item Food Frequency Questionnaire (FFQ). Nutritional content calculations were based on Taiwan's food composition tables. Heme iron content was calculated as a percentage of total iron: 65% for beef and lamb, 39% for pork, and 26% for chicken and fish. Only those who had not eaten meat, fish, or any animal flesh for at least one year before data collection were considered vegetarians. Smokers were defined as those who had smoked in the past six months, and drinkers as those who consumed alcohol at least once a week.

This study was approved by the Institutional Review Board (IRB), and each subject signed a consent form. It took two years to collect, organize, and input the data into the database system. The data was verified after input to ensure accuracy.

This database of over 6,000 entries includes various health examination data and can be linked to the National Health Insurance database. Since Taiwan's National Health Insurance covers over 99% of the population, the linked data is very accurate. If needed, it can also be linked to Tzu Chi Hospital's medical records, which is also within our research scope.

When research subjects returned to the hospital for comprehensive health examinations three years later, we began to understand how their diets had changed. The study showed that compared to those who continued non-vegetarian diets, those who "switched from non-vegetarian to vegetarian" and "continued vegetarian diets" had a significantly reduced

incidence of diabetes by 3-50%, as well as reduced incidence of fatty liver and gallstones.

The Tzu Chi Vegetarian Cohort Database is the world's third-largest vegetarian database after the Adventist Health Study in the United States and the EPIC-Oxford study in Europe. Increasingly, research is proving that vegetarian diets greatly benefit human health and are environmentally friendly. Moving forward, the Tzu Chi medical team will explore clinical research and continue to track the effects of vegetarian diets on autoimmune rheumatic diseases, cardiovascular diseases, and other conditions to care for public health and prevent diseases. We also call on everyone to change their diet to live longer and happier lives while making the Earth's environment healthier.

Of course, for chronic diseases like diabetes, a small portion of people may not have sought medical treatment under their National Health Insurance identity, so the coverage rate is not as high as for diseases like stroke. Even though the follow-up rate in the database research is over 90%, there is still a small portion of people whose data cannot be linked to the National Health Insurance database.

Previous research methods involved sending out questionnaires again after five or ten years to survey the same subjects about changes during that period, with recovery rates typically around 50% at best. However, with the establishment of the vegetarian cohort database linked to the National Health Insurance database, we can track all data unless there are errors in national ID numbers, allowing for meaningful data comparisons.

Taiwan has many excellent databases, including mortality data and cancer staging information, with very high follow-up rates that are beneficial for research analysis. After applying the data, we can immediately know how many vegetarians and non-vegetarians have developed cancer, how many have died, what diseases they have contracted, and so on.

Our subsequent research mainly uses the second cohort database, with most studies utilizing both major databases. Compared to analyses using only the National Health Insurance database, our strength lies in having dietary pattern survey questionnaires.

Switching from a non-vegetarian to a vegetarian diet can reduce the incidence of diabetes by up to 50% and decrease the occurrence of fatty liver and gallstones! Tzu Chi Medical Mission has created the world's third-largest and Asia's most comprehensive "Vegetarian Nutrition Cohort Research Database"

In 2005, Vice Superintendent Lin Ming-Nan and I collaborated to apply for a diet and health research project from the Health Promotion Administration, gradually developing the world's third-largest database, which has become an important asset in international vegetarian nutrition research.

In February 2018, I led the Tzu Chi medical research team at the 7th International Congress on Vegetarian Nutrition in the United States. This

conference, held every five years, drew over 750 representatives from 36 countries and regions. Our team presented several papers, including "Vegetarian Diet Can Reduce the Incidence of Stroke."

Dr. Tina Chiu (Chiu Hsueh-Ting), Secretary-General of the Taiwan Vegetarian Nutrition Society, collaborating with international scholars, published a research paper in October 2019, highlighting the importance of the Tzu Chi Vegetarian Cohort Database for health research on vegetarians in Asia.

[ACADEMIC PAPER]

Vegetarian epidemiology: review and discussion of findings from geographically diverse cohorts

Database TCHS (Tzu Chi Health Study)

PUBLICATION Advances in Nutrition, Volume 10, Issue Supplement_4, November 2019, S284–S295.

doi 10.1093/advances/nmy109

Authors Michael J Orlich,Tina HT Chiu, Preet K Dhillon, Timothy J Key,Gary E Fraser, Krithiga Shridhar,Sutapa Agrawal,and Sanjay Kinra

[Abstract]

Epidemiologic cohort studies enrolling a large percentage of vegetarians have been highly informative regarding the nutritional adequacy and possible health effects of vegetarian diets. The 2 largest such cohorts are the European Prospective Investigation into Cancer and Nutrition–Oxford (EPIC-Oxford) and the Adventist Health Study–2 (AHS-2). These cohorts are described and their findings discussed, including a discussion of where findings appear to diverge. Although such studies from North America and the United Kingdom have been important, the large majority of the world's vegetarians live in other regions, particularly in Asia. Findings fromrecent cohort studies of vegetarians in East and South Asia are reviewed, particularly the Tzu Chi Health Study and Indian Migration Study. Important considerations for the study of the health of vegetarians in Asia are discussed. Vegetarian diets vary substantially, as may associated health outcomes. Cohort studies remain an important tool to better characterize the health of vegetarian populations around the globe.

Cultivating Wellness | A Doctor's Green Prescription

Vegetarian Diet Protects Kidneys and Promotes Health

By Wu Sheng-Teng

Deputy Superintendent and Nephrologist, Kuanshan Tzu Chi Hospital

When I was studying at Kaohsiung Senior High School, there was a vegetarian restaurant near the school run by a kind elderly lady who took good care of students. She served delicious food at very low prices for students, which helped me develop a habit of eating vegetarian food. At my university, as I socialized more with classmates, I didn't eat vegetarian as often, and I didn't eat vegetarian during my military service. However, after starting work at Dalin Tzu Chi Hospital, which provides a vegetarian-friendly environment, I resumed my vegetarian diet.

The hospital offers a variety of vegetarian options at affordable prices with no quantity limits. I also often dine at the hospital's "Taiwan Coffee" restaurant, where the food is delicious and perfect for enjoying alone after a shift. Since then, I've been working in the Tzu Chi medical missoin. Although the hospital doesn't enforce it, I've continued with a vegetarian diet because of the positive experience. It's been over ten years now.

The biggest change I noticed since becoming vegetarian is that I no longer have a strong drive to pursue gourmet food. When hungry, I can satisfy myself with simple foods like seaweed or unsweetened soy milk. I can maintain focus on mundane things more easily, notice subtle changes, and have more stable emotions.

As a nephrologist in clinical practice, I often recommend vegetarian diets to chronic kidney disease patients. A vegetarian diet can reduce uremic toxin production, alter gut flora, lower oxidative stress, and slow down kidney function deterioration. Uremic toxins are harmful substances that accumulate in the body when kidney function is impaired, usually from waste products generated during meat digestion. Adopting a vegetarian diet can reduce the production of these waste products, thereby lowering uremic toxin generation and helping to

protect the kidneys.

Vegetarian diets are rich in antioxidants such as vitamins E, C, and anthocyanins. These anti-inflammatory substances can reduce intestinal inflammation and minimize kidney damage. Additionally, dietary fiber itself has anti-inflammatory properties, further contributing to maintaining gut health. To maintain a healthy vegetarian diet, the first key is to ensure adequate protein intake. Obtaining protein from various plant sources, such as legumes, whole grains, nuts, and seeds, ensures the intake of all essential amino acids. The second point is to supplement vitamin B12, which can be found in yogurt, seaweed, and eggs. However, in my experience, maintaining adequate exercise and sleep is much more effective than taking multivitamin supplements.

I offer these personal experiences as a reference for those preparing to start a vegetarian diet. I hope everyone can eat nutritiously and achieve good health through their diet!

NOTE

PART 3

Evidence of Disease Reduction Through Vegetarian Diet

We encourage the Tzu Chi medical team to engage in vegetarian-related research, utilizing the Tzu Chi Vegetarian Cohort Database linked with Taiwan's National Health Insurance Database for analysis. From 2014 to 2022, based on publication dates, 14 papers have been released, with more continuously being added.

Based on these 14 papers, we have identified ten major disease topics. In addition to providing Chinese translations of the paper abstracts, we have invited doctors from various Tzu Chi hospitals to share their research and experiences with vegetarian diets. The nutrition team from Hualien Tzu Chi Medical Center has also offered nutritional advice for each disease, designing creative and nutritious meals that are both delicious and healthy.

1.Diabetes

[ACADEMIC PAPER]

Taiwanese vegetarians and omnivores: dietary composition, prevalence of diabetes and IFG

Database TCHS (Tzu Chi Health Study)

Publication PLoS One. 2014; 9（2）：e88547.

doi 10.1371/journal.pone.0088547

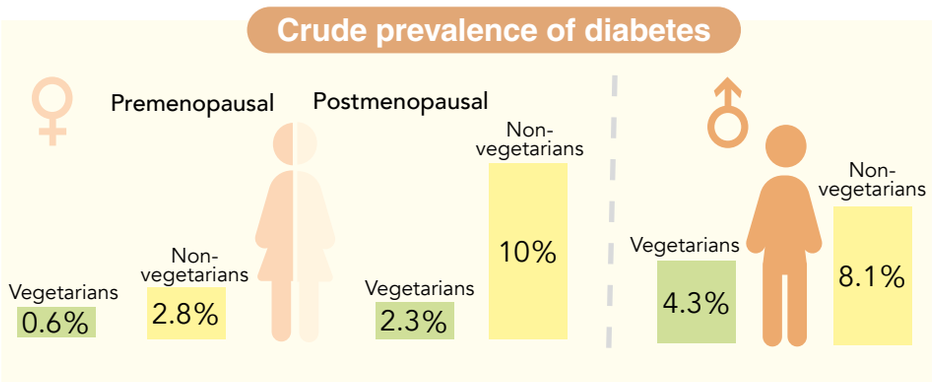
Authors Tina H. T. Chiu, Hui-Ya Huang, Yen-Feng Chiu, Wen-Harn Pa, Hui-Yi Kao, Jason P. C. Chiu, Ming-Nan Lin, Chin-Lon Lin

[Abstract]

Introduction Vegetarian diets have been shown to improve glucose metabolism and reduce risk for diabetes in Westerners but whether Chinese vegetarian diets have the same benefits is unknown.

Methods We evaluated the association between diet and diabetes/impaired fasting glucose (IFG) among 4384 Taiwanese Buddhist volunteers and identified diabetes/IFG cases from a comprehensive review of medical history and fasting plasma glucose.

Results Vegetarians had higher intakes of carbohydrates, fiber, calcium, magnesium, total and non-heme iron, folate, vitamin A, and lower intakes of saturated fat, cholesterol, and vitamin B12. Besides avoiding meat and fish, vegetarians had higher intakes of soy products, vegetables, whole grains, but similar intakes of dairy and fruits, compared with omnivores.



Conclusions

We found a strong protective association between Taiwanese vegetarian diet and diabetes/IFG, after controlling for various potential confounders and risk factors.

[ACADEMIC PAPER]

Vegetarian diet, change in dietary patterns, and diabetes risk: a prospective study

Database TCHS (Tzu Chi Health Study)

Publication Nutrition and Diabetes (2018) 8:12

DOI 10.1038/s41387-018-0022-4

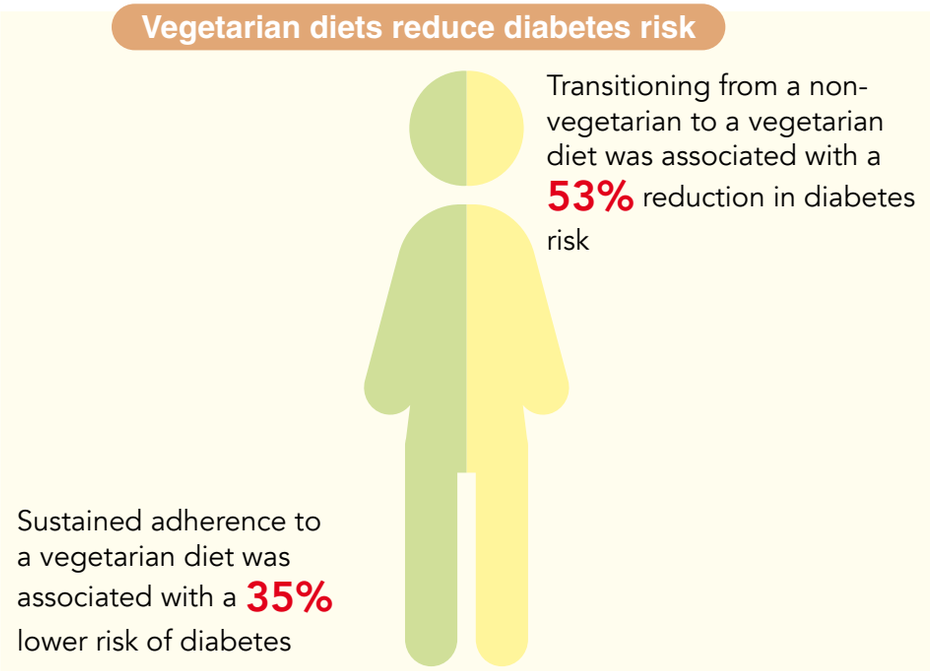
Authors Tina H. T.Chiu, Wen-Harn Pan, Wen-Harn Lin, and Chin-Lon Lin

[Abstract]

Background/objectives Vegetarian diets are inversely associated with diabetes in Westerners but their impact on Asianswhose pathophysiology differ from Westernersis unknown. We aim to investigate the association between a vegetarian diet, change in dietary patterns and diabetes risk in a Taiwanese Buddhist population.

Methods We prospectively followed 2918 non-smoking, non-alcohol drinking Buddhists free of diabetes, cancer, and cardiovascular diseases at baseline, for a median of 5 years, with 183 incident diabetes cases confirmed. Diet was assessed through a validated food frequency questionnaire at baseline and a simple questionnaire during follow-ups. Incident cases of diabetes were ascertained through follow-up questionnaires, fasting glucose and HbA1C. Stratifie Cox Proportional Hazards Regression was used to assess the effect of diets on risk of diabetes.

Results Consistent vegetarian diet was associated with 35% lower hazards (HR: 0.65, 95% CI: 0.46, 0.92), while converting from a nonvegetarian to a vegetarian pattern was associated with 53% lower hazards (HR: 0.47, 95% CI: 0.30, 0.71) for diabetes, comparing with nonvegetarians while adjusting for age, gender, education, physical activity, family history of diabetes, follow-up methods, use of lipid-lowering medications, and baseline BMI.



Conclusions

Vegetarian diet and converting to vegetarian diet may protect against diabetes independent of BMI among Taiwanese.

Plant-Based Diet Reduces Risk of Diabetic Nephropathy

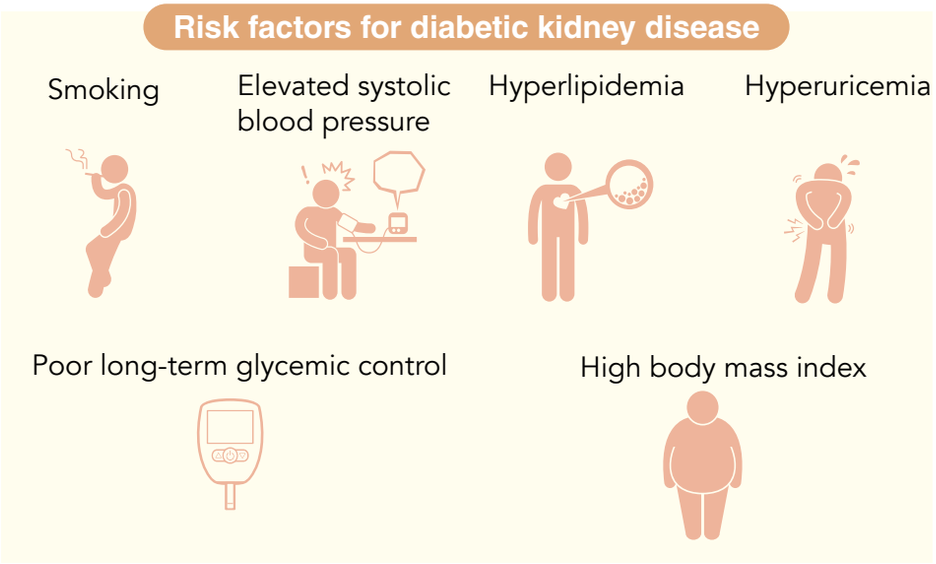
Taiwan's diabetic population continues to grow, now exceeding 2 million people. Diabetic patients with unstable blood sugar control are prone to kidney damage, leading to chronic kidney disease and potentially end-stage renal disease requiring dialysis to maintain kidney function. Dr. Kuo Ko-Lin, Director of the Kidney Dialysis Center at Taipei Tzu Chi Hospital, led a research team to analyze the direct and indirect effects of vegetarian diets on the occurrence of chronic kidney disease in diabetic patients. They found that such diets effectively reduced the risk of complications by 32%. The research findings were published in the renowned international journal "Frontiers in Nutrition."

In 2018, the European Renal Association had already discussed the effects of plant-based diets in alleviating and reducing insulin dysfunction and resistance. Insulin is the hormone that controls the body's "storage," including sugar, fat, and muscle storage, and is key to regulating blood sugar. Normally, when starch is digested, it forms glucose that enters the bloodstream, i.e., blood sugar. When the body detects a rise in blood sugar, it stimulates the pancreas to secrete insulin into the bloodstream. Insulin binds to insulin receptors on the cell membrane surface, opening channels for glucose to enter cells, thus lowering blood sugar levels. Insulin resistance is one of the symptoms of metabolic syndrome and a precursor to diabetes, making dietary patterns an important variable.

The Taipei Tzu Chi Hospital research team thus derived the research objective that "vegetarianism" might be one of the preventive strategies for chronic kidney disease in diabetic patients. They conducted a study on diabetic patients who received health check-ups at Taipei Tzu Chi Hospital. Dietary patterns were categorized as vegan, lacto-ovo vegetarian, or omnivorous. In the structural equation model, after adjusting for age, gender, and other interfering factors, compared to the omnivorous group, the hazard ratio for the vegetarian and lacto-ovo vegetarian groups was 0.68, meaning that vegetarian diets led to a lower risk of chronic kidney disease occurrence.

Further analysis of risk factors for diabetic nephropathy included: smoking habits, high systolic blood pressure, high blood lipids, poor long-term blood sugar control, hyperuricemia, and high body mass index (BMI). Vegan and lacto-ovo vegetarian diets were found to reduce hyperuricemia and high BMI, thereby lowering the risk of chronic kidney disease. Dr. Kuo Ko-Lin stated, "Through direct and indirect effects, diabetic patients following vegan or lacto-ovo vegetarian diets can reduce their risk of developing chronic kidney disease by 32%."

Dr. Kuo Ko-Lin suggests that people with diabetes should follow low-carbohydrate dietary guidelines. If they can adopt a plant-based diet as their primary dietary pattern, it can more effectively prevent the risk of diabetes complications and other chronic diseases.



[ACADEMIC PAPER]

Vegetarian diet was associated with a lower risk of chronic kidney disease in diabetic patients

PUBLICATION Front Nutr. 2022 Apr 26:9:843357.

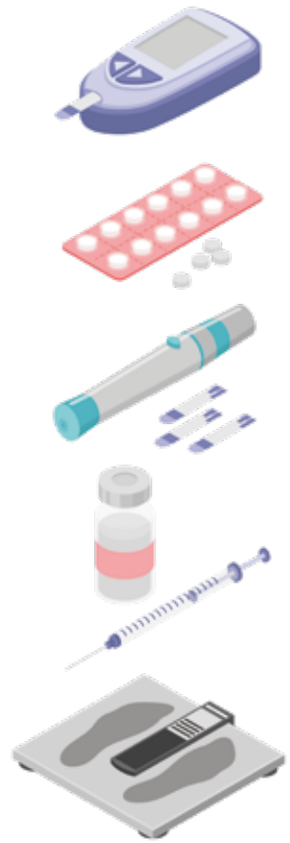
doi 10.3389/fnut.2022.843357. eCollection 2022.

Authors Yi-Chou Hou, Hui-Fen Huang, Wen-Hsin Tsai, Sin-Yi Huang, Hao-Wen Liu, Jia-Sin Liu, Ko-Lin Kuo

[Abstract]

Introduction: Diabetes mellitus (DM) is a pathological hyperglycemic state related to the dysregulation of insulin. Chronic kidney disease (CKD) is a common chronic complication in diabetic patients. A vegetarian diet could be one of the preventive strategies

for the occurrence of CKD in patients with diabetes mellitus. However, it is still unknown whether a vegetarian diet lowers the occurrence of CKD in DM patients.



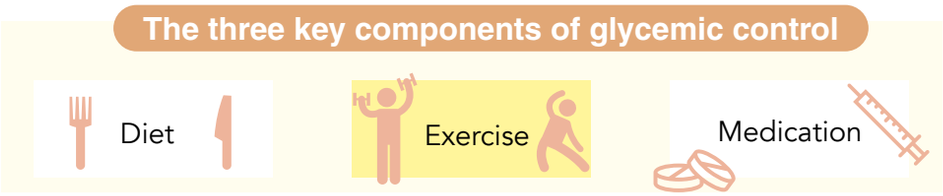
Research design and methods: This retrospective study was conducted at Taipei Tzu Chi Hospital from 5 September 2005 to 31 December 2016. Subjects with an HbA1c level > 6.5% or previous history of diabetes mellitus elder than 40 years were grouped based on self-reported dietary habits (vegetarians, lacto-ovo vegetarians and omnivores) in the structured questionnaire. Structural equation modeling (SEM) was applied to estimate the direct and indirect effects of variables on the occurrence of chronic kidney disease.

Results: Among these 2,797 subjects, the participants were grouped into dietary habits as vegans (n = 207), lacto-ovo vegetarians (n = 941) and omnivores (n = 1,649). The incidence of overall CKD was higher in the omnivore group [36.6% vs 30.4% (vegans) and 28.5% (lacto-ovo vegetarian), $p < 0.001$]. In the SEM model, after adjusting for age and sex, the lacto-ovo vegetarian [OR: 0.68, 95% confidence interval (CI): 0.57-0.82] and vegan groups (OR 0.68, 95% CI: 0.49-0.94) were both associated with a lower risk of CKD occurrence than the omnivore group. The vegan diet and lacto-ovo diet lowered the risk related to a high BMI (OR: 0.45, $p < 0.001$, OR: 0.58, $p < 0.001$) and hyperuricemia (OR: 0.53, $p < 0.001$; OR: 0.55, $p < 0.001$) for the occurrence of CKD.

Dietitian's Advice

Diabetes is one of the top ten causes of death in Taiwan. According to statistics from the Health Promotion Administration of the Ministry of Health and Welfare, there are about 2 million diabetics in Taiwan, with the number increasing annually. Risk factors for diabetes include: overweight and obesity, age, genetics, metabolic syndrome, gestational diabetes, smoking, and drinking. Early symptoms often include the "three increases and one decrease" - increased eating, increased drinking, increased urination, but decreased body weight.

If blood sugar is not actively controlled, leaving the body in a state of high blood glucose for long periods, complications may arise such as: eye disease, kidney disease, cardiovascular disease, cerebrovascular disease, and poor wound healing. Therefore, blood sugar control is crucial for diabetics.



The three key points of blood sugar control are: diet, exercise, and medication. For diet, it's recommended to have balanced meals, eat regularly and in controlled portions, limit intake of carbohydrate-rich foods, increase dietary fiber intake, avoid refined sugars and alcohol, and maintain an ideal body weight to avoid obesity or being overweight.

For diabetics, considering "low glycemic index" foods, often referred to as the "low GI diet," can be beneficial. The Glycemic Index (GI) uses the increase in blood sugar two hours after consuming 100 grams of glucose as a standard (GI value = 100). Low GI foods cause a more gradual rise in blood sugar and tend to provide a feeling of fullness.

In simple terms, each meal should include a main dish (whole grains), protein foods (beans and eggs), and vegetables. Unrefined whole grains retain more dietary fiber compared to refined grains, helping maintain stable blood sugar levels. It's recommended to choose unrefined whole grains for at least one meal, such as five-grain rice or brown rice, while controlling portion sizes. Root vegetables like sweet potatoes, pumpkin, potatoes, taro, and corn are also considered whole grains. Diabetics can eat these, but the amount should be calculated together with rice to avoid excessive carbohydrate intake.

High-Fiber Curry Fried Rice (Shown on page 82)

Stuffed Tofu Skin and Green Soy Beans Triangles (Shown on page 84)

For side dishes, it's recommended to pair high-quality plant proteins with fiber-rich foods. Good sources of plant protein include: edamame, black beans, soybeans, and their products (such as tofu, dried tofu, tofu pockets, soy milk, etc.). Vegetables are rich in dietary fiber and micronutrients, helping maintain stable blood sugar. Besides green vegetables, loofah, eggplant, radish, wood ear mushrooms, and other mushrooms are also considered vegetables. These can be rotated with each meal, with a recommendation of at least half a bowl of cooked vegetables per meal.

Fruits and dairy products are also high in carbohydrates, so it's advised to control portions and avoid processed foods like dried fruits and fruit juices.

[Nutrition Facts] Per serving (360g), this recipe yields 1 serving.

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
432.2	20.9	13.9	2.4	60.3	4.2	552.6	9.7

Category: Whole Grains

Cooking Time: 20 minutes

High-Fiber Curry Fried Rice

Brown rice is the part of the rice grain that remains after the outer husk is removed, and includes the bran, germ, and endosperm. White rice, on the other hand, has the bran and germ removed, leaving only the endosperm. Therefore, brown rice is less processed and retains more dietary fiber and micronutrients (such as B vitamins and vitamin E) compared to white rice.

This dish features brown rice as the main ingredient, which is high in dietary fiber. By reducing the portion of the staple food (about 80% full), adding high-quality plant-based protein from dried tofu, and including a large amount of vegetables, the dish helps to provide a feeling of fullness and maintain stable blood sugar levels. Cooking the ingredients in a non-stick pan also reduces the overall oil used, allowing you to enjoy the delicious food while avoiding excessive fat intake and reducing the body's burden.

Ingredients

- Brown rice ····· 120g
- Dried tofu cubes ····· 80g (about 3 slices)
- Corn kernels ····· 50g
- Green bell pepper ····· 60g (about 1/2 piece)
- Red bell pepper ····· 50g (about 1/4 piece)

Seasonings

- Olive oil ····· 1 teaspoon (about 5g)
- Jing Si Vegetarian Seasoning Powder (Curry Flavor) ····· 1/2 tablespoon (about 5g)

Instructions

1. Wash and dice the dried tofu cubes and corn kernels, then set aside.
2. Wash, deseed, and dice the green and red bell peppers, then set aside.
3. Heat a non-stick pan with olive oil, add the diced dried tofu, corn kernels, green bell pepper, red bell pepper, and Jing Si Vegetarian Seasoning Powder (Curry Flavor). Stir-fry over low heat for about 5 minutes.
4. Add the brown rice and continue to stir-fry over medium heat until the ingredients are evenly colored, then serve.

[Nutrition Facts] Per serving (170g), this recipe yields 1 serving.

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
250	22.7	14.6	2.2	11	2.5	667.6	4.4

Category: Side Dish

Cooking Time: 40 minutes

Stuffed Tofu Skin and Green Soy Beans Triangles

Every 100g of green soy beans contains about 6.5g of dietary fiber. Green soy beans are a high-quality plant-based protein source, rich in dietary fiber and micronutrients. "Tofu skin" is a sheet-like product made from tofu, which is also a protein-containing food.This recipe replaces the dough wrapper with tofu skin to reduce the carbohydrate intake from the wrapper, and uses high-quality plant-based protein and fiber-rich green soy beans as the main ingredients. This helps maintain stable blood sugar levels. The use of a non-stick pan also reduces the overall oil consumption.

Ingredients

- Tofu skin ····· 1.5 sheets (about 9g)
- Tofu pocket ····· 40g (about 2/3 piece)
- Frozen green soy beans ····· 50g
- Enoki mushrooms ····· 40g

Seasonings

- Low-sodium soy sauce — 2 teaspoons (about 10g)
- Grape seed oil ····· 1 teaspoon (about 5g)

Instructions

1. Cut one sheet of tofu skin in half from the middle; rinse the tofu pocket with water; trim the tough ends of the enoki mushrooms and rinse them lightly, then set aside.
2. Prepare a pot of boiling water, blanch the tofu pocket for 30 seconds, then add the green soy beans and blanch for 40 seconds. Remove and set aside.
3. Place the tofu pocket, green soy beans, and enoki mushrooms in a food processor (or blender) and blend into a paste.
4. Transfer the blended filling to a container and steam for 15 minutes in a rice cooker (with about 0.8 cups of water in the outer pot).
5. Remove the steamed filling, mix in the low-sodium soy sauce until evenly distributed, and divide into three equal portions (about 52g per portion).
6. Fold a half sheet of tofu skin in half, place one portion of the filling inside, and wrap it into a triangle shape. Repeat with the remaining filling.
7. Heat grape seed oil in a non-stick pan, add the wrapped triangles and pan-fry over medium heat until both sides are evenly browned (about 1-2 minutes per side).

[Nutritional Analysis] Per serving of 450g, recipe contains 4 servings

Calories	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
94	3.2	2.9	0.5	17.7	5.4	532.3	5.5

Category: Soup

Cooking Time: 2 hours
(including 30 minutes of preparation)

Fresh Mushroom and Lotus Root Soup

Lotus root is the underground stem of the lotus plant. Due to its high carbohydrate content, it is classified as a whole grain. Many diabetic patients worry about their blood sugar levels and are afraid to eat lotus root. However, compared to other unrefined whole grains (e.g., white rice), lotus root has a higher fiber content and has less impact on blood sugar fluctuations. It is considered a low GI food, so diabetic patients can still consume it if they control the portion size. This soup, in addition to lotus root, also includes a large amount of vegetables, which helps stabilize blood sugar.

※Reminder for diabetic patients: This recipe serves about 4 people. The amount of lotus root per person should be counted as 1/4 bowl of rice. Remember to deduct this from your main meal rice portion!

Ingredients

- lotus root ····· 250g (about 1 section)
- king oyster mushrooms ····· 150g
- carrots ····· 230g (about 1/2 carrot)
- dried shiitake mushrooms 10g (about 4 pieces)
- red dates ····· 10g (about 4 pieces)old
- ginger slices ····· 30g

Seasonings

- soybean oil ····· 2 teaspoons (about 10g)
- salt ····· 1 teaspoon (about 5g)

Instructions

1. Clean the lotus root with a scrubber, peel, slice, and soak in cold water. Wash the king oyster mushrooms and cut them into diagonal slices. Set aside.
2. Wash and peel the carrots, cut into diagonal slices. Wash the dried shiitake mushrooms, soak in water until soft, and then cut into pieces. Set aside.
3. Heat the soybean oil in a non-stick pan. Add ginger slices, shiitake mushrooms, and king oyster mushrooms. Stir-fry over medium heat until fragrant.
4. In an electric cooker pot, add 1 liter of water and all the ingredients. Add salt for seasoning. Pour 3.5 cups of water into the outer pot and steam for about 70 minutes, then let it sit for another 20 minutes before serving.

[Nutritional Analysis] Per serving of 18g, recipe contains 15 servings

Calories	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
84.1	**16**	**5.1**	**0.7**	**8.1**	**0.3**	**16.8**

Category: Snack

Cooking Time: 45 minutes
(including 20 minutes baking time)

Grain and Nut Crisp Biscuits

Blood sugar control emphasizes both total quantity control and GI value. Most biscuits are made with refined flour and sugar, which can easily cause blood sugar to rise. This recipe replaces low-gluten flour with grain powder and uses avocado oil (which has a high smoke point) instead of butter. It also uses a sugar substitute (monk fruit sweetener) instead of refined sugar, which can lower the GI value of the biscuits. Finally, cutting and baking every 2 biscuits as one serving of snack (containing 15g of carbohydrates) makes it convenient for users to control their carbohydrate intake.

Ingredients

- low-gluten flour ····· 100g
- sugar-free five-grain powder ····· 2 packs (60g)
- skinless peanuts ····· 20g
- avocado oil ····· 60cc
- sugar-free soy milk ····· 30cc

Seasonings

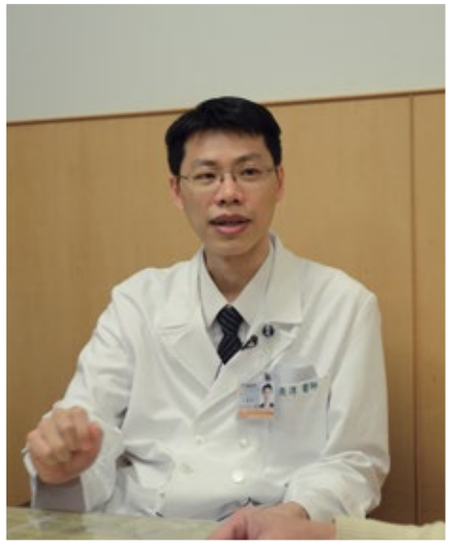
- monk fruit sweetener ····· 40g

Instructions

1. In a mixing bowl, sift the low-gluten flour. Dry roast the skinless peanuts in a pan over low heat until fragrant. Set aside.
2. Put the low-gluten flour, five-grain powder, and monk fruit sweetener in a mixing bowl and mix well. Add peanuts and avocado oil, and mix again.
3. Pour in the sugar-free soy milk, mixing and shaping until the ingredients come together. Preheat the oven to 175°C (347°F) with top and bottom heat.
4. Take a PE bag (medium/28cm*22cm), place the dough in the bag and roll it flat (about 0.8cm thick rectangle), then cut the rectangular dough into 15 equal parts.
5. Place the biscuits on a baking tray and bake in the oven for about 10 minutes. Flip and bake for another 10 minutes (depending on your oven's temperature, you may need to bake for an additional 3-5 minutes if necessary). Remove from the oven, let cool, and serve.

Healthy, Eco-friendly, and Fortunate

By Dr. Wang Yi-Chun
Attending Physician, Department of Nephrology, Taipei Tzu Chi Hospital



"Healthy, eco-friendly, and a blessing!" This is the phrase I use most often when sharing my decision to adopt a "healthy vegetarian diet." For over a decade, I've been grateful for this decision every day, and I hope to share it with those who are destined to hear it!

I often hear my father tell the story of why he doesn't eat beef. When my father was young, he lived in rural Yunlin, and his family had an old ox. Once, he went with the ox to a far-off place to graze, and accidentally fell asleep on the ox cart. When he woke up, it was already dark, and he didn't know where he was. At that time, rural homes didn't even have electric lights, and there were no street lights. He didn't know what to do. Unexpectedly, in the pitch-black night, the old ox slowly pulled the cart, step by step. Finally, late at night, his family was surprised to find the old ox had returned home, with my father asleep and hungry on the cart. One day, the ox finally became too old to walk and was about to be sent to the slaughterhouse. My father saw with his own eyes the old ox shedding tears as it was roped onto the truck.

When I first became an attending physician, I was assigned to support Fengshan Hospital, which had a slaughterhouse nearby. While driving to work, I was often blocked by trucks filled with dirty piglets, making squealing noises. I knew very well what would happen to them next. Over ten years ago, I started working at Taipei Tzu Chi Hospital and participated in the "Water Repentance" sutra adaptation "A Mindful Thought." We played various adorable animals, happily frolicking in the forest. The music suddenly changed, with intense lyrics singing "Cold blade edge, wailing screams deafening." From that moment, hearing the animals' cries in the music, a healthy vegetarian diet became my natural choice. Now when people ask me why I want to be vegetarian, I simply answer: "There's no need to think about it." It's good for health, reduces carbon dioxide emissions, and allows us to always be friends with animals. As Taiwanese people often say - it's a blessing!

After starting a healthy vegetarian diet, the biggest change to my body was weight loss, and I felt refreshed. Previously, for unknown reasons, I would sometimes feel inexplicably sad or suddenly want to get angry for no reason. After starting a healthy vegetarian diet, these situations rarely occurred.

A healthy vegetarian diet also led me to change my eating habits. I eat less at night and avoid late-night snacks. In the morning, I happily make breakfast and design my favorite menu. For example: blanched romaine lettuce drizzled with cold pressed olive oil and balsamic vinegar, avocado with whole wheat bread, a glass of Jing Si energy drink, plus an apple or guava. Other menu items include red bean and lotus seed soup, white fungus with wolfberry and red date soup, etc.

During the pandemic, I was assigned to the isolation ward to care for confirmed COVID-19 patients. The mental and physical pressure was immense, and I was afraid of getting infected. I researched medical literature and found that vegetarian healthcare workers had a significantly lower rate of developing severe COVID-19. So I continued my healthy vegetarian diet, exercised more daily (e.g., arm swinging or meridian exercises), and took nutritional supplements like vitamin B12, vitamin D, and Jing Si herbal drinks. My colleagues in the isolation ward and I were fortunate to get through this period safely and complete our mission of caring for patients. Later, the Nutrition Department of Taipei Tzu Chi Hospital analyzed 136 COVID-19 patients over 65 years old and found that vegetarian patients had a significantly lower risk of severe illness. Our nephrology team at Taipei Tzu Chi Hospital analyzed the gut bacteria of chronic kidney failure patients and found that vegetarians had higher amounts of Bifidobacterium and other beneficial bacteria. I reviewed medical literature and found that these good bacteria can enhance antiviral immune responses. Accordingly, in the face of COVID-19 or other epidemics, everyone can consider a healthy vegetarian diet to strengthen gut bacterial immunity.

▲ Bananas are high in potassium

▲ Dialysis patients should not eat starfruit

As a nephrologist, I often recommend a "healthy vegetarian diet" to patients in my clinic. Chronic kidney disease patients, due to decreased kidney function, need to pay attention to the "three lows" in their diet: low protein, low phosphorus, and low potassium. If patients can adopt a healthy vegetarian diet, they can easily achieve "low protein", "low phosphorus" and "reduced metabolic acid."

- **Low protein**: When the body consumes excessive high-protein foods like meat, it increases glomerular filtration rate (GFR) and proteinuria, causing kidney damage. Literature published as early as 2016

confirms that a vegetarian diet combined with low protein intake, supplemented with amino acids specific for chronic kidney disease, can slow kidney deterioration and delay the start of dialysis.

- **Low phosphorus**: People with poor kidney function cannot eliminate large amounts of phosphorus, so dietary adjustments are necessary. The fastest-absorbing phosphorus in the intestines is "inorganic phosphorus," found in sodas, processed meats, sauces, and processed foods. Next is "animal phosphorus," found in beef, pork, etc. Both of these phosphorus sources should be reduced. Phosphorus that is absorbed more slowly by the intestines is "plant phosphorus," found in soy milk, nuts, etc., so these can be consumed in moderation. Long-term high blood phosphorus can lead to increased parathyroid hormone, calcium-phosphorus deposition, and ultimately increase the risk of atherosclerosis and cardiovascular events such as stroke or myocardial infarction.

- **Reducing metabolic acid**: As kidney function declines, the body's ability to eliminate metabolic acid decreases, leading to accumulation. Patients need to compensate for this through breathing, making them more prone to shortness of breath. At this point, doctors will prescribe "sodium bicarbonate" to reduce metabolic acid. Currently, many medical studies have shown that eating more vegetables and fruits can achieve the same effect as sodium bicarbonate in reducing metabolic acid and slowing kidney function deterioration.

- **Low potassium:** Chronic kidney disease patients should not consume too much potassium, as high potassium levels can cause arrhythmia. Therefore, high-potassium fruits should be eaten in moderation. For example, bananas should not be eaten too much. After vegetables are blanched, potassium is removed with the cooking water, so blanched vegetables can be eaten, but vegetable broths, meat broths, and stocks should be avoided.

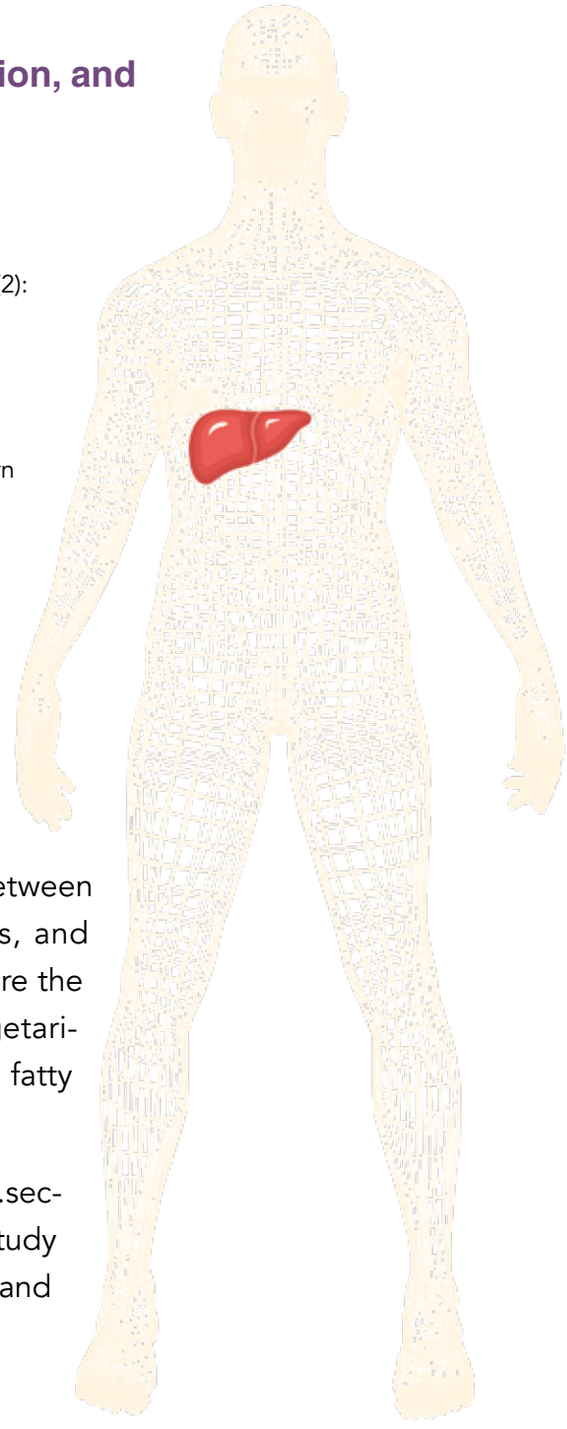
When chronic kidney disease patients start dialysis, they can continue a "healthy vegetarian diet" to maintain "low phosphorus, low potassium." The difference is that they can start supplementing their diet with high-protein nutrition. However, dialysis patients should be especially reminded "not to eat star fruit"! Star fruit contains a neurotoxin that can cause side effects like confusion in dialysis patients.

Chronic kidney disease requires good dietary management. It is recommended to befriend health educators and nutritionists to discuss favorite foods and create nutritious, delicious, and appropriate menus together. Combined with regular blood tests for confirmation and adjustment, a good diet helps fulfill the goal of slowing kidney function deterioration. For the kidneys, a "healthy vegetarian diet" is a scientifically proven good choice. I recommend it to you because it's "healthy, eco-friendly, and a blessing"!

2.Fatty liver

[ACADEMIC PAPER]

Vegetarian diet, food substitution, and nonalcoholic fatty liver



Database TCHS (Tzu Chi Health Study)

Publication Tzu Chi Medical Journal 2018; 30(2): 102.109

doi 10.4103/tcmj.tcmj_109_17

Authors Tina H. Chiu, Ming-Nan Lin, Wen-Harn Pan, Yen-Ching Chen, Chin-Lon Lin

[Abstract]

Objectives Vegetarian diets have been shown to improve insulin resistance and reduce body weight, but the effects on nonalcoholic fatty liver require further confirmation. We aim to investigate the association between vegetarian diets, major food groups, and nonalcoholic fatty liver, and to compare the degree of liver fibrosis between vegetarians and nonvegetarians in those with fatty liver.

Materials and Methods We analyzed cross.sectional data from the Tzu Chi Health Study which included 2127 nonvegetarians and 1273 vegetarians who did not smoke or habitually drink alcohol and had no hepatitis B or hepatitis C. Fatty liver and liver fibrosis were determined using ultrasonography and the nonalcoholic fatty liver disease fibrosis score, respectively. Diet was assessed through a validated food frequency questionnaire.

Results Vegetarian diets were associated with lower odds of fatty liver (odds ratio = 0.79, 95% confidence interval: 0.68–0.91) after adjusting for age, gender, education, history of smoking and alcohol drinking. Adjustment for body mass index (BMI) attenuated the protective association. Vegetarians had less severe fibrosis than nonvegetarians. Replacing a serving of soy with a serving of meat or fish was associated with 12%–13% increased risk, and replacing a serving of whole grains with a serving of refined grains, fruits, and fruit juice was associated with 3%–12% increased the risk of fatty liver.

Conclusions

Vegetarian diets, replacing meat and fish with soy, and replacing refined carbohydrates with whole grains, may be inversely associated with nonalcoholic fatty liver related to BMI.

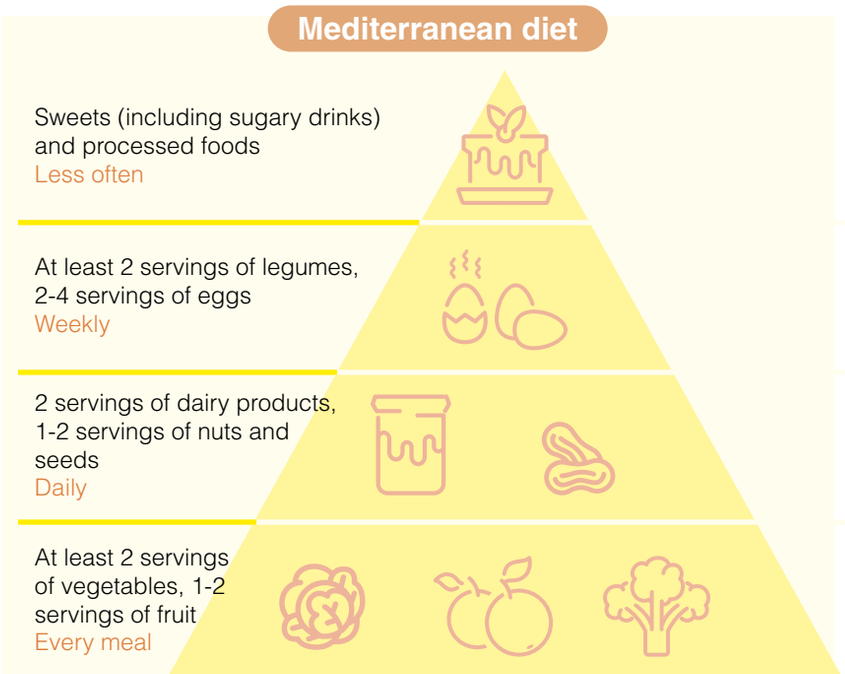
▲ Legumes

▲ Whole grain foods

Dietitian's Advice

In Taiwan today, one in every three to four people has fatty liver. If fatty liver is neglected, it may progress to liver fibrosis, cirrhosis, and potentially liver cancer. A correct diet is the most effective way to protect the liver. It is recommended to follow the principles of the "Mediterranean diet."

The Mediterranean diet emphasizes at least 2 servings of vegetables and 1-2 servings of fruit per meal, 2 servings of dairy products and 1-2 servings of nuts and seeds daily, and the use of herbs and spices for flavoring. It recommends at least 2 servings of legumes and 2-4 servings of eggs per week, while reducing the consumption of red meat, sweets (including sugary drinks), and processed meats. The Mediterranean diet also emphasizes the use of olive oil as the main source of fat.



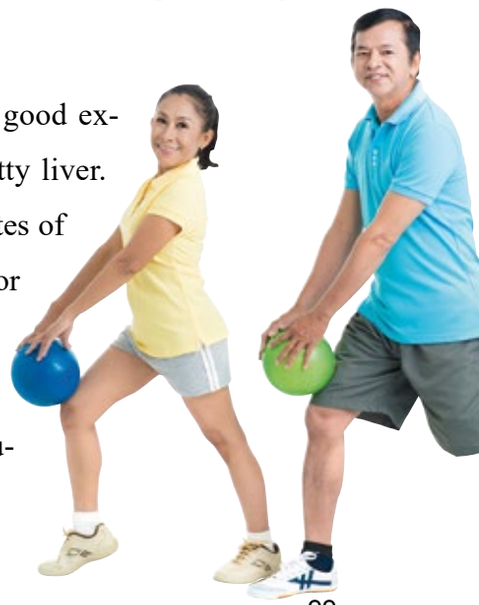
The Mediterranean diet emphasizes olive oil as the main source of fat.

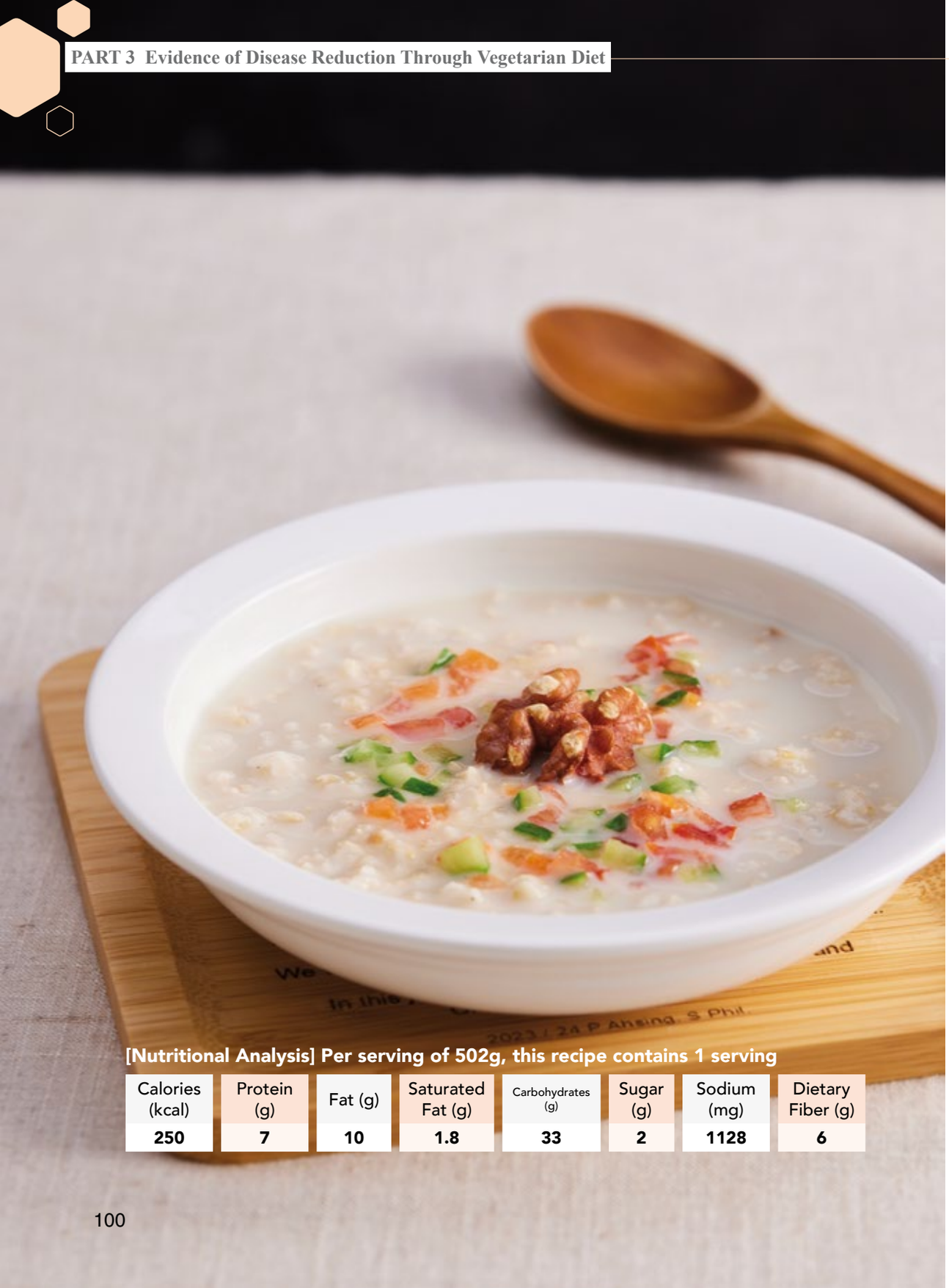
For whole grain choices, it's recommended to focus on unrefined starches, such as oats and sweet potatoes. These unrefined starches contain soluble fiber, which can bind with bile acids and remove them from the body. This prevents bile acids from being reabsorbed through the human enterohepatic circulation, helping to promote the conversion of cholesterol into bile acids, thereby lowering blood fats and preventing the occurrence of fatty liver.

▲ Golden Liver-Protecting Soup (Shown on Page 104)

▲ Chickpea Deviled Egg Snack (Shown on Page 106)

Changing lifestyle habits and maintaining good exercise habits are also essential in preventing fatty liver. It's recommended to engage in at least 150 minutes of moderate-intensity regular exercise per week. For beginners, it's suggested to start with activities like brisk walking, swimming, or cycling. At home, bodyweight training can be used to gradually increase the amount of exercise.





[Nutritional Analysis] Per serving of 502g, this recipe contains 1 serving

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
250	7	10	1.8	33	2	1128	6

Category: Whole Grains

Cooking Time: 25 minutes

Oatmeal Walnut Liver-Protecting Porridge

Oatmeal is rich in dietary fiber that aids digestion and promotes metabolism. The soluble dietary fiber in oatmeal has the function of lowering blood lipids. Replacing refined starches with oatmeal not only provides lower calories but is also rich in fiber. It's often used by health-conscious individuals as breakfast. This recipe uses vegetables (office workers can pre-cut, blanch, and freeze them, using a variety of seasonal local ingredients to change colors). We also encourage using soy milk instead of water and adding nuts for flavoring, making it a nutritionally balanced meal.

Ingredients

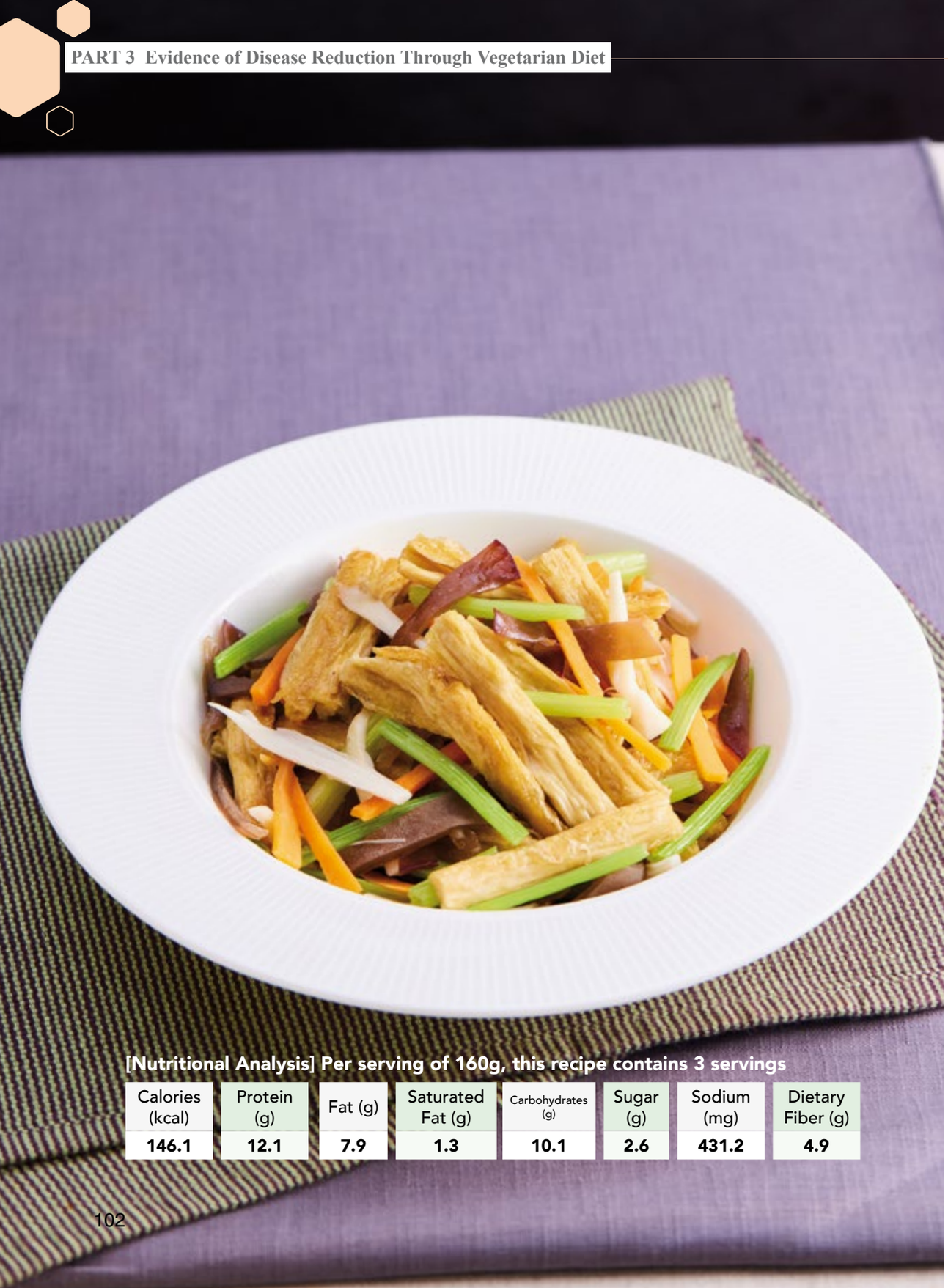
- instant oatmeal 40g
- carrots 20g
- cucumber 20g
- tomato 20g
- walnuts ..... 1 tsp
- warm soy milk 400cc

Seasonings

- salt ..... 1/4 tsp
- peanut butter ..... 1 tsp

Instructions

1. Place instant oatmeal in a container, add 400cc of boiling water (or warm soy milk), salt, and peanut butter. Soak for about 10 minutes to form an oatmeal paste.
2. Wash carrots and cut into 0.5-1cm cubes. They can be pre-blanched for 3-5 minutes and frozen for storage, or replaced with cooked corn kernels.
3. Other fruits and vegetables for raw consumption should be thoroughly washed. Wear gloves and use a cutting board for cooked food to cut them into 0.5-1cm cubes. After mixing into the oatmeal porridge, consume within 2 hours to ensure hygiene safety.



[Nutritional Analysis] Per serving of 160g, this recipe contains 3 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
146.1	12.1	7.9	1.3	10.1	2.6	431.2	4.9

Category: Side Dish

Cooking Time: 20 minutes

Tofu Skin with Fresh Vegetables

The formation of fatty liver is related to high-carb, high-fat, and excessive calorie intake dietary habits. Weight management and control are the most important principles. The dietary recommendation is based on high-fiber and antioxidant principles. This dish combines mushrooms and high-fiber vegetables to provide fullness, and reduced calorie intake, and it uses fresh bean skin to provide high-quality protein for repairing liver cells.

Ingredients

- boxed fresh bean curd (tofu skin) ····· 120g
- king oyster mushrooms ····· 150g
- fresh black fungus ····· 100g
- celery ····· 70g
- carrots ····· 60g

Seasonings

- olive oil ····· 10cc
- salt ····· 3g

Instructions

1. Rinse king oyster mushrooms; remove stems from black fungus and clean; wash celery and remove leaves; wash and peel carrots.
2. Slice king oyster mushroom caps horizontally, then cut into strips; cut stems horizontally, then hand-tear into strips.
3. Prepare boxed fresh bean curd sticks (can rinse with water and drain), cut black fungus into strips, cut celery stems into sections, and cut carrots into strips (same length as black fungus and king oyster mushrooms).
4. Heat a wok, add olive oil over medium heat, stir-fry carrots until cooked, then add king oyster mushrooms, black fungus, and celery in order.
5. When vegetables are softened, add bean curd sticks and stir-fry until cooked. Finally, add salt to taste and serve.

[Nutritional Analysis] Per serving of 206g, this recipe contains 1 serving

Calories	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
102	10.4	2.8	0.46	10.2	2.8	1082

Category: Soup

Cooking Time: 30 minutes

Golden Liver-Protecting Soup

Recent scientific research reports indicate that curcumin (turmeric) has the potential to prevent and improve non-alcoholic fatty liver disease, and has beneficial effects in preventing hepatitis and liver diseases. Therefore, turmeric has been upgraded to a popular health food.

Ingredients

- carrots 50g
- noodle rolls 20g
- bean skin 20g
- fresh ginger 5g
- basil leaves, minced 2g

Seasonings

- turmeric powder ..... 3 tsp
- salt ..... 1 tsp

Instructions

1. Prepare a soup pot, add cold water and carrot chunks, cook until carrots are soft.
2. Add noodle rolls, bean skin, and fresh ginger, then add turmeric powder. Cook over medium-low heat for about 5-10 minutes.
3. Finally, add salt to taste. Before serving, sprinkle with minced basil leaves (or cilantro).

[Nutritional Analysis] Per serving of 60g, this recipe contains 4 servings

Calories	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
143.2	8.6	10.6	2.7	4.2	0.1	278.7

Category: Snack

Cooking Time: 30 minutes

Chickpea Deviled Egg Snack

Chickpeas, containing 19g of protein and 61g of carbohydrates (including 11g of dietary fiber) per 100g, are actually a high-quality whole grain. Combined with complete protein from eggs and oleic acid-rich olive oil, this forms a super snack that brings together quality carbohydrates, protein, and fats. For those in urgent need of weight control, reducing inflammation indices, and using high-quality protein to repair damaged liver tissue, this is a recommended hunger-satisfying snack.

Ingredients

- chickpeas 20g
- eggs 4
- olive oil 20ml

Seasonings

- salt 2g
- black pepper powder 1g
- A pinch of paprika (for decoration)

Instructions

1. Wash chickpeas, cover with water, refrigerate, and soak overnight.
2. Drain chickpeas, place in an electric cooker with water covering them; add 1 cup of water to the outer pot, steam until done, remove, peel, and mash into a paste.
3. Prepare a pot of boiling water and a pot of cold water (enough to cover the eggs).
4. Place eggs in boiling water, reduce heat and simmer for 10-12 minutes (gently turn eggs during cooking to keep yolks centered), remove and place in cold water to cool.
5. Once eggs are cooled, peel, cut lengthwise, remove yolks, and set whites aside.
6. In a clean container, mix egg yolks, chickpea paste, and olive oil. Season with salt and black pepper.
7. Put the mixture from step 6 into a piping bag or (cut corner) plastic bag, pipe onto egg whites, and sprinkle with a little paprika to finish.

A Vegetarian Life from the Womb

Dr. Chang Shun-Chin
Department of Geriatric Medicine, Dalin Tzu Chi Hospital

I've been vegetarian since I was in the womb, starting from age zero and continuing for thirty-seven years. I've never thought about not being vegetarian. However, because I followed my mother's diet, I didn't truly understand what "being vegetarian" meant.

I remember in kindergarten, when the whole class had chicken legs to eat, the teacher let me eat just the skin. I gave the meat to others, and then my classmates gave me their skin, so I ended up eating a lot of chicken skin. When I told my mother, she called the teacher to explain, and the teacher understood and apologized profusely.

In elementary school, I brought lunch boxes made by my mother every day. In middle school, we ordered lunch boxes, and there were only five vegetarians in the whole school. We had to go far to eat lunch every day. Coincidentally, some had good test scores, so some suggested that eating vegetarian before exams might lead to good results. Later, we found out it wasn't about being vegetarian. But afterwards, more than a dozen classmates would eat vegetarian before exams, hoping for good scores. It was quite amazing.

I grew up healthy without eating meat, never having nutritional deficiencies, which is the best testament to vegetarianism. During my military service, a medic colleague who was a dentist was worried about his pregnant vegetarian wife's nutrition and the health of their baby. When he learned that I was vegetarian from birth, he looked at me and felt relieved. Later, his child was born healthy.

My wife also became vegetarian after we married. Our three children were born subsequently, and the whole family is vegetarian. When we visit my wife's family, they accommodate our vegetarian diet.

In my geriatric clinic, if I encounter patients with high uric acid due to excessive meat consumption, I remind them to eat less meat and more vegetables and fruits. Patients often ask, "Isn't that telling me to be vegetarian? Will that be nutritionally sufficient?" I reply, "Being vegetarian is OK! I'm vegetarian myself." Seeing me, patients feel that being vegetarian might be acceptable. My experience is that a doctor being vegetarian is the most encouraging example to patients.

Protein sources are not limited to meat. Clinically, I've encountered some monks who are strict vegetarians avoiding eggs and dairy, or some Tzu Chi volunteers whose health check results show low vitamin B12

levels. Young vegetarian women may easily develop iron-deficiency anemia. These people need to pay attention to consuming foods rich in iron and vitamin B12, or directly take iron or vitamin B12 supplements.

I want to remind vegetarians not to eat too many processed vegetarian products, but to focus on whole foods. If possible, cooking for yourself allows you to make meals interesting, delicious, and nutritious. For example, my mother would make bean curd pockets filled with potatoes and water chestnuts, wrapped in seaweed, which is very tasty.

A meal should basically include protein, whole grains, vegetables, fruits, and nuts, maintaining a balance. Beans, for instance, are categorized as "protein beans," "starch beans," "oil beans," and "vegetable beans" like green beans, peas, and string beans. Edamame, soybeans, and black beans are the same bean at different stages of maturity, with the same nutritional content, belonging to the category "protein beans." Red beans and mung beans are starch beans, while peanuts are "oil beans" containing fats and should be eaten in moderation. So even with beans, it's important to eat the right ones.

Fruits are rich in vitamin C, which aids iron absorption. If taking iron supplements, they can be taken with vitamin C. It's also important to avoid substances that interfere with iron absorption, such as antacids, stomach medicines, and foods like milk.

These are my experiences with a vegetarian diet. Eating a balanced, nutritious diet makes staying healthy simple.

3.Gallstone

[ACADEMIC PAPER]

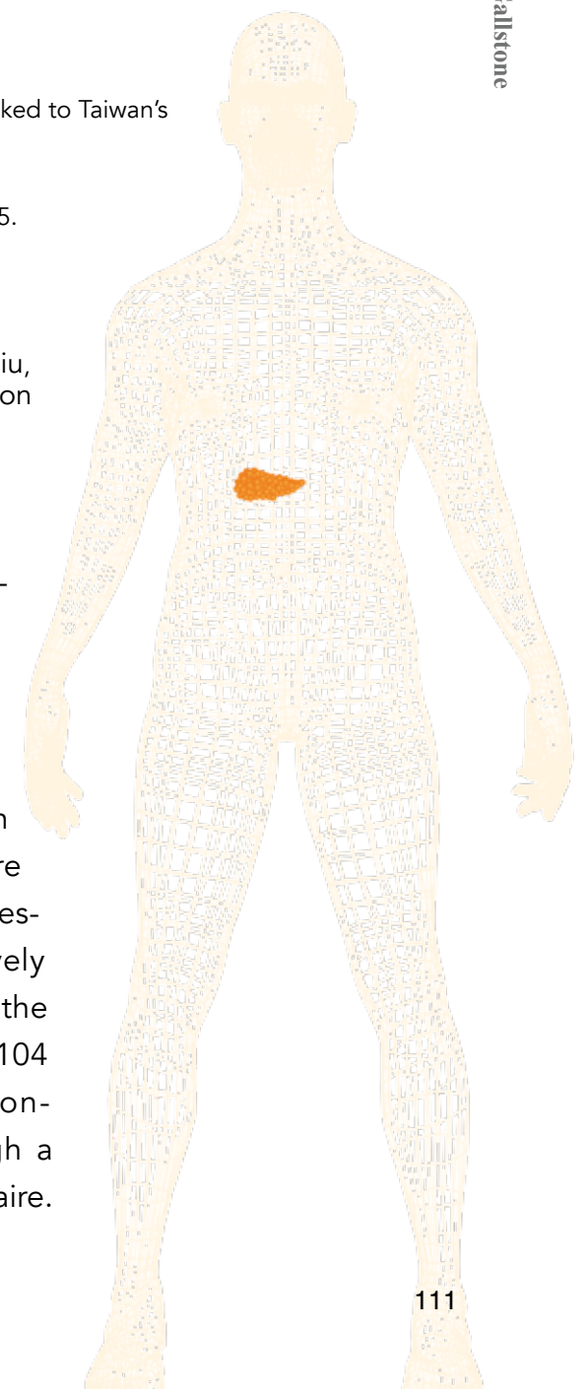
Plant-based diet, cholesterol, and risk of gallstone disease: a prospective study

Database TCHS (Tzu Chi Health Study) & Linked to Taiwan's National Health Insurance Database

Publication Nutrients. 2019 Feb 4;11（2）:335.

doi 10.3390/nu11020335

Authors Chun-Ming Chang, Tina H T Chiu, Chia-Chen Chang, Ming-Nan Lin, Chin-Lon Lin



[Abstract]

Vegetarian diets may lower symptomatic gallstone disease via cholesterol lowering. This study aimed to examine the risk of symptomatic gallstone disease (GSD) in Taiwanese vegetarians vs. nonvegetarians in a prospective cohort and to explore if this association is related to cholesterol concentration. We prospectively followed 4839 participants, and in the 29,295 person-years of follow-up, 104 new incident GSD cases were confirmed. Diet was assessed through a validated food frequency questionnaire.

Symptomatic GSD was ascertained through linkage to the Taiwan National Health Insurance Research Database. Blood cholesterol profiles were measured at recruitment. Cox regression was applied to assess the effect of diet on symptomatic GSD, adjusting for age, education, smoking, alcohol, physical activities, diabetes, kidney diseases, body mass index, lipid-lowering medication, and hypercholesterolemia.

Vegetarian diet was associated with a decreased risk of symptomatic GSD compared with nonvegetarian diet in women (hazard ratio [HR], 0.52; 95% confidence interval [CI], 0.280.96) but not in men. In women, nonvegetarians with hypercholesterolemia had 3.8 times the risk of GSD compared with vegetarians with normal cholesterol (HR, 3.81, 95% CI, 1.619.01). A vegetarian diet may therefore protect against GSD independent of baseline hypercholesterolemia. A nonvegetarian diet and hypercholesterolemia may have an additive effect in increasing GSD risk in women.

Note: "Person-years" = number of people tracked × tracking time. In this study, the tracking period was approximately six years.

A Research Physician's Perspective

Dr. Chang Chun-Ming
General Surgery Department, Hualien Tzu Chi Hospital

Gallstones have many causes, but the main causes can be divided into two types: one is pigment deposition, and the other is cholesterol deposition. Gallstones caused by cholesterol deposition can lead to pain and gallbladder inflammation. We began this research with the hypothesis that "a vegetarian diet can lower cholesterol." The most intuitive thought was that vegetarians might have lower cholesterol levels, and we wondered if this would reduce the chances of gallstone attacks and gallbladder inflammation.

Many people have gallstones in their bodies but don't show symptoms, coexisting peacefully within the body. Our study aimed to see when gallstones would cause gallbladder inflammation. The Tzu Chi vegetari-

an cohort database consists mostly of women, so for this study, the male sample size was insufficient. Therefore, the results primarily focus on women. We observed a difference - vegetarian women had a lower probability of developing cholecystitis compared to non-vegetarians.

Further analysis of blood test results explored whether there was a relationship of blood cholesterol levels to cholecystitis. We found that if a person eats meat and has higher cholesterol levels, their chances of getting cholecystitis are higher than vegetarian women or women with lower cholesterol levels.

I have been vegetarian for about eight years, currently following a lacto-ovo vegetarian diet. My diet is neither too oily nor too salty. I prefer mild flavors and don't like fried foods. I try to eat a variety of vegetables and include soy products in every meal.

People's biggest concern about vegetarianism is protein deficiency. In fact, protein isn't only found in soy products or eggs; grains, noodles, and other starchy foods also contain protein. Eating isn't just about filling your stomach; it should also be interesting, so I intake a variety of foods and have small changes in each meal. However, I don't overeat any one favorite food; balance is still important. When work is busy, I blend nuts and homemade soy milk together for breakfast and drink it as a smoothie.

In clinical practice, I see many breast cancer patients, and many ask me what they should pay attention to in their diet. My first suggestion is to eat vegetarian. A vegetarian diet has the effect of reducing the incidence of breast cancer for breast cancer patients or women in general.

But many patients say they can't do it, so as a compromise, I suggest they eat less meat. I also teach patients about vegetarian eating methods. Even when people say you should eat sea bass soup or similar foods after surgery to nourish the body, I still emphasize that eating vegetarian is fine. It's equally nutritious and nourishing, promoting wound healing. Changing food cravings is difficult, but some patients do eventually become vegetarian, which gives me a sense of accomplishment.

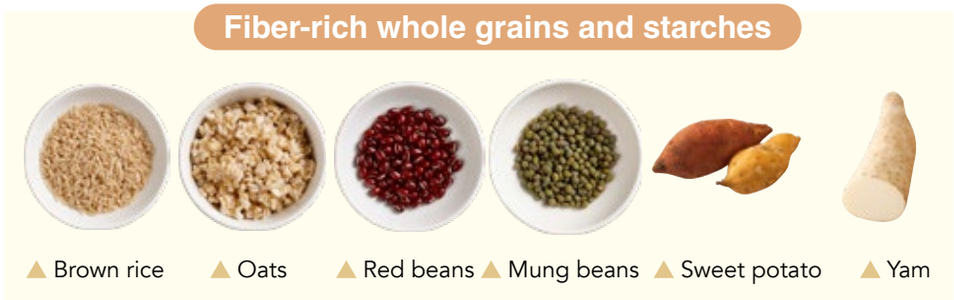
Dietitian's Advice

There is a certain relationship between gallstones and diet. If your usual dietary habits are more refined, and you like to eat large amounts of refined starch products, desserts, cookies, etc., it is recommended to reduce the intake of refined starches and their products, and instead increase

▲ Whole Tomato Rice (shown on Page 118)

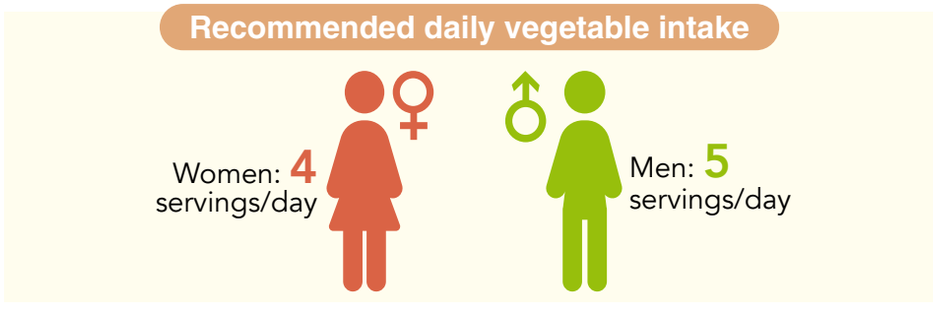
▲ Walnut Sweet Potato Pie (shown on Page 124)

the intake of whole grains and miscellaneous grains. Whole grains and miscellaneous grains include brown rice, oats, red beans, mung beans, sweet potatoes, yams, whole wheat, etc., as well as vegetables and fruits, which are rich in dietary fiber. This can increase the chance of bile acids being excreted with feces in the intestines, thereby reducing the bile acids recycled by the small intestine. The liver then needs to produce new bile



acids to make up for the lost portion. Cholesterol in the blood is the raw material for new bile acids. Through this cycle, the cholesterol content in the body is reduced, driving down the cholesterol in bile, and reducing the possibility of gallstones.

The dietary principles for preventing gallstones, in addition to reducing refined starch intake and reducing cholesterol-rich foods, suggest consuming sufficient dietary fiber to prevent bile from staying in the gallbladder for too long and becoming too concentrated. It can also increase the sense of fullness and allow the patient to avoid feeling hungry due to some adjustments in dietary principles. The Ministry of Health and Welfare recommends that women consume 4 servings of vegetables per day, while men should consume 5 servings.



[Nutritional Analysis] Per serving of 320g, this recipe contains 1 serving

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium
353.9	7.8	7.1	1.29	66.7	3.9	92

Potassium	Phosphorus	Calcium	Iron
525.7	248.1	25.0	1.6

Category: Whole Grains

Cooking Time: 45 minutes
(including 30 minutes steaming time)

Whole Tomato Rice

This dish replaces the usual white rice staple with brown rice, thereby increasing the intake of whole grains and miscellaneous grains. It is paired with beef tomatoes to add flavor to the dish and increase the palatability for those who are not used to eating brown rice. If you're still not accustomed to eating brown rice as a staple, you can also replace 1/3 of the brown rice with white rice.

Ingredients

- brown rice 80g
- beef tomato ..... 1 (about 160g)
- olive oil ..... 1 teaspoon

Seasonings

- salt 0.25g
- hot water 80cc

Instructions

1. Wash the brown rice and pour it into the inner pot of the rice cooker. Add an equal amount of hot water to the brown rice and soak for 10 minutes.
2. Wash the beef tomato, remove the stem, and make cross-shaped cuts on the top and bottom with a knife, then blanch in hot water for about 1-2 minutes. Remove, peel off the skin, and place it in the center of the inner pot with the soaked brown rice from step 1.
3. Add 1 teaspoon of olive oil and salt to the inner pot of the rice cooker. Add 1 cup of water to the outer pot, press the switch to start cooking. When the switch pops up (don't open the rice cooker lid yet), continue to steam for about 10-15 minutes.
4. Wear heat-resistant gloves, open the rice cooker lid, and mix well with a rice paddle. It's now ready to serve.

[Nutritional Analysis] Per serving of 170g, this recipe contains 2 servings

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium
231.8	12.9	14.3	3.2	13.7	0.6	264

Potassium	Phosphorus	Calcium	Iron
267.9	174.1	167.5	2.7

Category: Side Dish

Cooking Time: 30 minutes

Tofu Okonomiyaki

This recipe uses firm tofu to replace seafood and pork in Okonomiyaki, achieving a reduction in dietary cholesterol intake. If you want to make the Okonomiyaki texture more diverse, you can also add other ingredients such as grated carrots or diced king oyster mushrooms. However, note that vegetables will release water, so if the proportion of vegetables increases, you may need to increase the amount of flour accordingly to prevent insufficient viscosity and inability to form shape.

Ingredients

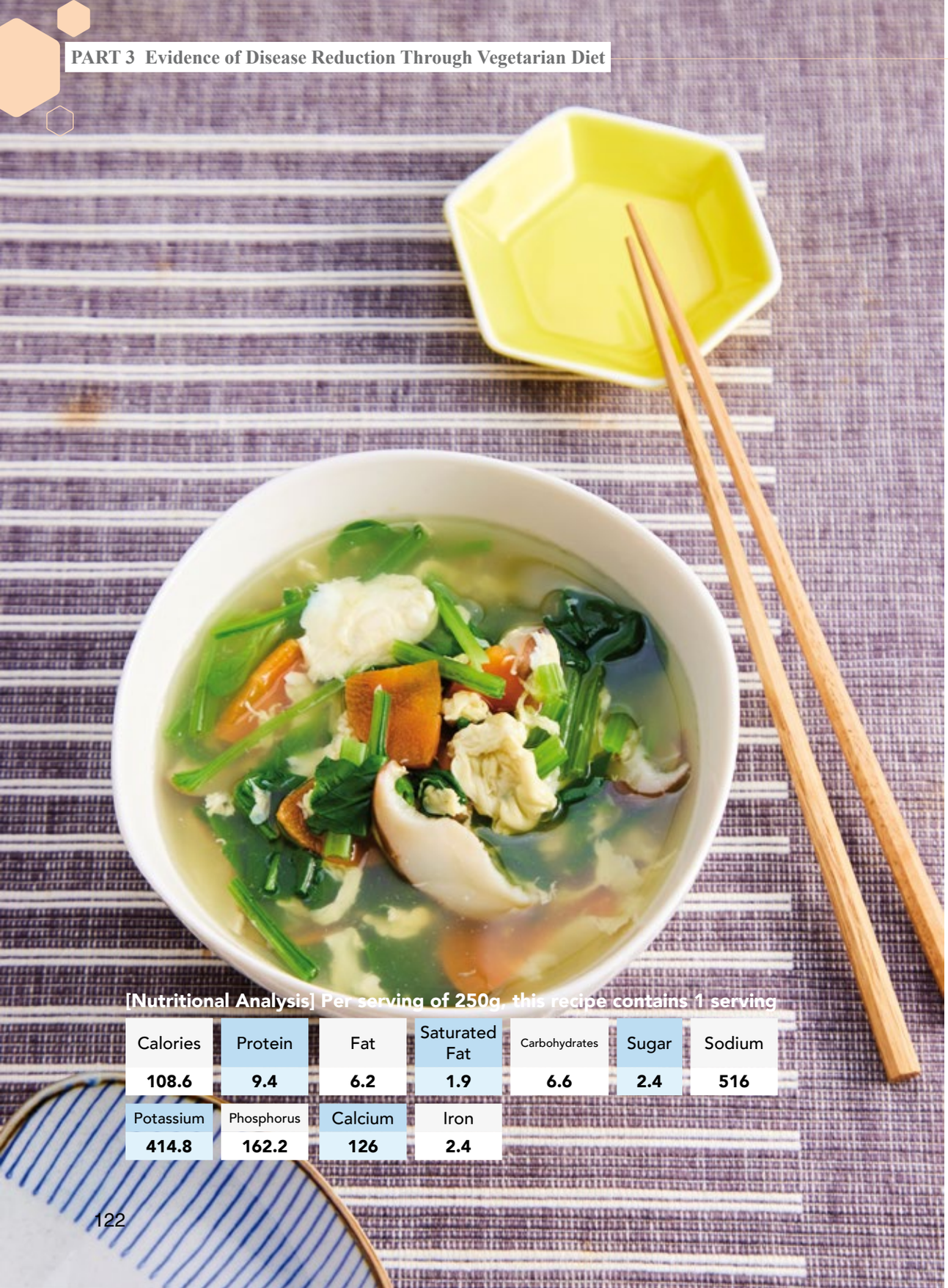
- firm tofu 200g
- cabbage 40g
- egg 1
- all-purpose flour 15g
- teaspoons avocado oil 2

Seasonings

- salt 1g
- mayonnaise 10g
- Nori (seaweed) ..... as needed
- Teriyaki sauce ..... as needed

Instructions

1. Place the firm tofu in a container and mash it with a spoon. Wash the cabbage, cut it into thin strips, and drain the water using paper towels. Set aside.
2. Put the all-purpose flour, shredded cabbage, and egg in a mixing bowl, then add the mashed tofu and salt. Mix well to form the tofu batter.
3. Pour avocado oil into a frying pan and heat over low heat. Use a ladle to scoop the tofu batter and spread it evenly in the frying pan (recommended to divide into four pieces).
4. Wait until one side is golden brown, then flip and continue to fry over low heat until both sides are golden brown. Remove from the pan.
5. Spread an appropriate amount of teriyaki sauce, drizzle with mayonnaise, and sprinkle with an appropriate amount of nori flakes. It's now ready to eat.



[Nutritional Analysis] Per serving of 250g, this recipe contains 1 serving

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium
108.6	9.4	6.2	1.9	6.6	2.4	516

Potassium	Phosphorus	Calcium	Iron
414.8	162.2	126	2.4

Category: Soup

Cooking Time: 20 minutes

Fresh Vegetable Egg Drop Soup

This recipe contains about half of the daily recommended vegetable intake for women and about one-third of that for men. In addition to containing three types of vegetables, this dish is low in oil but uses egg drops to increase its smooth texture when eaten. For strict vegetarians who don't eat eggs, it's recommended to stir-fry the carrots and mushrooms with one teaspoon of vegetable oil first, and blanch the spinach before making the vegetable soup. This will improve both the texture and flavor.

Ingredients

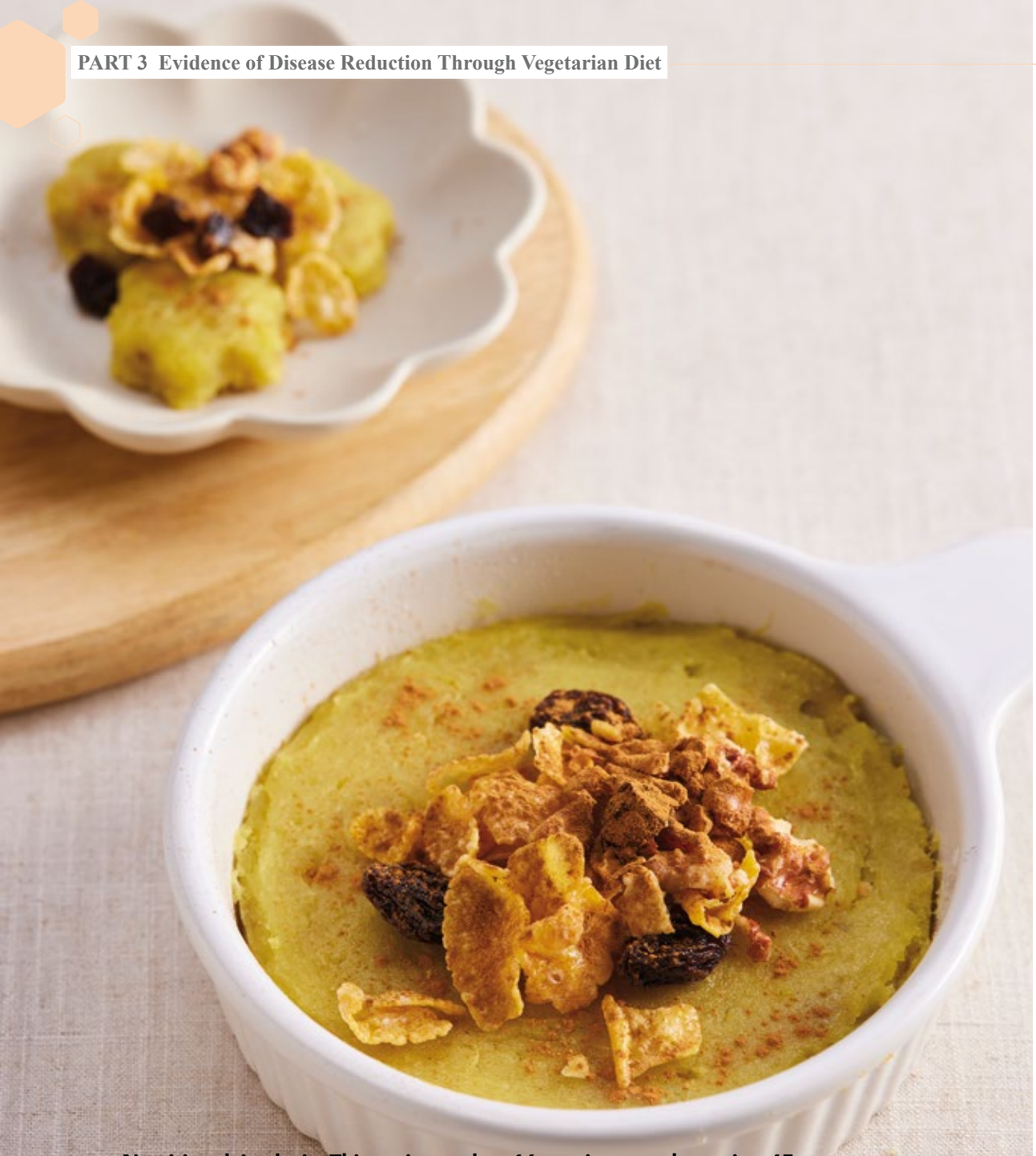
- spinach ····· 100g
- carrot ····· 25g
- fresh shiitake mushrooms ····· 25g
- egg ····· 1

Seasonings

- salt ····· 1g
- Sesame oil ····· as needed

Instructions

1. Wash the spinach and cut it into sections. Wash the carrot, peel it, and cut it into thin slices. Slice the fresh shiitake mushrooms thinly. Beat the egg and set aside.
2. Pour 500cc of water into a soup pot and bring to a boil. First add the carrots and cook until soft, then add the fresh shiitake mushrooms, spinach, and salt.
3. When the water in the soup pot boils again, pour in the beaten egg, turn off the heat, and drip a little sesame oil on top. The Fresh Vegetable Egg Drop Soup is now complete.



Nutritional Analysis: This recipe makes 16 servings, each serving 45g:

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium	Enhanced Nutrient
75.4	**1.1**	**1.2**	**0.1**	**15.6**	**3.1**	**115.9**	**1.2**

Category: Snack

Cooking Time: 60 minutes

Walnut Sweet Potato Pie

High-fat, high-cholesterol diets can easily cause an imbalance in the ratio of bile salts, lecithin, and cholesterol in bile. When cholesterol becomes oversaturated and cannot be effectively dissolved and excreted, it easily forms cholesterol crystals, leading to stone formation. Dietary principles should focus on high-fiber, low-fat diets. This simplified snack uses high-fiber sweet potatoes as the main ingredient, paired with quality oil from walnuts, and flavored with corn flakes and raisins, providing a high-quality snack option.

Ingredients

- sweet potatoes (about 650g) 2
- corn flakes 60g
- large raisins 50g
- walnuts 25g

Seasonings

- salt 3g
- A pinch of cinnamon powder 1g

Instructions

1. Wash the sweet potatoes, peel them, steam until cooked, mash them, and mix with salt. Crush the walnuts and set aside.
2. Preheat the oven to 175°C (top and bottom heat). Prepare a baking tray, spread the mashed sweet potatoes on the bottom, and then evenly sprinkle the crushed walnuts on top.
3. Place in the oven and bake for 20 minutes. Remove the baking tray, sprinkle corn flakes, raisins, and cinnamon powder on top. It's now ready to eat.

4.Gout

[ACADEMIC PAPER]

Vegetarian diet and risk of gout in two separate prospective cohort studies

Database TCVS (Tzu Chi Vegetarian Study), TCHS (Tzu Chi Health Study) & Linked to Taiwan's National Health Insurance

Publication Clin Nutr. 2020 Mar;39（3）：837-844.

doi 10.1016/j.clnu.2019.03.016 Epub 2019 Mar 27

Authors Tina H.T. Chiu, Chin-Hsiu Liu, Chia-Chen Chang, Ming-Nan Lin, Chin-Lon Lin

[Abstract]

Backgrounds & aims Plant-based diets may target multiple pathways in gout pathogenesis (uric acid reduction and anti-inflammation) while improving gout associated cardiometabolic comorbidities. We aim to prospectively examine the relationship between a vegetarian diet and gout, and to explore if this relationship is independent of hyperuricemia.

Methods We followed 4903 participants in the Tzu Chi Health Study (Cohort1, recruited in 2007–2009) and 9032 participants in the Tzu Chi Vegetarian Study (Cohort2, recruited in 2005) until end of 2014. Baseline serum uric acid was measured in Cohort1. Vegetarian status was assessed through a diet questionnaire that includes dietary habits and a food frequency questionnaire. Incidence of gout was ascertained by linkage to the National Health Insurance Database. Hazard Ratio of gout in vegetarians versus nonvegetarians was assessed by Cox regression, adjusted for age, sex, lifestyle and metabolic risk factors. Hyperuricemia was additionally adjusted in Cohort1.

Results In Cohort1, lacto-ovo vegetarians had the lowest uric acid concentration, followed by vegans, then nonvegetarians (men: 6.05, 6.19, 6.32 mg/dL, respectively; women: 4.92, 4.96, 5.11 mg/dL, respectively); 65 gout cases occurred in the 29,673 person-years of follow-up; vegetarians experienced a lower risk of gout (without adjustment for hyperuricemia: HR: 0.33; 95% CI: 0.14, 0.79; with adjustment for hyperuricemia: HR: 0.40; 95% CI: 0.17, 0.97). In Cohort2, 161 gout cases occurred in the 83,019 person years follow-up, and vegetarians also experienced a lower risk of gout (HR: 0.61; 95% CI: 0.41, 0.88).

Conclusions

Taiwanese vegetarian diet is associated with lower risk of gout. This protective association may be independent of baseline hyperuricemia.

[ACADEMIC PAPER]

Vegan diet is associated with a lower risk of chronic kidney disease in patients with hyperuricemia

Publication Nutrients. 2023 Mar 16;15 (6) :1444.

doi 10.3390/nu15061444.

Authors Chia-Lin Wu, Wen-Hsin Tsai, Jia-Sin Liu, Hao-Wen Liu, Sin-Yi Huang, Ko-Lin Kuo

[Abstract]

Hyperuricemia is a well-known risk factor for chronic kidney disease (CKD). Little is known about whether a vegetarian diet is associated with a lower risk of CKD in patients with hyperuricemia. From 5 September 2005, to 31 December 2016, we retrospectively included clinically stable patients with hyperuricemia who received health check-ups at Taipei Tzu Chi Hospital. All participants completed a dietary habits questionnaire to determine whether they were omnivorous, lacto-ovo vegetarian, or vegan. CKD was defined as an estimated glomerular filtration rate <60 mL/min/1.73 m2 or the presence of proteinuria. A total of 3618 patients with hyperuricemia were recruited for this cross-sectional study, consisting of 225 vegans, 509 lacto-ovo vegetarians, and 2884 omnivores. After adjusting for age and sex, vegans had a significantly lower odds ratio (OR) of CKD than omnivores (OR, 0.62; $p = 0.006$). The OR of CKD remained significantly lower in vegans after adjusting for additional confounders (OR, 0.69; $p = 0.04$). Additionally, age (per year OR, 1.06; $p < 0.001$), diabetes mellitus (OR, 2.12; $p < 0.001$), hypertension (OR, 1.73; $p < 0.001$), obesity (OR, 1.24; $p = 0.02$), smoking (OR, 2.05; $p < 0.001$), and very high uric acid levels (OR, 2.08; $p < 0.001$) were independent risk factors for CKD in patients with hyperuricemia. Moreover, structural equation modeling revealed that a vegan diet was associated with a lower OR of CKD (OR, 0.69; $p < 0.05$). A vegan diet is associated with a 31% lower risk of CKD in patients with hyperuricemia. A vegan diet may be beneficial in reducing the occurrence of CKD in patients with hyperuricemia.

Dietitian's Advice

When uric acid levels in the blood are too high, crystals form and deposit in joints, causing inflammation and problems such as gout. High uric acid levels can also lead to kidney function abnormalities. About twenty percent of uric acid in the body comes from food. Foods containing purines and those rich in nucleoproteins can increase uric acid levels in the blood. Recent dietary recommendations for controlling uric acid include avoiding alcohol consumption, especially beer. Drinking 2-3 bottles of beer daily can increase the chance of gout by 2.5 times. Meat and seafood can increase gout occurrence by 41% and 51% respectively. Sugary drinks, especially those containing synthetic high-fructose corn syrup, can increase gout occurrence by 239% if two servings are consumed daily, according to research.

Studies indicate that only animal-based purines have a positive correlation with gout occurrence. Plant-based high-purine foods like beans and mushrooms do not increase the risk of gout. Foods rich in fiber, vitamin C, and folic acid can reduce the risk of gout: whole grains and dark green vegetables are excellent choices. Research shows that the natural fructose in fruits does not increase the risk of gout. One serving of fruit contains about 8 grams of pure fructose, and the daily recommended intake according to the Ministry of Health and Welfare's Daily Dietary Guidelines is 2 servings.

Recent studies have found that hyperuricemia increases the risk of many diseases, such as cardiovascular disease, kidney disease, and metabolic syndrome. 80% of uric acid in the body is related to metabolism, so gout patients still need to follow their doctor's medication instructions and adjust their lifestyle, including getting adequate hydration, observing weight control, and getting moderate exercise, to reduce outbreaks and maintain health.

Note for "Shell Ginger Leaf Rice Packet" shown on page 132

Beans and shiitake mushrooms have long been considered taboo foods for gout patients. Many sources label dried shiitake mushrooms as high-purine foods but often overlook the issue of "usage amount". In fact, when dried shiitake mushrooms are used for flavoring, they are often only a few grams, and the purine content is not high. For example, in this recipe, only 1 gram of shiitake mushroom is used per serving, with a purine content of about 2 mg; 10 grams of emperor beans contain about 3.2 mg of purines, which can be safely consumed in moderation.

Note for "Golden Jade Steamed Dumplings" shown on page 136

Sun-dried shiitake mushrooms have a higher purine content due to dehydration and have long been considered taboo. According to research, consuming vegetables, including soybeans, legumes, and mushrooms, does not increase the risk of gout. The 2016 Taiwan Gout and Hyperuricemia Treatment Guidelines state: "Legumes can be consumed in moderation based on various studies, unless they have previously triggered gout attacks in individual patients." Small amounts of flavor enhancers do not affect uric acid production. Therefore, this recipe uses a small amount of MSG along with mushrooms to enhance the umami flavor while avoiding large amounts of mushrooms.

Category: Whole Grains

Cooking Time: 60 minutes

Shell Ginger Leaf Rice Packet

[Nutritional Analysis] Per serving 68 grams, this recipe contains 3 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Purine
106.5	3	2.1	0.4	18.8	0.4	179	10.7

*Purine content calculation source: Shmeul Halevi. Gout and Purine content in foods

Ingredients

shell ginger leaves	3-4
brown rice	50g
purple rice	10g
emperor beans	30g
shiitake mushrooms	3g
dried radish	15g
water	110g

Seasonings

vegetable oil	5g
sugar	0.6g
white pepper powder	0.4g
black bean soy sauce	2g
vegetarian oyster sauce	5g

Note

Placing the shell ginger leaf in with the raw rice will infuse the brown rice with the leaf's aroma. If you don't like a strong flavor, blanch the shell ginger leaves for longer before using.

Instructions

1. Wash the brown rice and purple rice, drain, add 110cc water and soak for at least 6 hours. Set aside.

2. Wash the emperor beans and blanch in boiling water. Remove 2/3 of the hard stem from the shell ginger leaves and soften them in hot water. Take one shell ginger leaf, tear off a strip along the leaf vein to use as a tie, and tear off another piece of leaf. Set aside.

3. Soak the shiitake mushrooms until soft, squeeze out excess water, and chop coarsely. Soak the dried radish for about 20 minutes (to remove excess salt), drain, and chop finely.

4. Heat vegetable oil in a frying pan, add chopped shiitake mushrooms and dried radish, and fry until fragrant. Add sugar, white pepper powder, and black bean soy sauce, stir well, and turn off the heat.

5. Pour the soaked brown rice with the soaking water into the inner pot of the rice cooker, add vegetarian oyster sauce and mix well. Place the torn shell ginger leaf on top.

6. Add 2 cups of water to the outer pot of the rice cooker, steam until the switch pops up, then continue to steam for 10-20 minutes. Remove the shell ginger leaf.

7. Mix the brown rice well and divide into 3 portions. Place each portion on a shell ginger leaf and add 2-3 emperor beans to each.

8. Fold the shell ginger leaves and tie them up to form packets. Place them in the rice cooker, add half a cup of water to the outer pot, and steam until the switch pops up.

[Nutritional Analysis] Per serving 65 grams, this recipe contains 5 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin C
31.3	0.7	0.2	0	7.3	5.3	253.6	21.1

Category: Side Dish

Cooking Time: 10 minutes
(excluding resting time)

Lemon-Pickled Purple Cabbage and White Radish Duo

Research shows that vitamin C can increase uric acid excretion. Fruits rich in vitamin C include guava, cherry tomatoes, kiwi, and sweet oranges. Among vegetables, bell peppers have the highest vitamin C content. Vitamin C is easily destroyed by high temperatures, so eating raw is better for absorption. Cherries and lemons are fruits that help reduce the risk of uric acid. Purple cabbage contains abundant anthocyanins, which help with antioxidation and reduce inflammatory responses, making it a good choice for reducing uric acid occurrence.

Ingredients

purple cabbage ····· 150g
peeled white radish ····· 150g

Seasonings

fresh lemon juice
(can be substituted with white vinegar) ····· 40g
salt ····· 3.5g
sugar ····· 20g
lemon peel or kaffir lime leaves (lemon leaves) ····· a small amount of ground
(add according to personal preference)

Note
Purple cabbage has a harder texture and needs a longer time to absorb flavors. You can also make it without salt for a sweet and sour pickled cabbage.

Instructions

1. Wash the purple cabbage and cut into thin strips. Add salt and massage lightly, then let it sit for 2-4 hours until soft. Mix lemon juice with sugar and set aside.

2. Pour 45g of the prepared lemon juice and lemon peel (or kaffir lime leaves) into the purple cabbage strips. Refrigerate for about 1-2 hours, turning once. After marinating, pour out the purple cabbage marinade and set aside.

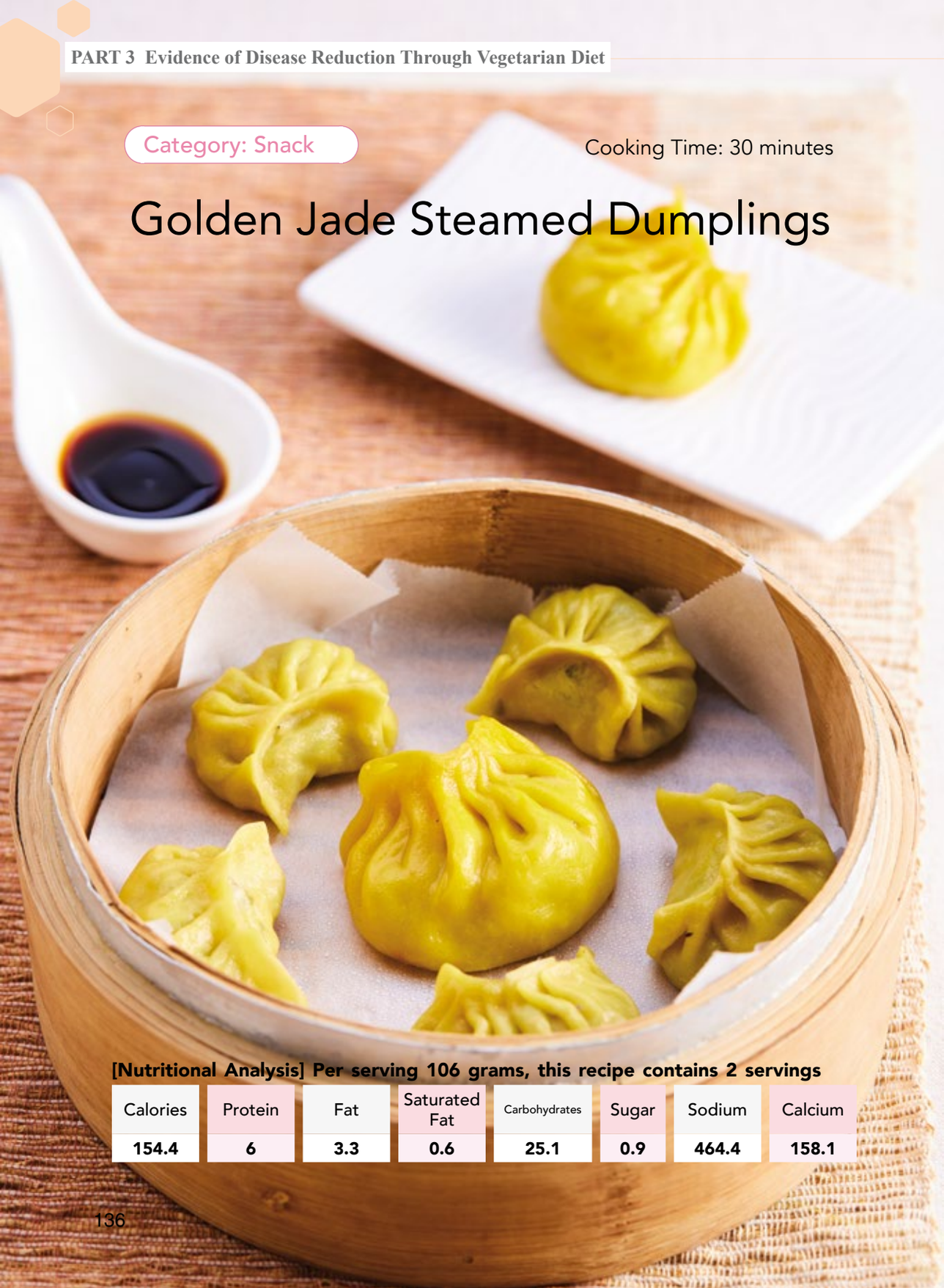
3. Cut the white radish into thin slices, add 1.5g salt, massage lightly, and let it sit for about 30 minutes until soft.

4. Squeeze out the water from the white radish slices, pour in the purple cabbage marinade and the remaining 15g of lemon juice. Refrigerate, turning once every 1-2 hours, until well-marinated.

Category: Snack

Cooking Time: 30 minutes

Golden Jade Steamed Dumplings



[Nutritional Analysis] Per serving 106 grams, this recipe contains 2 servings

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium	Calcium
154.4	6	3.3	0.6	25.1	0.9	464.4	158.1

Ingredients

Wrapper

- all-purpose flour ····· 50g
- tapioca starch (or cornstarch) ····· 5g
- salt ····· 0.3g
- hot water (above 90°C) ····· 20g
- cooked chestnut pumpkin flesh ····· 20g

illing

- bok choy ····· 120g
- dried tofu ····· 30g
- enoki mushrooms ····· 10g

Seasonings

- salt ····· 1.5g
- A pinch of white pepper powder
- sesame oil ····· 3g
- minced ginger ····· 3g
- A tiny amount of MSG

Instructions

Filling

1. Wash the bok choy, blanch in boiling water, squeeze out excess water, and chop finely. Wash the enoki mushrooms and chop finely. Chop the dried tofu finely. Set aside.
2. Mix the chopped bok choy, enoki mushrooms, dried tofu, and all the seasonings well to make the filling. Set aside.

Dumpling Wrapper

1. Mix the flour with tapioca starch (cornstarch) and salt. Gradually add 20cc of hot water while stirring. Let it cool slightly, then add the cooked chestnut pumpkin flesh and knead well. Place in a bowl, cover to keep moist, and let it rest.
2. Sprinkle a little flour on the table to prevent sticking. Take out the dough, knead into a long strip, and divide into 6 pieces.
3. Flatten each small piece of dough, then use a rolling pin to roll into round dumpling wrappers. Fill each wrapper with the prepared filling.
4. Place a piece of baking paper in the steamer, then place the wrapped dumplings on the paper. Put in the steamer (water should be boiling), and steam on high heat for about 10 minutes. Remove and serve.

[Nutritional Analysis] Per serving 172 grams, this recipe contains 1 serving

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar (including lactose)	Sodium	Calcium
142.7	7.2	2.9	2	22.4	24.3	84.7	227.8

Category: Beverage

Cooking Time: 10 minutes

Ginger Milk Curd

Many commercial bubble tea drinks contain over 30g of pure fructose per cup, which can increase uric acid. Many people find low-fat dairy products less rich in taste. This recipe uses concentration and the addition of ginger juice to enhance the palatability of the drink, which can replace sugary commercial beverages and reduce fructose intake.

*For those who don't drink milk, soy milk can be used as a substitute. The mild taste of soy milk paired with the slightly spicy ginger juice creates a unique flavor.
*The protease in ginger will react with the casein in milk, causing coagulation. The protease content in ginger varies depending on the variety and growth time. Young ginger contains too little and cannot be used. Generally, bamboo ginger and mature ginger have the highest content. You can adjust the amount of ginger juice according to the ginger variety and personal preference. The best texture for ginger milk curd is achieved at temperatures between 70-75 degrees. If the temperature is too low, it won't coagulate. Skim milk is less likely to form curds, but it's still a delicious drink even if it doesn't set.

Ingredients

- low-fat fresh milk ····· 230cc
- freshly grated ginger juice ····· 12g

Seasonings

- sugar ····· 10g

Instructions

1. Pour the fresh milk into a small saucepan, add sugar and mix well. Heat over low heat until reduced to 150g. Turn off the heat and let it cool to about 75°C.
2. Stir the white sediment in the ginger juice again, then pour the milk from step 1 into it. Cover and let it sit for about 10 minutes before serving.

Note
Ginger juice will produce white sediment when left to stand. Mix thoroughly to avoid affecting the taste. You can also choose to make an unsweetened original flavor drink.

Mental and Physical Well-being through More Vegetables and Exercise

Dr. Yeh Ming-Hsien,
Director of Traditional Chinese Medicine Department, Dalin Tzu Chi Hospital

I truly became a complete vegetarian in 2010 after participating in Tzu Chi's "Water Repentance" sutra adaptation. I realized that to have a better spiritual life, vegetarianism was a key factor. Not harboring thoughts of killing allows for greater respect for each other's lives.

I discovered that after becoming vegetarian, my life began to simplify. At first, I only knew that my choices had become fewer, but the subsequent change was a settling of body and mind. My desires became increasingly simple, and my life began to shed much of its arrogance.

If I encounter tumor patients in clinical practice, I recommend vegetarianism to them. One lung cancer patient changed from a meat-eating habit to a vegetarian diet because of this and regained his health. Traditional Chinese medicine theory states that "the lungs govern all meridians." All the turbid qi (life force or energy) from food and drink is transmitted throughout the body via the lungs. If we can address the root cause by eating vegetarian food, the body's turbid qi decreases, and diseases become easier to treat and manage. After adjusting his diet, this lung cancer patient's disease was well controlled. A smile appeared on his face, and he even had the energy to volunteer as an electrical appliance repair technician at a Tzu Chi recycling station, finding joy in giving. Originally diagnosed with terminal lung cancer, the patient has now survived for over five years, maintaining both physical and mental health.

In the Chinese medicines we prescribe, there are quite a few animal-based medicinal materials. Different disease conditions require different states, and each medicinal material has its characteristics, some

replaceable and some irreplaceable. For vegetarian patients, I usually avoid animal-based medicinal materials. However, if the patient's condition is pathological or very severe, necessitating the use of animal-based medicines, I always inform the patient so they can decide but I respect their decision. Nature nurtures all things and heals all ailments. If there are more and more opportunities to develop non-animal-based medicines with the same therapeutic effects, it should be a blessing for us vegetarians.

When transitioning from a meat-based diet to a vegetarian one, I don't recommend immediately switching to a pure vegan diet. To allow the body to adapt, it's advisable to take a gradual approach. After becoming accustomed to a vegetarian state, one can then become fully vegan.

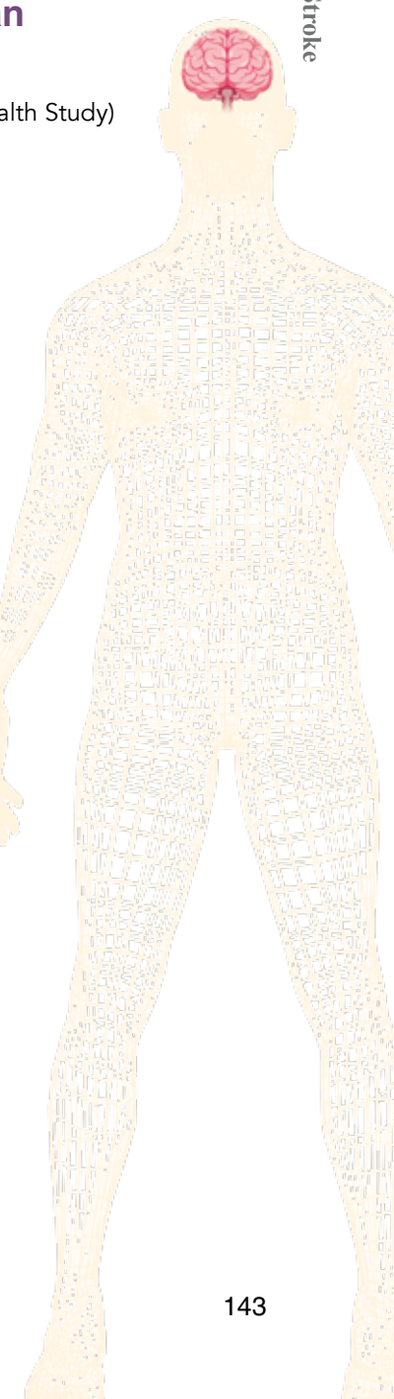
My vegetarian habit is to eat more vegetables, consume a wide variety of foods, and then combine this with exercise to allow my body to digest these good foods.

Developing regular exercise habits is an important part of a healthy lifestyle. I exercise at least one to two hours every Tuesday and Friday, and spend four hours on exercise on Saturdays. My exercise routine includes basic stretching, horse stance, Tai Chi (fist, sword, and saber forms), and internal martial arts training. At other times, walking can also be considered exercise training. Internal martial arts can be practiced anytime, anywhere. Doing a little exercise whenever you have time will accumulate enough exercise volume to achieve the best effects.

5.Stroke

[ACADEMIC PAPER]

Vegetarian diet and incidence of total, ischemic, and hemorrhagic stroke in 2 cohorts in Taiwan



Database TCVS (Tzu Chi Vegetarian Study), TCHS (Tzu Chi Health Study) & Linked to Taiwan's National Health Insurance

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Authors Tina H T Chiu, Huai-Ren Chang, Ling-Yi Wang, Chia-Chen Chang, Ming-Nan Lin, Chin-Lon Lin

[Abstract]

Objective To determine how a vegetarian diet affects stroke incidence in 2 prospective cohorts and to explore whether the association is modified by dietary vitamin B12 intake.

Methods Participants without stroke in the Tzu Chi Health Study (cohort 1, n = 5,050, recruited in 2007-2009) and the Tzu Chi Vegetarian Study (cohort 2, n = 8,302, recruited in 2005) were followed until the end of 2014. Diet was assessed through food frequency questionnaires in both cohorts at baseline. Stroke events and baseline comorbidities were identified through the National Health Insurance Research Database. A subgroup of 1,528 participants in

cohort 1 were assessed for serum homocysteine, vitamin B12, and folate. Associations between vegetarian diet and stroke incidences were estimated by Cox regression with age as time scale, adjusted for sex, education, smoking, alcohol, physical activities, body mass index (only in cohort 1), hypertension, diabetes, dyslipidemia, and ischemic heart diseases.

Results Vegetarians had lower serum vitamin B12 and higher folate and homocysteine than nonvegetarians. In cohort 1, 54 events occurred in 30,797 person-years follow-up. Vegetarians (vs nonvegetarians) experienced lower risk of ischemic stroke (hazard ratio [HR], 0.26; 95% confidence interval [CI], 0.08-0.88). In cohort 2, 121 events occurred in 76,797 person-years follow-up. Vegetarians (vs nonvegetarians) experienced lower risk of overall stroke (HR, 0.52; 95% CI, 0.33-0.82), ischemic stroke (HR, 0.41; 95% CI, 0.19-0.88), and hemorrhagic stroke (HR, 034; 95% CI, 0.12-1.00). Our exploratative analysis showed that vitamin B12 intake may modify the association between vegetarian diet and overall stroke (p interaction = 0.046).

Conclusions

Taiwanese vegetarian diet is associated with a lower risk of ischemic and hemorrhagic strokes.

A Research Physician's Perspective

Dr. Chang Huai-Ren

Cardiologist at Hualien Tzu Chi Hospital

Dr. Lin Ming-Nan, Deputy Superintendent of the Family Medicine Department at Dalin Tzu Chi Hospital, Associate Professor Chiu Hsueh-ting from the Department of Nutritional Science at Fu Jen Catholic University, and I, under the leadership of CEO Lin Chin-lon of the Tzu Chi Medical Foundation, began researching the correlation between vegetarian nutrition and health in relation to Taiwanese dietary habits more than a decade ago. At that time, in addition to cerebrovascular stroke, we had yet to publish studies on ischemic heart disease, heart failure, and arrhythmia. Some of these were due to insufficient case numbers discovered when linking to the National Health Insurance database, or because we couldn't yet discern any differences.

Before we published our paper, Oxford University in the UK had just released a study stating that vegetarianism increases the proportion of strokes. At that time, some papers had already confirmed that vegetari-

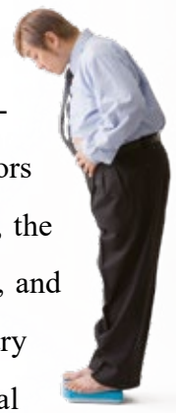
anism could protect the heart, but whether it protected against stroke was still a question mark, with no definitive conclusion.

Therefore, our paper focused on researching the vegetarian dietary patterns of Taiwanese and East Asian people. We used two prospective cohort follow-up studies from the Tzu Chi database, setting up various modules for analysis. After adjusting for all confounding factors, the conclusions were consistent: vegetarianism reduces the proportion of strokes by 60-74%. This reduction was not only in ischemic strokes but also in hemorrhagic strokes. However, because there were fewer cases of hemorrhagic strokes, the reviewers raised this point when we submitted the paper, so we didn't emphasize the effect of vegetarianism on hemorrhagic strokes as much. The research results were published in the journal Neurology in 2020, which is a top global scientific journal in the field of clinical neurology.

Dietitian's Advice

According to the 2021 statistics from the Ministry of Health and Welfare on the top ten causes of death, heart disease ranks second, and cerebrovascular disease ranks fourth. The World Health Organization considers both to be vascular-related diseases. Therefore, any risk factors that cause an increase in blood pressure, blood sugar, blood lipids, excess weight, and obesity will increase the risk of developing these two diseases. Conversely, if blood pressure, blood sugar, and blood lipids can be controlled and standard body weight maintained, stroke can also be prevented.

In addition to using medication for control, more experts recommend first implementing a therapeutic lifestyle for at least 3 to 4 months. By adjusting diet and lifestyle habits, the progression of chronic metabolic diseases (hypertension, hyperglycemia, and hyperlipidemia) can be controlled, risk factors eliminated, and the probability of stroke reduced. Currently, the diet proven to effectively lower blood pressure, blood lipids, and subsequently control blood sugar is the "DASH diet" (Dietary Approaches to Stop Hypertension). Proposed by the National Institute of Health (NIH), it recommends foods rich in fiber, protein, calcium, potassium, and magnesium, including vegetables, fruits, low-fat dairy products, whole grains (while reducing refined grains), plant oils, white meat, nuts, and legumes. Foods containing large amounts of saturated fats (such as fatty meat, full-fat dairy products, coconut oil, and palm oil), trans fats, and high sodium content (exceeding 2300 mg per day) should be avoided.



[Nutritional Analysis] Per serving 120g, this recipe contains 3 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
237.58	7.6	1.1	0.2	48.9	0	229.8

Category: Whole Grains

Cooking Time: 40 minutes

Buckwheat Noodle Dumplings

Buckwheat belongs to the whole grain category and contains protein and dietary fiber comparable to wheat. Buckwheat grains contain higher amounts of soluble fiber than other cereal crops, and their vitamin B2, B1, and E content is significantly higher than other crops. They also contain rutin, which has blood vessel dilation and strengthening effects, helping to prevent stroke and hypertension.

Wheat protein lacks gluten properties, thus elasticity, so sometimes wheat flour is added during the production process to enhance texture. The Health Promotion Administration recommends consuming at least 1/3 unrefined grains daily to increase the intake of dietary fiber, various vitamins, minerals, and trace elements.

Ingredients

- medium gluten flour ····· 150g
- buckwheat flour ····· 50g
- water ····· 100cc

Seasonings

- salt ····· 2g

Instructions

1. Mix buckwheat flour and medium gluten flour evenly, add salt, then gradually add 100cc of water to the flour (start kneading, adding water while kneading) until the two types of flour can be kneaded into a dough (not sticking to hands or bowl, smooth surface). Place in a plastic bag or wrap with cling film and let rest for 20 minutes to relax.
2. Take out the relaxed dough, knead it again, and shape it into a long strip. Set aside.
3. Prepare a pot of water and bring to a boil over high heat. Tear the long strip of dough into small pieces, press with your fingers, and throw them into the hot water. Cook until they float to the surface, then remove.
4. 4. Let cool (and could be frozen for storage), to be used as a staple food substitute.
5. Can be paired with the vegetable soup recipe in this book to make vegetable noodle dumpling soup, or stir-fried, or eaten with dipping sauce.

[Nutritional Analysis] Per serving 130g, this recipe contains 2 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
117.8	13.5	5.7	1.4	19.7	2.4	101.9

Category: Side Dish

Cooking Time: 20 minutes

Natto Vegetable Roll

Natto is mainly made from soybeans fermented with Bacillus subtilis, forming a pungent and sticky food. During the fermentation process, it not only retains the nutritional value of soybeans but also contains rich vitamin K2 and produces many active substances, such as nattokinase, which has the effect of dissolving fibrin in the body (preventing blood clots) and other health-promoting functions that regulate physiological functions. As nattokinase is not very heat-resistant, it is recommended to eat natto mainly as a cold dish, avoiding prolonged heating and cooking. Due to its strong and unique flavor, it is suggested to pair it with foods that have a mild taste and no special odor to balance the unique taste of natto.

Ingredients

1 pack of natto (about 50g)
(small grain natto, can be vegetarian)

baby cabbage 200g

Half pack of cold tofu (about 150g)

Seasonings

yellow mustard
(sauce pack included with natto) 1g

soy sauce (or use the sauce pack included with store-bought natto) 3cc

Instructions

1. Separate baby cabbage leaves one by one, wash clean, blanch in boiling water (until the stem becomes slightly transparent), place in cold water to cool, then remove and drain. Set aside.

2. Open the natto pack, use chopsticks to stir until it becomes stringy and slimy, add yellow mustard and soy sauce, stir again (to mix the seasonings evenly into the natto). Mash the cold tofu and set aside.

3. Take two blanched baby cabbage leaves (depending on size), half-roll them (with the stem inside) to form a funnel shape (fold the leaves outward to keep the funnel-shaped roll from coming apart), fill the center with mashed tofu and seasoned natto (tofu to natto ratio 2:1). Ready to eat.

[Nutritional Analysis] Per serving 208g, this recipe contains 2 servings

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium
152.9	8.9	3.4	0.7	26.9	5.3	521

Category: Soup

Cooking Time: 20 minutes

Classic Middle Eastern Lentil Soup

Red lentils, also known as meat beans, red meat beans, fire sickle lentils, Emei beans, lentil seeds, or red snow beans, are common household ingredients in the Middle East and one of the staple foods in the region. Red lentils are particularly rich in vitamin A and protein (plant-based protein), with protein content similar to meat but very low in fat. Additionally, they are rich in dietary fiber and minerals, which help with weight control. Red lentils are mainly cooked by stewing, and because they easily gelatinize, there's no need to add extra starch or thickeners when making thick soups. Paired with some spices, it's easy to cook healthy dishes with an exotic flavor.

Ingredients

- red lentils ····· 60g
- onion ····· 1/2 (about 100g)
- tomato ····· 1 (about 180g)
- lemon ····· 1/4 (about 25g)
- mint leaves ····· a few (for decoration)
- teaspoon olive oil ····· 1 (about 5g)

Seasonings

- cumin powder (adjust to personal taste) ····· 3-5g
- mixed pepper powder (adjust to personal taste) ····· 2-3g
- salt ····· 3g

Note

If you're not accustomed to the spices used in Middle Eastern cuisine, such as cumin powder or paprika powder, you can omit them and only use familiar seasonings like salt and pepper. It will still be a delicious and nutritious soup!

Instructions

1. Rinse red lentils and soak for half an hour; peel and chop the onion; wash and dice the tomato (better if peeled); squeeze the lemon juice and set aside.
2. Pour olive oil into a frying pan, add chopped onions, and fry over medium heat until slightly yellow, then add tomato dices and stir-fry (cook the tomatoes until soft).
3. Add red lentils and mix well, add cumin powder and 400cc water (if you want a thicker consistency, 300cc water is enough), turn to high heat and bring to a boil.
4. Use a food processor to blend the ingredients in the soup into a thick soup. Add salt and mixed pepper powder for seasoning before removing from heat. Finally, drizzle lemon juice and garnish with mint leaves.

Category: Snack

Cooking Time: 90 minutes

Fennel Olive Oil Cookies

Fennel is a low-calorie, high-fiber food rich in antioxidants, and is also a good source of vitamin C and calcium. Fennel also contains many other nutrients such as iron, magnesium, vitamin B6, and potassium. Fennel has anti-inflammatory and antioxidant properties: it is rich in powerful antioxidants such as vitamin C, chlorogenic acid, limonene, and quercetin, which are helpful in protecting blood vessel wall health.

[Nutritional Analysis] Per serving 12g, this recipe contains 24 servings

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium	Dietary Fiber (g)
45	1.1	1.4	0.2	7.2	1.3	29	0.7

Ingredients

- fennel seeds ····· 1 teaspoon(2g)
- whole wheat flour ····· 200g
- yeast ····· 1/2 teaspoon(2g)
- warm water ····· 70ml
- olive oil ····· 3 tablespoons(3g)
- baking soda ····· 1/2 teaspoon(3g)

Seasonings

- white sugar ····· 2 tablespoons(30g)
- salt ····· 1/2 teaspoon

Instructions

1. Pour olive oil into a frying pan and fry fennel seeds at low temperature until bubbling, then turn off the heat, let cool, and set aside.
2. Put whole wheat flour in a mixing bowl, add salt and baking soda, mix well, and set aside.
3. Take 70ml of warm water (about 60 degrees Celsius), pour into a container, add 1 tablespoon of white sugar and yeast, and stir.
4. Pour the yeast liquid from step 3 into step 2, knead into a ball, then add the fennel olive oil from step 1 and knead into the dough.
5. Put the kneaded dough into a mixing bowl, seal, and let it ferment at room temperature for 1 hour. Prepare two large baking papers and two long rulers.
6. First, flatten the fermented dough with your hands, place it on the baking paper, cover with another baking paper, place long rulers on both sides (to help maintain uniform cookie thickness), use a rolling pin to roll into a rectangle. Use a fork to poke small holes.
7. Use the long ruler to mark every 8cm on the left and right sides, use the ruler and scraper to divide the cookie sizes (the dough can make 24 cookies in total, it is recommended to roll it flat in two batches).
8. Put the cut cookies into a 180-degree oven and bake for 8-10 minutes.

6.Urinary tract infection

[ACADEMIC PAPER]

The risk of urinary tract infection in vegetarians and non-vegetarians a prospective study

Database TCVS (Tzu Chi Vegetarian Study) & Linked to Taiwan's National Health Insurance

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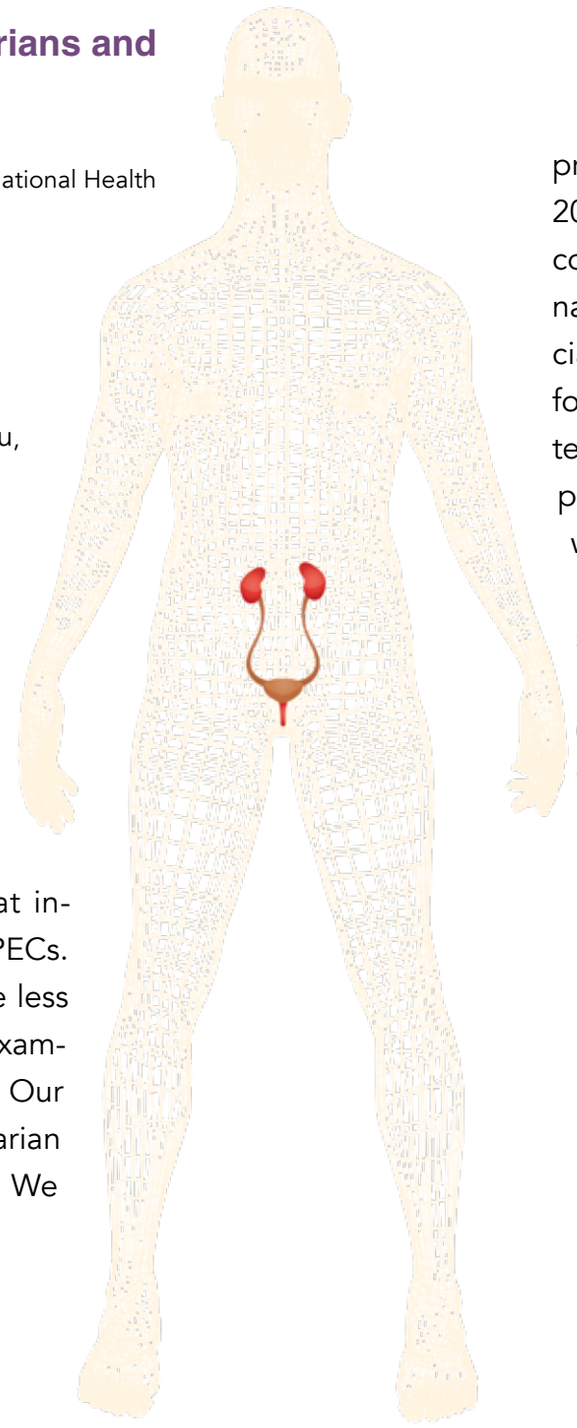
Authors Yen-Chang Chen, Chia-Chen Chang, Tina H T Chiu, Ming-Nan Lin, Chin-Lon Lin



[Abstract]

Urinary tract infection (UTI) is caused principally by ascending Escherichia coli infection via an intestine-stool-urethra route. Recent studies found that the strains of E. coli causing UTIs, called extra-intestinal pathogenic E. coli (ExPEC), were distinct from the intestinal pathogenic strains and normal commensal strains. Further analysis found the meat including poultry and pork is the major reservoir for ExPECs. Vegetarians avoid meat and should theoretically have less exposure to ExPEC. However, no study thus far has examined whether vegetarian diets reduce the risk of UTI. Our aim was to examine the association between vegetarian diet and UTI risk in a Taiwanese Buddhist population. We prospectively followed 9724 Buddhists free of UTI from 2005 to 2014. During the 10-year follow-up, 661 incident UTI cases were confirmed. Diet was assessed through a food frequency questionnaire. Cox regression was used to evaluate the prospective association between a vegetarian diet on risk of UTI while adjusting for age, sex, educational level, alcohol-drinking, smoking, hypertension, diabetes mellitus, hyperlipidemia, and disease conditions predisposing to UTIs. Overall, vegetarian diet was associated with 16% lower hazards (hazard ratio [HR]: 0.84, 95% confidence interval [CI]: 0.71-0.99). In subgroup analysis, the protective association between vegetarian diet and UTI is observed mainly in the female (HR: 0.82, 95% CI: 0.69-0.99), never smokers (HR: 0.80, 95% CI: 0.67-0.95), and for uncomplicated UTI (HR: 0.81, 95% CI: 0.68-0.98).

A Research Physician's Perspective

Dr. Chen Yen-Chang

Department of Anatomical Pathology, Hualien Tzu Chi Hospital

As a child, seeing chickens being slaughtered in the market seemed cruel, so I decided to become a vegetarian. After becoming vegetarian, I felt my mind was clearer, and I wouldn't create negative karma with other beings.

Being a vegetarian myself and wanting to promote vegetarianism, I came to know the Taiwan Vegetarian Nutrition Society by chance. Learning that Executive Director Lin Chin-Lon was conducting vegetarian research, I joined the research team. During discussions, Executive Director Lin mentioned preliminary ideas about vegetarianism and urinary tract infections, giving me the opportunity to be the researcher on this topic. With the joint efforts of professional nutritionists and statistical analysts in the team, we achieved good research results.

My personal experience is that vegetarians need to pay special attention to diverse intake, eating vegetables, fruits, nuts, grains, and legumes, especially ensuring adequate protein intake. Eating a lot of fried foods would be very unhealthy. Besides reducing the risk of urinary tract infections, vegetarianism also has protective effects against gout, stroke, cardiovascular diseases, and more.

I'd like to share my life philosophy with everyone - A vegetarian diet means fewer illnesses and fewer health worries; practicing vegetarianism protects life and creates blessings; spreading love and fulfilling vows through collective goodness.

Dietitian's Advice

According to the Taiwan Urological Association, urinary tract infection refers to the invasion of microorganisms in organs such as the kidneys, ureters, bladder, and urethra, causing various symptoms. The urinary system composed of these organs is mainly responsible for excreting excess water and metabolic waste from the body, as well as maintaining electrolyte balance and blood pressure control. High-risk groups for UTI include women, children, the elderly, long-term bedridden patients, or

those with congenital urinary tract diseases, urinary stones, kidney disease, diabetes, or those who frequently hold urine and are constipated.

To prevent urinary tract infections, in addition to maintaining personal hygiene and urinating frequently, the most important nutritional aspects are drinking plenty of water and eating high-fiber vegetables to reduce constipation. Controlling the "three highs" (high blood sugar, high blood pressure, high blood lipids) is also an important requirement for protecting the kidneys. Many domestic and international studies mention the preventive effects of cranberries, vitamin C, and probiotics on urinary tract infections. For example, cranberries contain proanthocyanidins, which can reduce simple urinary tract infections caused by E. coli, but many commercial products add large amounts of refined sugar, which may not be suitable for diabetics. Vitamin C and phytochemicals (such as sulfur compounds, anthocyanins, etc.) are abundant in vegetables and fruits and can increase antioxidant capacity, helping the body fight infections and speed up recovery..

Additionally, probiotics can maintain the balance of intestinal flora, not only improving constipation and aiding digestion but also enhancing immunity and preventing infections. One of the most common probiotics, lactic acid bacteria, can also reduce vaginal and urinary tract inflammation. The simplest way to maintain health is to increase daily water intake, which can reduce the amount of bacteria in urine. The recommended water intake for the general public is about 30-35 times per kilogram of body weight (in milliters).

Recommended Daily Water Intake for the General Public

Body weight (kg) multiplied by **30 to 35**

For example for a person weighing 70 kg, the recommended daily water intake is approximately: 70 × 30 = 2,100 to 70 × 35 = 2,450

A person weighing 70 kg should drink 2,100 to 2,450 milliliters of water per day.

In this topic, nutritionists have specifically designed four recipes for urinary tract infections, including Vegetarian Scallop Pesto Pasta, Bell Pepper Stuffed with Eggs, Italian Vegetable Stew, and Yogurt Tiramisu.

▲ Vegetarian Scallop Pesto Pasta (shown on Page 164)

▲ Bell Pepper Stuffed with Eggs (shown on Page 166)

▲ Italian Vegetable Stew (shown on Page 168)

▲Yogurt Tiramisu (shown on Page 170)

In addition to the aforementioned antioxidant nutrients (phytochemicals, vitamin C) and probiotics (lactic acid bacteria), they have also increased the use of vegetables in main dishes and stews to increase dietary fiber intake.

Antioxidant Foods

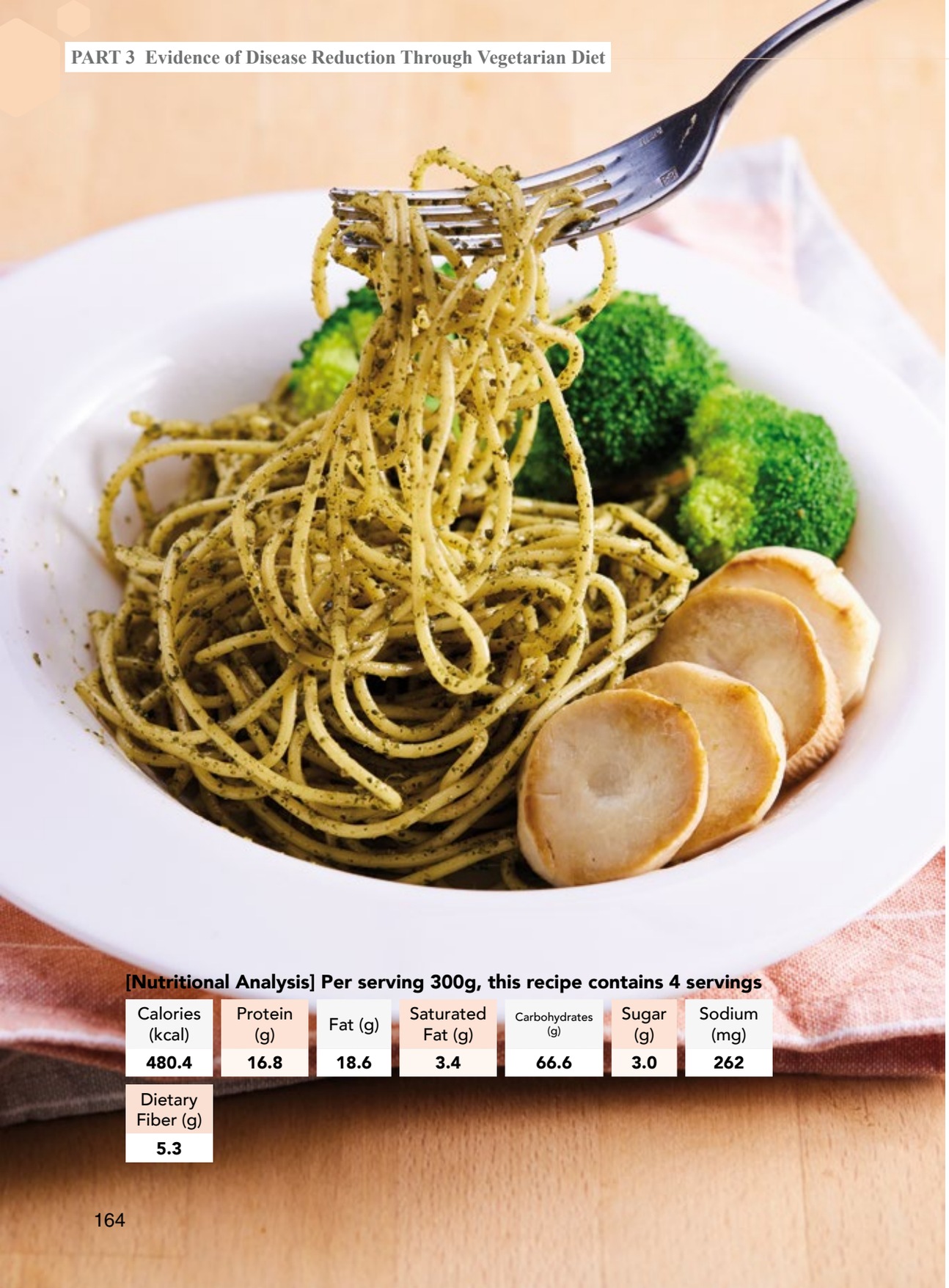
▲ Broccoli

▲ Bell Peppers

Probiotic Foods

▲ King Oyster Mushroom

▲ Yogurt



[Nutritional Analysis] Per serving 300g, this recipe contains 4 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
480.4	16.8	18.6	3.4	66.6	3.0	262

Dietary Fiber (g)
5.3

Category: Whole Grains

Cooking Time: 25 minutes

Vegetarian Scallop Pesto Pasta

Broccoli is rich in vitamin C and a natural phytochemical called sulforaphane, which has antioxidant functions that can help the body fight infections and speed up recovery. The best methods to preserve these nutrients include brief blanching, steaming, and quick stir-frying. In addition to increasing dietary fiber intake by adding a large amount of vegetables to this main dish, walnuts are chosen as a nut source to replace part of the oil source, enhancing food flavor and nutrients. The use of imitation scallops - pan-fried king oyster mushrooms - adds some fun to food preparation.

Pesto Ingredients

- Basil 150g
- Cooked walnuts 35g
- Olive oil 40g
- Salt ..... 1/4 teaspoon
- Black pepper powder ..... 1/4 teaspoon
- Lemon juice 10g
- Parmesan cheese powder 15g

Seasonings

- Straight pasta 320g
- Broccoli ..... 1 head 300g
- King oyster mushroom 150g
- Black pepper salt ..... (add to taste)

Instructions

1. Put all pesto ingredients in a container and blend with a homogenizer until smooth to make the pesto.
2. Clean the broccoli, remove the tough skin, cut into small florets, and blanch in hot water until soft. Slice the king oyster mushrooms into rounds, dry fry in a flat pan until colored, and finally sprinkle with black pepper salt for seasoning to make vegetarian scallops.
3. Prepare a pot of hot water, add the pasta, and cook over medium-high heat for about 8-10 minutes until done, then drain.
4. In a flat pan, add the pasta and pour in the pesto. Stir-fry over low heat for about 3 minutes. You can add an appropriate amount of hot water (about 100ml) to adjust the sauce consistency according to personal preference. Cook until done, transfer to a large plate, add broccoli and vegetarian scallops, and serve.

[Nutritional Analysis] Per serving 180g, this recipe contains 4 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin C
133.2	8.6	6.0	1.8	12.8	0.1	250	134.2

Category: Side Dish

Cooking Time: 30 minutes

Bell Pepper Stuffed with Eggs

This dish uses baking techniques to reduce oil use while preserving the original flavor of the food. In terms of nutritional value, every 100 grams of red bell pepper contains 137 mg of vitamin C, which far exceeds the average daily recommended intake of 100 mg for Taiwanese people. Red bell peppers also have significantly higher vitamin C content than yellow or green bell peppers. Consuming enough vitamin C daily can help maintain the body's antioxidant capacity, enhance immunity, and prevent infections.

Ingredients

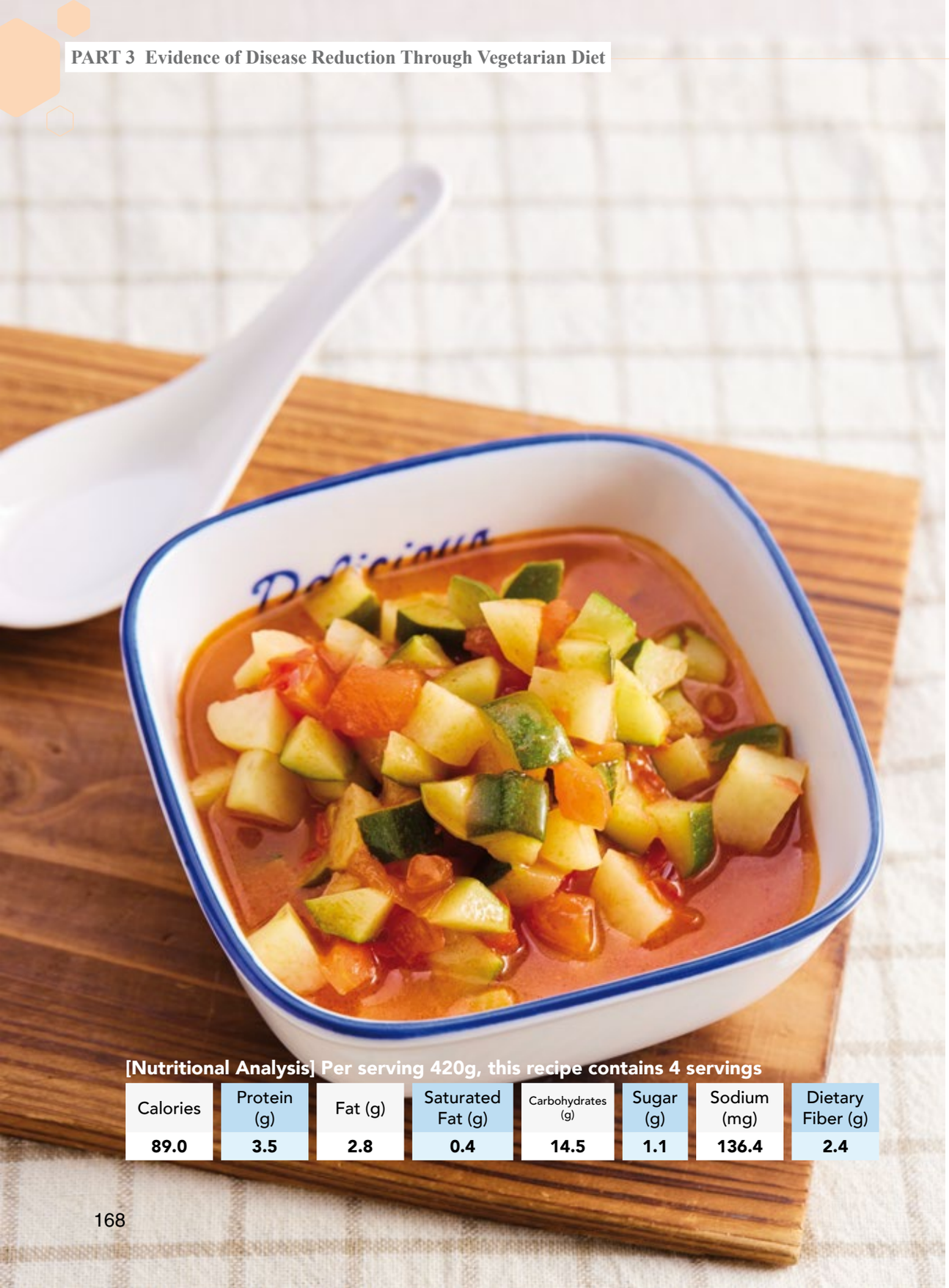
- 1 Potato (small) ····· 150g
- Red bell peppers 2 pcs ····· 400g
- Eggs 4 pcs ····· 240g

Seasonings

- Olive oil ····· 1/2 teaspoon
- Provencal herb salt ····· 1/4 teaspoon
- Salt ····· 1/4 teaspoon
- Black peppercorns ····· 1/8 teaspoon

Instructions

1. Preheat the oven to 200°C.
2. Make mashed potatoes: Peel and dice the potato, boil in a pot until cooked (can be pierced with chopsticks), drain, mash while hot, then add all seasonings and mix well.
3. Wash the red bell peppers, cut in half, remove seeds, keeping the stem part (each pepper can make two pieces).
4. Assembly and baking: Use a spoon to scoop an appropriate amount of mashed potato and spread it inside each bell pepper piece (about 25g per piece). Place on a baking tray, crack an egg into each, and move into the oven. Bake at 200°C with top and bottom heat for about 15-20 minutes until the eggs are cooked. Remove and serve.



[Nutritional Analysis] Per serving 420g, this recipe contains 4 servings

Calories	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
89.0	3.5	2.8	0.4	14.5	1.1	136.4	2.4

Category: Soup

Cooking Time: 35 minutes

Italian Vegetable Stew

Different colored ingredients represent different natural phytochemicals and functions. For example, lycopene in tomatoes and sulfur compounds in cabbage both have antioxidant capabilities, which can prevent body infections. This dish uses the natural flavors of ingredients along with herbs (Italian herbs) and low-sodium seasonings (tomato sauce) to reduce excessive salt intake from typical store-bought broths, achieving the effect of protecting the kidneys and urinary system. The addition of olive oil is to help the absorption of fat-soluble nutrients (lycopene).

Ingredients

- Green zucchini (1 pc) ····· 200g
- Beef tomato (1 medium) ····· 200g
- Potato (1 medium) ····· 200g
- Cabbage ····· 200g
- Olive oil ····· 2 teaspoons (10g)
- Water ····· 1000ml

Seasonings

- Tomato sauce ····· 2 teaspoons
- Salt ····· 1/4 teaspoon
- White pepper powder ····· 1/4 teaspoon
- Italian herbs ····· 1/2 teaspoon (optional)

Instructions

1. First, prepare the green zucchini, beef tomato, and potato (peeled) by cutting them into cubes (cut larger if you prefer more texture). Wash the cabbage and cut into small pieces.
2. In a deep pot, add olive oil and all the ingredients, stir-fry over medium heat for about 3-5 minutes, then pour in 1 liter of hot water and bring to a boil over high heat, then reduce to low heat.
3. Add all the seasonings, cover with a lid, and simmer for about 30 minutes until the ingredients are soft. Serve.

[Nutritional Analysis] Per serving 165g; this recipe contains 2 servings

Calories	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
275.8	7.1	20.4	3.9	20.0	12.7	70.2

Category: Snack

Cooking Time: 15 minutes

Yogurt Tiramisu

Commercially available tiramisu usually contains excessive fat and refined sugar, which can be a burden on the body. The design purpose of this recipe is to find a simple way to make a dessert that satisfies the taste buds. It uses walnuts instead of high-fat cookies and yogurt instead of cream cheese. Yogurt, a fermented dairy product, is rich in natural probiotics - lactic acid bacteria, which can reduce the risk of vaginal and urinary tract inflammation. Supplementing with probiotics can help improve intestinal flora and strengthen the body's immune system.

Ingredients

- Cooked walnuts ····· 50g
- Maple syrup ····· 10g
- Sugar-free Greek yogurt ····· 200g
- Unsweetened cocoa powder ····· as needed

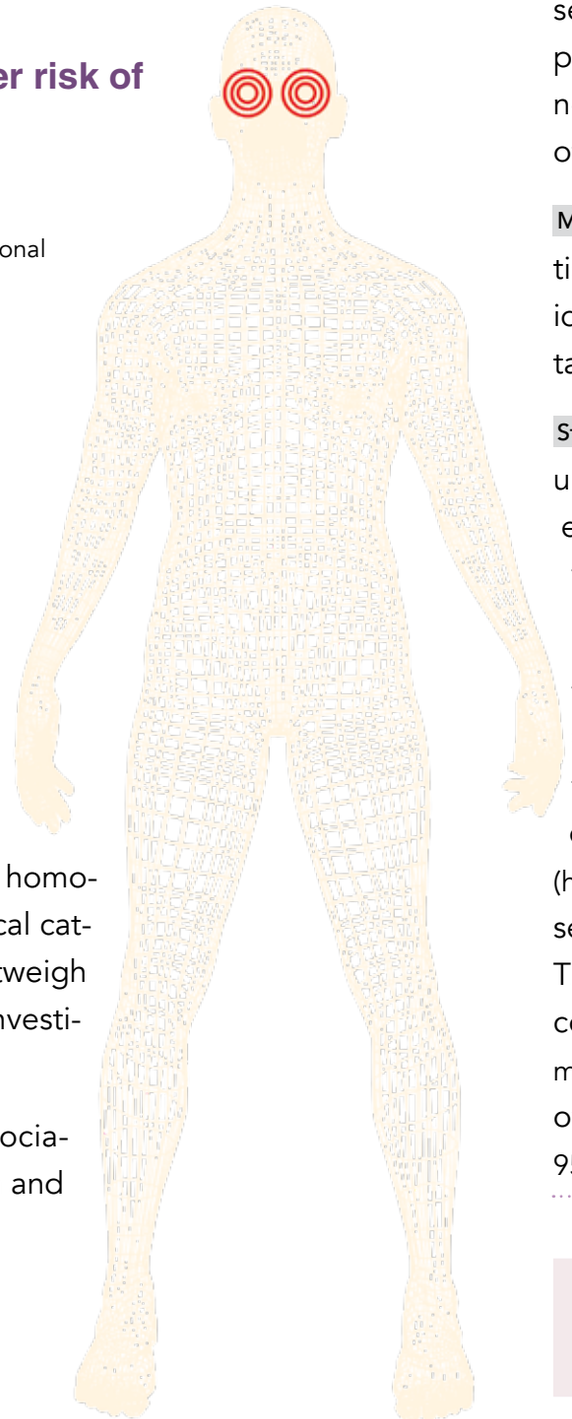
Instructions

1. Make the cookie base: First, put the walnuts in a food processor and grind into crumbs, then mix with maple syrup and spread evenly on the bottom of a clean container, pressing flat.
2. Filling layer: Spread an appropriate amount of Greek yogurt (if you prefer sweetness, you can choose yogurt with sugar or add banana cubes).
3. Decoration: Take a sieve, pour in cocoa powder, and sprinkle on the top layer to complete the decoration. Ready to serve.

7.Cataract

[ACADEMIC PAPER]

A vegetarian diet is associated with a lower risk of cataract, particularly among individuals with overweight: a Prospective Study



Database TCHS (Tzu Chi Health Study) & Linked to Taiwan's National Health Insurance

Publication J Acad Nutr Diet. 2021 Apr;121（4）:669-677.e1.

doi 10.1016/j.jand.2020.11.003. Epub 2020 Dec 11.

Authors Tina H T Chiu, Chia-Chen Chang, Chin-Lon Lin, Ming-Nan Lin

[Abstract]

Background Cataracts are caused by oxidative stress in the lens of the eyes and plant-based dietary patterns can contain a wide variety of protective antioxidants. However, strict vegetarians with inadequate vitamin B-12 intakes can have elevated homocysteine levels, which could increase the risk of cortical cataracts. Whether the benefits of a vegetarian diet outweigh its risks in the development of cataracts warrants investigation.

Objective Our aim was to study the prospective association between a Taiwanese vegetarian dietary pattern and cataract risk.

Design This was a prospective cohort study.

Participants/setting The Tzu Chi Health Study recruited 6,002 participants from 2007 to 2009 at Dalin Tzu Chi Hospital. Diet was assessed through a validated food frequency questionnaire. Participants 40 years and older and without cataracts at recruitment (3,095 nonvegetarians and 1,341 vegetarians) were followed until the end of 2014, death, or occurrence of cataracts.

Main outcome measures Cataract incident cases ((International Classification of Diseases, 9th Revision, Clinical Modification code 366) were identified by linkage to the National Health Insurance Research Database in Taiwan.

Statistical analysis Cox proportional hazard regression with age as the underlying scale was used to estimate the association between dietary patterns and cataract risk while adjusting for potential confounders.

Results Compared with nonvegetarians, vegetarians had higher intakes of soy, vegetables, nuts, whole grains, dietary fiber, vitamin C, folate, and vitamin A equivalent. In the 25,103 person-years of follow-up, 476 incident cases of cataracts were identified. A vegetarian diet was associated with a 20% reduced risk of cataracts (hazard ratio 0.80, 95% CI 0.65 to 0.99; P = 0.04) after adjusting for sex, education, smoking, alcohol drinking habits, physical activities, Tzu Chi volunteer status, hypertension, diabetes, hyperlipidemia, corticosteroid prescription, and body mass index (calculated as kg/m2). This association was more pronounced among individuals with overweight (defined as body mass index ≥24 in Taiwan [hazard ratio 0.70, 95% CI 0.50 to 0.99; P = 0.04]).

★ Conclusions ★

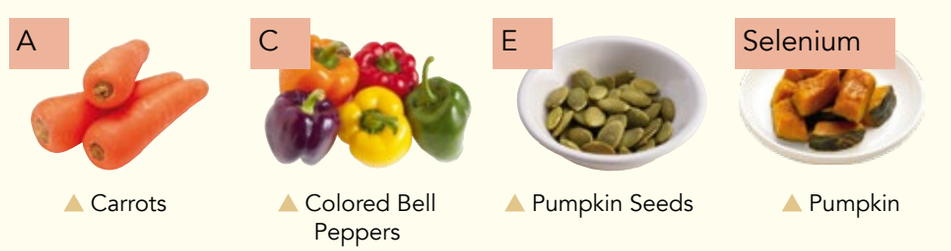
A vegetarian diet was associated with a lower risk of cataracts, particularly in study participants with overweight.

Dietitian's Advice

Cataracts are a degenerative, age-related eye disease. If we want to prevent cataracts through diet, how should we eat to effectively help prevent the occurrence of cataracts? We can first briefly explain the causes of cataracts.

It turns out that cataracts are caused by the gradual hardening and clouding of the lens as the body ages, leading to visual impairment. Another type of cataract is caused by external forces damaging vision. To delay aging, we can consume antioxidants in food, such as vitamins A, C, E, selenium, and fish oil.

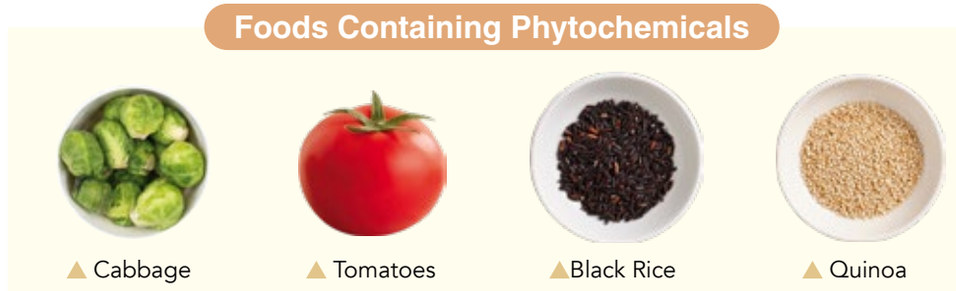
Foods Containing Vitamins A, C, E, and Selenium



▲ Carrots ▲ Colored Bell Peppers ▲ Pumpkin Seeds ▲ Pumpkin

The most common and widely present antioxidants in food are vitamins A, C, E, and the most important element - phytochemicals. The phytochemicals contained in plant-based foods have different functions for the human body, such as antioxidant properties, free radical scavenging, immune function activation, and immune system enhancement. They help in treating and preventing chronic diseases such as hypertension, diabetes, obesity, osteoporosis, and cardiovascular diseases. Common phytochemicals include anthocyanins, lycopene, catechins, and carotenoids. Examples of foods containing phytochemicals include kale, broccoli, cauliflower, tomatoes, pumpkin, purple rice, brown rice, quinoa, and bell peppers.

Foods Containing Phytochemicals



▲ Cabbage ▲ Tomatoes ▲ Black Rice ▲ Quinoa

Absorption rate is closely related to cooking methods. Fat-soluble vitamins A and E can achieve the best absorption rate when cooked with healthy fats (e.g., stir-frying, pan-frying).

The ingredients presented in the recipes are all rich in vitamins and phytochemicals, which means that in addition to cataracts, we can also prevent other chronic diseases.

▲ Quinoa Rice Balls (shown on Page 176)

▲ Garlic Butter Wild Mushroom Roasted Bell Peppers (shown on Page 178)

▲ Eye-Protecting Thick Soup (shown on Page 180)

▲ Nut and Pumpkin Parent-Child Balls (shown on Page 182)

[Nutritional Analysis] Per serving 40g, this recipe contains 10 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin A (IU)
82	2	1	0.2	15.9	0	360	102.2

Category: Whole Grains

Cooking Time: 50 minutes

Quinoa Rice Balls

According to the Ministry of Health and Welfare's daily dietary guidelines, at least 1/3 of the main food, which is whole grains and cereals, should be unrefined grains. Quinoa, originally a staple food in South America, belongs to the unrefined whole grain category. It is highly nutritious, containing nutrients such as vitamin E, vitamin B1, folic acid, iron, calcium, copper, magnesium, manganese, phosphorus, potassium, and zinc. Although it's called quinoa, it doesn't contain gluten, making it a good grain choice for those with gluten allergies or intolerances. This dish is paired with Lion's mane mushroom filling, which can increase fiber intake.

Pesto Ingredients

- Quinoa ····· 30g
- White rice ····· 170g (about 1 standard cup)
- Lion's mane mushroom ····· 30g
- Seaweed ····· 1 sheet (about 3g)
- Cooked edamame ····· 30g

Seasonings

- Olive oil ····· 3g
- Sesame oil ····· 3g
- Salt ····· 1g

Instructions

1. Wash the Lion's mane mushroom and quinoa separately, and soak them in water for about 30 minutes.
2. Wash the white rice, add the soaked quinoa, and steam in a rice cooker until cooked. Set aside.
3. In a frying pan, add olive oil and sesame oil (1:1 ratio), put in the Lion's mane mushroom and edamame, stir-fry evenly, and then add salt for seasoning.
4. Take an appropriate amount of rice, add the stir-fried Lion's mane mushroom, shape it as desired, and wrap with seaweed. Ready to serve.

[Nutritional Analysis] Per serving 200g, this recipe contains 4 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin A (IU)
82.5	**2.7**	**3.5**	**1.7**	**13.1**	**1.1**	**466.8**	**1283.75**

Category: Side Dish

Cooking Time: 10-15 minutes

Garlic Butter Wild Mushroom Roasted Bell Peppers

This dish uses red and yellow bell peppers as the main ingredients, which are rich in vitamin C, vitamin A, fiber, calcium, phosphorus, iron, magnesium, potassium, sodium, zinc, and abundant phytochemicals: beta-carotene. During cooking, adding fats can increase the release and absorption of fat-soluble vitamins. Many people are very afraid of the taste of bell peppers. However, after roasting, the taste of bell peppers becomes sweeter and less intense, and pairing with green beans can increase visual richness.

Ingredients

- Red bell pepper ..... 1 (about 250g)
- Yellow bell pepper ..... 1 (about 250g)
- Shimeji mushroom 100g
- Green beans ..... about 150g
- Garlic ..... 3 cloves (about 10g)

Seasonings

- Butter 15g
- Black pepper 5g
- Sea salt 5g

Instructions

1. Wash all ingredients and cut them into bite-sized pieces. Preheat the oven to 200°C.
2. In a frying pan, add butter and heat over low heat. Add minced garlic and stir-fry until fragrant.
3. On a baking tray, lay a sheet of baking paper, evenly arrange all the vegetables, sprinkle with black pepper and sea salt, then drizzle with the sautéed garlic butter.
4. Place in the oven and bake for about 10 minutes. Remove and serve.

[Nutritional Analysis] Per serving 450g, this recipe contains 1 serving

Calories	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin A (IU)
325	10.8	12.9	3.7	42	11	807	9469

Category: Soup

Cooking Time: 40-50 minutes

Eye-Protecting Thick Soup

Carrots are rich in beta-carotene, which can be converted into vitamin A in the human body. They effectively help maintain healthy vision and have various health benefits such as antioxidant properties, free radical scavenging, cancer prevention, and anti-aging effects. They can also reduce macular degeneration. In addition to beta-carotene, carrots contain fiber, as well as minerals such as calcium, phosphorus, iron, niacin, and oxalic acid, which can repair and strengthen cell membranes. Stir-frying carrots can increase the absorption of fat-soluble vitamins in carrots.

Ingredients

- Carrot 80g
- Peas 35g
- Potato 150g
- Celery leaves 2g
- Milk 50cc
  (15g whole milk powder mixed with 35cc water)

Seasonings

- Salt 2g
- Canola oil ..... 2 teaspoons

Instructions

1. Wash, peel, and slice the carrot. Wash and peel the peas and potatoes, slice until cooked through, and set aside.
2. In a frying pan, add canola oil and sauté the carrots until cooked. Add salt and stir-fry until the carrots turn a powdery orange color.
3. Add 300cc of hot water and bring to a boil (you can adjust the amount of water to your preferred consistency). Transfer to a food processor and blend until smooth.
4. Pour into a soup bowl, sprinkle with celery leaves, and mix with milk (vegans can use plant-based milk as a substitute). Ready to serve.

[Nutritional Analysis] Per serving 30g, this recipe contains 10 servings

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium	Beta-carotene (μg)
84	3.2	5	0.6	11	1.5	10	455

Category: Snack

Cooking Time: 45 minutes

Nut and Pumpkin Parent-Child Balls

Pumpkin belongs to the whole grain and cereal category, not the vegetable category, but like most vegetables, it is rich in phytochemicals and fiber. Pumpkin flesh is rich in beta-carotene, vitamins A, C, and E, which can enhance immunity, neutralize free radicals, prevent free radical damage to cells, and thus achieve antioxidant effects. In addition, pumpkin seeds are also a good source of polyunsaturated fatty acids, minerals, vitamins A, B, E, and beta-carotene. This recipe improves on traditional snack-making methods, hoping to provide an easy snack-making option for those who only have a rice cooker.

Ingredients

- Pumpkin ····· 200g
- Cooked pumpkin seeds ····· 50g
- Long-grain glutinous rice ····· 80g

Seasoning

- Granulated sugar ····· 5g
- Powdered sugar ····· 10g
- Canola oil ····· 15g

Instructions

1. Wash the pumpkin, remove the hard skin, cut into pieces, and steam in a rice cooker until cooked. Remove, mash into a paste, let cool, add granulated sugar, and mix with oil. Set aside.
2. Wash the glutinous rice and soak in clean water for half an hour, then drain and set aside.
3. Divide the pumpkin paste into 20g balls (about the radius of a 50-cent coin), roll into rounds, then coat with glutinous rice. Place on a steaming cloth or non-stick bun paper, spacing 2-3 cm apart in the rice cooker.
4. Steam the glutinous rice pumpkin balls in a rice cooker or steamer over medium heat for 15-20 minutes until the glutinous rice is cooked through. While still hot, stick or insert pumpkin seeds, sprinkle with an appropriate amount of powdered sugar, and serve.

Cultivating Wellness | A Doctor's Green Prescription

With Correct Knowledge as a Foundation, Maintaining a Vegetarian Diet Is Not Difficult At All

Dr. Chang You-Kang

Department of Radiation Oncology, Taipei Tzu Chi Hospital

Without realizing it, I've been vegetarian for 12 years. I'm grateful for participating in the Taiwan Vegetarian Nutrition Society and sharing with nutritionists at Taipei Tzu Chi Hospital. Every time I educate new cancer patients about high-protein, high-calorie diets, I confidently tell them that it's not just fish, meat, dairy, and eggs that are high in protein. Foods like soybeans, edamame, chickpeas, cashews, and quinoa can also help cancer patients get through their treatment period with a correct and balanced diet.

Cancer patients often have iron and calcium deficiency problems, which can be easily solved with a plant-based diet. When I discover these issues, I have specialized educational handouts ready in my clinic that can be put to use immediately. Cancer patients often ask how to avoid recurrence after completing treatment. We know that intake of red meat, processed meats, and animal fats is associated with various cancers, while the abundant phytochemicals, high fiber, various vitamins, and trace elements in vegetarian diets are exactly what's needed to prevent cancer. The answer is quite clear.

Cancer patients often have some misconceptions, such as not being able to eat sweets. However, all starchy staple foods are actually sugars. Patients should reduce refined sugar intake and consume appropriate amounts of brown and black sugar instead. Another common myth is that soy products contain isoflavones, so breast and endometrial cancer patients shouldn't eat them. I tell patients that, according to professional nutritionists' recommendations, three servings of soy products a day is very safe. There are even large-scale human studies reporting that soy products can reduce tumor recurrence because low concentrations of soy isoflavones compete with the body's endogenous hormones for their receptors, reducing the effect of endogenous hormones on cells.

Five years ago, I began promoting the "Patient Autonomy Act," encouraging people to use careful hand-feeding instead of uncomfortable and low-quality-of-life nasogastric tube feeding. I'm grateful to the nutritionists at Taipei Tzu Chi Hospital for putting together techniques for careful hand-feeding and semi-liquid and liquid vegetarian formulas (note). This has been appreciated by many families with frail elderly members, as most recipes available are mainly meat-based.

I'm grateful that my family members went from respecting my vegetarian choice to, two years ago when the conditions were right, my wife also decided to join the vegetarian ranks. She started figuring out how to create various vegetarian dishes at home. Some Dharma sisters I know shared recipes or directly supplied vegetarian dishes. When eating out, we choose reputable vegetarian restaurants, slowly getting the children used to delicious and nutritious vegetarian food. Recently, I've also found that combining vegetarian food with enough exercise and perspiring has many health benefits. I've started walking more, hiking trails, climbing stairs, and learning to play badminton, hoping to be a model of vegetarian health. At appropriate times, I also tell patients that I'm vegetarian, hoping to encourage them to try it too.

Ever since I became vegetarian, I naturally don't want to touch non-vegetarian food anymore. To reassure my family, I of course pay more attention to correct vegetarian dietary principles. I've started to reduce dairy and egg products as much as possible, avoid refined starches, and try to use five-grain rice or brown rice instead of white rice; whole wheat or multi-grain bread instead of white flour or overly sweet and oily bread. I try not to drink popular sweet soft drinks, opting for sugar-free drinks, tea, or black coffee to reduce refined sugar intake. I eat fewer sweet biscuits or snacks, replacing them with healthier nuts. In addition to basic green vegetables, I also eat other colored vegetables, eggplants, and bell peppers in rotation, as well as calcium-rich foods like basil, seaweed, algae, black sesame, and wood ear fungus.

When first becoming vegetarian, the aroma of non-vegetarian food can be attractive. I found that the dining environment and the people you eat with are very important. I'm grateful to my family for supporting my vegetarian journey. I'm thankful for the Taiwan Vegetarian Nutrition Society and the nutritionists at Taipei Tzu Chi Hospital because correct nutritional knowledge is the essential foundation for healthy vegetarianism. This also helps patients develop healthy eating habits, preventing diseases at the source. For me now, the unhealthy vegetarian foods mentioned earlier are more tempting than non-vegetarian food. It's necessary to absorb more correct knowledge and healthy eating principles, reminding myself to pay attention to small details. Then you'll find that maintaining a vegetarian diet is not difficult at all.

8.Depression

[ACADEMIC PAPER]

Vegetarian diet is associated with lower risk of depression in Taiwan

Database TCVS (Tzu Chi Vegetarian Study) & Linked to Taiwan's National Health Insurance

Publication Nutrients 2021,13, 1059. doi: 10.3390/nu13041059

Authors Yu-Chih Shen, Chiao-Erh Chang, Ming-Nan Lin, Chin-Lon Lin

[Abstract]

In order to determine whether Taiwanese vegetarian diets reduce the risks of depression, we analyzed data from the Tzu Chi Vegetarian Study (TCVS), which is a prospective cohort study following 12,062 participants from the Buddhist Tzu Chi Foundation of Taiwan since 2005. The cohort was prospectively followed by linking to the National Health Institute Research Database (NHIRD) of Taiwan and hazard ratios of depression between vegetarian and non-vegetarian groups were calculated by Cox proportional hazards regression. We assessed dietary intake using a detailed food frequency questionnaire (FFQ). Incident depression was ascertained through linkage to NHIRD which had claim records with the International Classification of Diseases, and a total of 3571 vegetarians and 7006 non-vegetarians were included in this analysis. Compared with non-vegetarians, the vegetarian group had a lower incidence of depressive disorders (2.37 vs. 3.21 per 10,000 person-years; adjusted hazard ratio (aHR): 0.70; 95% confidence interval (95% CI): 0.52-0.93). Thus, Taiwanese vegetarians had a lower risk of developing subsequent depressive disorders compared with non-vegetarians. This indicated that diet may be an important measure for the prevention of depression. However, to generalize to the global population requires further study.

Dietitian's Advice

Nutritional advice to help stabilize mood and stay away from depression:

Sufficient protein

Amino acids are the main materials for neurotransmitters, and amino acids can be supplemented and obtained from protein-rich food sources. For vegetarians, the main sources of protein are beans and soy products. Soybeans and soy-based foods such as tofu, dried tofu, and tofu skin are good choices and pairings.

▲ Soybeans

▲ Tofu Skin

Tryptophan

Tryptophan is the main source of serotonin. Serotonin is a neurotransmitter, and when the metabolism of serotonin in specific brain areas is too fast or its synthesis is reduced, it may trigger depressive moods. Foods rich in tryptophan include avocados, cashews, soybeans, and milk.

▲ Avocado

▲ Cashews

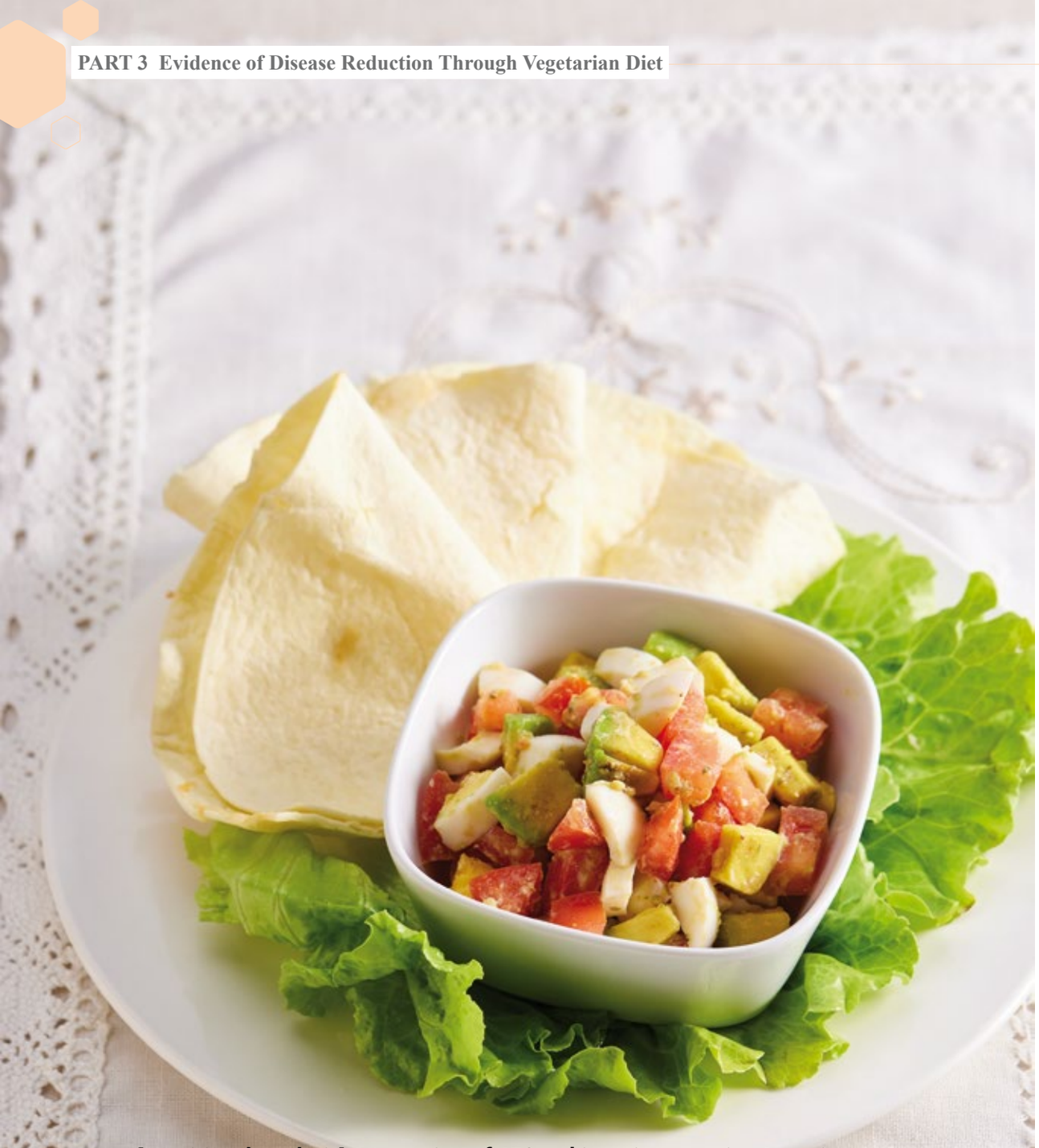
▲ Avocado Pita Bread (shown on Page 192)

▲ Golden Sand Peas (shown on Page 194)

▲ Energizing Vegetable Soup (shown on Page 196)

▲ Banana Berry Smoothie (shown on Page 198)

It is recommended that people consume a balanced diet of six major food groups, establish good living habits, develop regular exercise routines, spend time outdoors in the sun, maintain a pleasant mood, and reduce consumption of high-sugar and high-fat foods to keep depression at bay.



[Nutritional Analysis] Per serving of 150g, this recipe contains 1 serving

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
232	11.1	9.5	2.8	26.5	0	432

Category: Whole Grains

Cooking Time: 20 minutes

Avocado Pita Bread

A gloomy mood may be caused by low levels of unsaturated fatty acids! Avocados contain rich unsaturated fatty acids, which help improve mental and physical balance. Since avocados are rich in unsaturated fatty acids, they are prone to deterioration when cooked at high temperatures. It is recommended to use low-temperature cooking methods. This dish uses avocado as the main ingredient, paired with sweet and sour beef tomatoes, and protein-rich eggs wrapped in pita bread. With a little seasoning, this dish retains the original flavors of the ingredients while providing different layers of taste. It's worth trying.

Pesto Ingredients

- Pita bread ····· 1
- Avocado ····· 50g
- Beef tomato ····· 50g
- Egg ····· 1

Seasonings

- Salt ····· 0.5g
- Cumin powder to taste
- Black peppercorns to taste

Instructions

1. Rinse the egg and place it in boiling water. Cook over medium-low heat for about 5 minutes, then cool (or soak in cold water for 3 minutes). Remove the shell and set aside.
2. Dice the avocado, beef tomato, and boiled egg separately. Add salt, cumin powder, and black peppercorns, and mix evenly to create the filling.
3. Heat a flat pan and place the pita bread in it. Toast over low heat until slightly crispy, then remove.
4. Take an appropriate amount of the filling from step 2, wrap it in the pita bread, and roll it up. It's now ready to eat.

[Nutritional Analysis] Per serving of 105g, this recipe contains 2 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
102	5.7	3.8	0.8	15.4	0	300

Category: Side Dish

Cooking Time: 10 minutes

Golden Sand Peas

Plant-based soy products contain tryptophan, tyrosine, phenylalanine, and glycine. These, in conjunction with B vitamins and essential fatty acids, can produce mood-enhancing serotonin, which can stabilize emotions, soothe the body, and prevent brain overactivity. A balanced plant-based diet with adequate protein intake can balance the body and mind, keeping depression at bay.

Ingredients

- onion ····· 1/8 (25g)
  (can be replaced with white cauliflower if you don't eat onions)
- carrot ····· 25g
- frozen peas ····· 1 bowl (150g)
- salted egg yolk ····· 1 (12g)
- olive oil ····· 1 teaspoon (5cc)

Seasonings

- salt ····· 1/4 teaspoon (1g)
- White pepper powder to taste

Instructions

1. Dice the onion; peel and dice the carrot.
2. Put the frozen peas and diced carrots into boiling water and cook until done. Drain and set aside.
3. Heat a pan with a little olive oil, add the onion and stir-fry. Remove from the pan.
4. Turn to medium heat, add the salted egg yolk and cook until it bubbles. Then add the cooked peas, carrots, and stir-fried onions. Mix well, add salt and white pepper powder to taste. It's now ready to eat.

[Nutritional Analysis] Per serving of 150g, this recipe contains 1 serving

Calories	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
33	0.6	2.2	0.4	3.3	0	223	1.5

Category: Soup

Cooking Time: 10 minutes

Energizing Vegetable Soup

Celery contains rich nutrients including potassium, magnesium ions, and dietary fiber. Dietary fiber can maintain the balance of intestinal flora, causing the intestines to secrete neurotransmitters related to emotions, which helps reduce the incidence of depression. It can calm emotions and soothe irritability and stress. In addition to celery, this soup also includes carrots and enoki mushrooms, making it colorful and adding layers to the taste. Before eating, drip a few drops of sesame oil to add fragrance and release fat-soluble vitamins.

Ingredients

- Celery 50g
- Carrot 10g
- Enoki mushrooms 10g
- Old ginger slices 5g

Seasonings

- Sesame oil 2g
- Salt 0.5g

Instructions

1. Wash and chop the celery and carrot separately; cut the enoki mushrooms into small sections.
2. Take a soup pot, pour in water and bring to a boil. Add ginger slices and cook until boiling, then add an appropriate amount of sesame oil.
3. Add celery and carrots, cook for about 5 minutes, then add enoki mushrooms. Bring to a boil again, add salt to taste, and it's ready to serve.

[Nutritional Analysis] Per serving 30g, this recipe contains 10 servings

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium	Dietary Fiber (g)
236	8.5	8.1	0.04	35	0	120	2

Category: Snack

Cooking Time: 10 minutes

Banana Berry Smoothie

Many people have probably heard that eating bananas can make you feel happier, and drinking a glass of milk before bed can help you sleep better. This is mainly because bananas contain tryptophan. Tryptophan is a type of amino acid and is a precursor to serotonin. When serotonin levels increase, it makes people more relaxed, not only stabilizing mood but also making it easier to fall asleep. This time we use bananas paired with slightly sour blueberries, giving it a berry aroma. You can also use raspberries or cranberries for different variations.

Ingredients

Banana 1
Blueberries 20g
Fresh milk 240cc

Instructions

1. Wash and slice the banana; wash the blueberries and drain.
2. Put the banana and blueberries into the blender jar, then pour in the fresh milk.
3. Press the blend button, mix evenly, and then pour into a cup to drink.

A Safe and Comfortable Eating Style

Dr. Chen Ching-Yuan

Director of Nuclear Medicine Department, Taichung Tzu Chi Hospital

I joined Taichung Tzu Chi Hospital when it opened in 2007 and started eating vegetarian then. After joining Tzu Chi, participating in its activities, interacting with volunteers, and listening to Master Cheng Yen's teachings, I began to feel reluctant when eating fish or meat. Coincidentally, my wife suggested, "Shall we start a vegetarian diet now?" In the blink of an eye, it's been 16 years of vegetarianism.

After becoming vegetarian, I discovered many benefits. There are still plenty of food choices, and I became more aware of the nutritional content in plants. I found that plants contain a complete range of nutrients, so there's no need to worry about nutritional deficiencies.

Since becoming vegetarian, I feel I can maintain better physical fitness and a good mood. From a food safety perspective, vegetarian diets are relatively safe and reassuring. Eating animal meat made me feel a bit guilty - we wouldn't want someone to take a bite out of us, yet animals are eaten by humans. With a vegetarian diet, I don't have that feeling of guilt, so eating is more enjoyable.

Our children also eat vegetarian, so the whole family shares this diet. When it's inconvenient to cook at home, we can find delicious vegetarian options when we're out.

There are inevitably some inconvenient times, so we prepare and bring our own food, or bring easily prepared yet nutritious items like pre-packaged vegetarian meals or nuts. We buy local fresh vegetables and prepare protein-rich soy powder to maintain a balanced diet during short periods of inconvenience.

When I'm conducting examinations or seeing patients in the clinic, or even with my friends, I always try to tell them that what they eat must be healthy. Especially for those who are already ill and come for examinations - many have cardiovascular diseases, chronic illnesses, or even cancer - I tell them, "You should eat vegetarian." Many of my patients have switched to vegetarian diets on my advice and found their bodies feeling lighter. Some worried about malnutrition, but that doesn't happen. I also suggest they can come for monitoring anytime to check if what they're eating is truly nutritious. Many people have benefited from this approach.

Especially for patients with cardiovascular diseases or metabolic syn-

drome, switching to a vegetarian diet helps them the most. Not only do they lose weight, but they also feel more relaxed. Some people with constipation find their condition improves after eating a healthy vegetarian diet. Of course, some worry about nutritional deficiencies from a vegetarian diet, or that it's easy to lack iron, calcium, become anemic, or not get enough protein, but that really doesn't happen.

To maintain health, just develop four good habits: eat well, sleep well, exercise more, and drink more water. Add regular health check-ups, blood tests, urine tests, stool tests, X-rays, and gastroscopies to keep track of which organs might have problems. Our body's organs are amazing and can function normally for a while even when sick. Other organs and tissues might even become stronger to compensate for the sick parts, making you unaware that you're ill, so it's easy to overlook. That's why health check-ups are very important for early detection, including whether nutrient intake is sufficient.

Vitamin B12 supplements are recommended to those with poorer health, gastrointestinal issues, or severe gastric ulcers, even to those who've had gastric removal. Also, if a physical examination shows a need for calcium supplementation, you can consider taking some calcium nutritional supplements with meals.

I've been vegetarian for 16 years, and many people say I look the same as I did 16 years ago, without much change. This means I've maintained my figure well and don't seem to be aging too quickly. Eating a healthy vegetarian diet should be one of the good ways to slow down aging, and maintaining a cheerful and optimistic mood is also important!

9.Heart/dyslipidemia

[ACADEMIC PAPER]

A dietitian-led vegan program may improve GlycA, and other novel and traditional cardiometabolic risk factors in patients with dyslipidemia:a pilot study

Database TCVS (Tzu Chi Vegetarian Study) & Linked to Taiwan's National Health Insurance

Publication Front Nutr. 2022 Mar 24;9:807810.

doi 10.3389/fnut.2022.807810. eCollection 2022.

Authors Tina H T Chiu, Yun-Chun Kao, Ling-Yi Wang, Huai-Ren Chang, Chin-Lon Lin

[Abstract]

Background Systematic inflammation and lipid profiles are two major therapeutic targets for cardiovascular diseases. The effect of a nutritionally balanced vegan diet on systematic inflammation and lipoprotein subclass awaits further examination.

Objective To investigate the change in novel and traditional cardiometabolic risk factors before and after a dietitian-led vegan program, and to test the bioavailability of vitamin B12 in Taiwanese purple laver as part of a vegan diet.

Design A one-arm pilot intervention study.

Participants/setting Nine patients with dyslipidemia participated in this 12-week vegan program.

Main outcome measures Nuclear Magnetic Resonance (NMR) detected GlycA signals (systematic inflammation) and lipoprotein subclass (atherogenicity); trimethylamine N-oxide (TMAO); and other cardiometabolic risk factors.

Statistical analyses performed Wilcoxon signed-rank test.

Results In this 12-week vegan intervention emphasizing whole foods, systematic inflammation improved as indicated by a reduction in GlycA (median: -23 μmol/L, $p = 0.01$). LDL-c (low-density lipoprotein cholesterol) (median -24 mg/dl, $p = 0.04$) and LDL-p (low-density lipoprotein particles) (median -75 nmol/L, $p = 0.02$) both decreased significantly. VLDL (very-low-density lipoprotein) and chylomicron particles showed a decreasing trend (-23.6 nmol/L, $p = 0.05$). Without caloric restriction, body mass index (BMI) (-0.7 kg/m2, $p = 0.03$), waist circumferences (-2.0 cm, $p < 0.001$), HbA1c (-0.2%, $p = 0.02$), and (HOMA-IR) homeostatic model assessment for insulin resistance (-0.7, $p = 0.04$) have all improved. The change in the TMAO and vitamin B12 status as measured by holo-transcobalamin appeared to depend on baseline diets, TMAO, and vitamin B12 status.

Conclusions

A dietitian-led vegan program may improve systematic inflammation and other novel and traditional cardiometabolic risk factors in high-risk individuals.

A Research Physician's Perspective

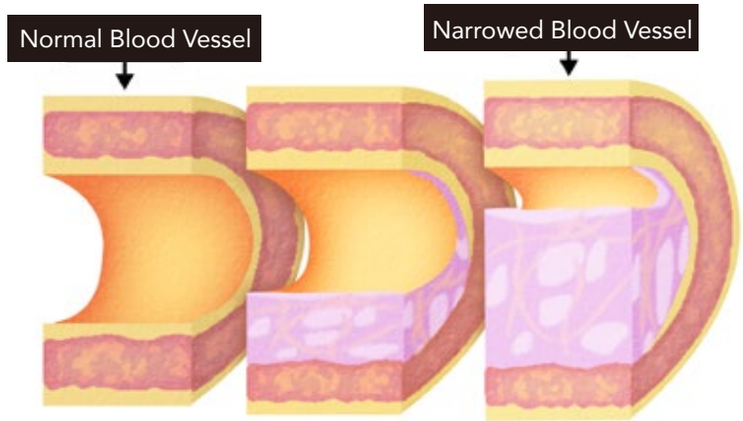
Dr. Chang Huai-Ren

Cardiologist at Hualien Tzu Chi Hospital

We applied for a cross-institutional research project with the Tzu Chi Medical Foundation, and I'm responsible for executing one of the dietary intervention plans. In my cardiology clinic, there are many patients with high cholesterol. Among vegetarians in the Tzu Chi database, compared to meat-eaters, while overall there are more benefits with vegetarianism than drawbacks, some people's vegetarian diets are healthy, while others are not. Research now proves that only healthy vegetarian diets are good for the body, while unhealthy vegetarian diets can be even worse than meat-based diets. So we recruited a group of high-cholesterol patients who were originally meat-eaters. Nutritionist Kao Yun-Chun from the Tzu Chi Medical Foundation designed a set of anti-inflammatory whole-plant diet recipes. We arranged three group health education sessions and three one-on-one nutrition consultations over a three-month period. During the study, we provided ingredients to patients, including brown rice, olive oil, nuts, sea moss, etc., asking patients to come and collect them once a month and cook at home according to the recipes. Blood tests were done at the beginning of the study and again after three months for comparison. As expected, cholesterol levels decreased

significantly, weight decreased, and waist circumference also reduced. The most interesting finding was confirming that patients with abnormal blood lipids, after changing their diet under the design and guidance of professional nutritionists for three months, could significantly improve systemic inflammatory biomarkers (GlycA), LDL particle size, oxidized trimethylamine (TMAO), and various traditional cardiovascular metabolic risk factors. This proves that a whole-plant diet can effectively reduce these cardiovascular metabolic risk factors.

Atherosclerosis



GlycA is a novel systemic inflammatory biomarker that has been proven to be closely related to various inflammatory responses, including cardiovascular atherosclerotic diseases. Its predictive association with future cardiovascular diseases is superior to the traditional inflammatory marker high-sensitivity CRP. This is the world's first study to prove that a whole-plant dietary intervention can reduce the systemic inflammatory marker GlycA, providing scientific objective evidence for the benefits of a vegetarian diet.

The second aspect is looking at the volume of cholesterol. Cholesterol actually has various particles of different sizes. The study results found that cholesterol particles also showed significant improvement. The third aspect is looking at the metabolic indicator - oxidized trimethylamine (TMAO), which has also become a new risk factor in the past five years.

In recent decades, scientists have discovered that we have many intestinal bacteria in our gut, with an average person having about 10 trillion to 100 trillion bacteria of over a thousand species in their intestines. Because food entering the body is not 100% digested, absorbed, and decomposed, there will always be excess that travels to the large intestine. Red meat contains carnitine, which is important for fat transport and cellular homeostasis, and crucial for brain neurotransmission. It's essential for the human body. Eggs and milk contain choline. Whether it's carnitine or choline, they are actually necessary for the body's nervous system, but when consumed in excess and not absorbed in the intestines, they travel to the large intestine. After being acted upon by intestinal bacteria, carnitine and choline are metabolized into "trimethylamine." Trimethylamine is a gas with a fishy odor that is directly absorbed through the intestinal villi into the liver. The liver then oxidizes it into "oxidized trimethylamine" and sends it back into the blood. It has now been discovered that oxidized trimethylamine is related to platelet coagulation and closely related to arterial atherosclerosis.

In 2016, a well-regarded journal, Cell, also published a paper showing that after adjusting for cholesterol factors, oxidized trimethylamine was found to be an independent factor causing stroke and myocardial infarction. (Gut Microbial Metabolite TMAO Enhances Platelet Hyperreactivity and Thrombosis Risk, Cell journal Volume 165, Issue 1, 24 March 2016, Pages 111-124, https://doi.org/10.1016/j.cell.2016.02.011)

This explains why many young people without the "three highs" (high blood pressure, high blood sugar, high blood lipids) can still suffer from myocardial infarction and stroke. The reason is oxidized trimethylamine, which comes from the metabolism of excess carnitine and choline in the diet. This also illustrates the importance of a vegetarian diet for health, as it not only simply reduces cholesterol but can also change the intestinal bacterial flora in the body. When the intestinal flora improves, the metabolites change accordingly. Research has also found that intestinal bacteria affect the immune system, which is also closely related to the brain.

Experience with Vegetarian Diet

Originally, my concept of vegetarian diet and nutrition was as superficial as that of the general public. In 2017, when I engaged in this dietary intervention research project, recruiting patients to eat vegetarian, I was the project leader, so I took the lead in participating, attending nutritionist group health education courses together with patients. Only then did I understand healthy vegetarian diets and whole-plant diets, and I started eating vegetarian along with the patients.

After adopting a vegetarian diet, you really do become thinner. Not only does body weight decrease, but waist circumference also reduces. Moreover, the intestines feel very comfortable, and bowel movements become smoother. At first, there's a slight feeling like diarrhea, going to the bathroom two or three times a day, but it's not really an upset stomach. Rather, it's the effect of eating large amounts of high-fiber foods causing increased intestinal motility.

As a side note, I personally don't experience bloating from eating legumes. If someone experiences bloating from legumes, it's probably because their intestinal bacteria are not easily metabolizing legumes, but this can actually improve with training.

In 2019, a large-scale study in the Journal of the American Medical Association (JAMA) stated that eating too many eggs can lead to cardiovascular disease (Associations of Dietary Cholesterol or Egg Consumption With Incident Cardiovascular Disease and Mortality, JAMA 2019 Mar 19;321(11):1081-1095. doi: 10.1001/jama.2019.1572.). I happened to see an interview with the researcher about this study. When asked by a reporter, "Your research says you shouldn't eat too many eggs because it leads to high cholesterol and mortality rates. Do you eat eggs yourself?" He candidly admitted that he used to love eating eggs, especially omelets, with at least three eggs

in an omelet. After the research paper was published, his son often said to him, "Dad, you've found out that eating eggs isn't good, why are you still eating so many?" He also started reducing his egg consumption and even stopped eating eggs.

After I conducted this dietary intervention study, my children also ask me, "Dad, you say eating vegetarian is good, why do you still...?" Today, we've scientifically proven that a vegetarian diet reduces the risk of disease, so we should do good things. This opportunity also changed my eating habits.

Traffic Light Diet Principles

Green Light Foods	Yellow Light Foods	Red Light Foods
Comply with whole-food plant-based diet and healthy cooking methods	Help us eat more green light foods	Eat less or don't eat

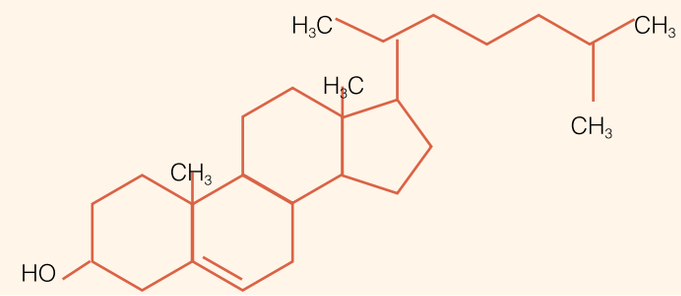
Regarding vegetarian diets, I encourage everyone to "eat with your brain," starting from a health perspective, which is the so-called "traffic light principle." Green light foods are those that conform as much as possible to a whole-plant diet and healthy cooking methods. Yellow light foods can help us eat more green light foods. Others are considered red light foods. If you have to eat red light foods when you're out, think twice. When your ability or environment allows, just eat more green light foods.

Cholesterol consumed by the human body combines with specific proteins in the blood. The two main types are "High-Density Lipoprotein" (HDL) and "Low-Density Lipoprotein" (LDL).

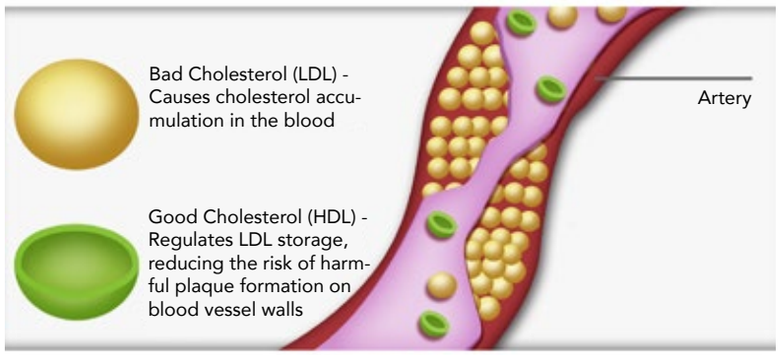
Cholesterol bound to HDL is transported away from the blood into the liver for storage, or broken down into bile, or synthesized into other substances. Therefore, when more cholesterol in the blood is bound to HDL, it reduces the risk of cholesterol forming harmful plaques on the blood vessel walls. This is why we call cholesterol bound to HDL "good cholesterol."

Conversely, cholesterol bound to LDL is transported from the liver into the blood. Therefore, when more cholesterol in the blood is bound to LDL, it indicates an increased risk of cholesterol forming plaques on the blood vessel walls. This is why we call cholesterol bound to LDL "bad cholesterol."

Cholesterol is a single chemical molecule (molecular formula C27H46O) and has no inherent good or bad distinction.



Good Cholesterol (HDL) vs Bad Cholesterol (LDL)



Dietitian's Advice

High blood lipids (including total cholesterol TCH, low-density cholesterol LDL, triglycerides TG) can easily lead to cardiovascular diseases, and are also related to hypertension, diabetes, stroke, and kidney diseases. To address high blood lipids, it is recommended to establish and maintain a good lifestyle. In addition to developing exercise habits and quitting smoking, attention should also be paid to daily diet.

▲ Tofu ▲ Thousand-Layer Tofu

For those with high blood lipids, dietary considerations include firstly controlling weight within the ideal range, as being overweight is one of the risk factors for cardiovascular disease. Secondly, control the source and intake of fat in the diet, choosing whole foods as much as possible and avoiding processed or refined foods. For example, choose soft tofu or traditional tofu, but avoid high-oil pressed tofu.

For protein sources, it is recommended to replace animal protein with plant-based protein (soy products), which is also high-quality protein. Plant-based proteins have lower fat content and no cholesterol, making them a better protein source for patients with high blood lipids. However, be cautious of fried tofu and deep-fried tofu skin products. It is also recommended to consume more fiber-rich foods, including vegetables, fruits, unrefined beans, and whole grains.

High-Quality Plant-Based Protein

Soy Products	Grains & Nuts	Vegetables
▲ Chickpeas	▲ Quinoa	▲ Asparagus

When cooking, it is recommended to choose cooking methods that use less oil, such as blanching, steaming, baking, cold mixing, and water stir-frying. Avoid cooking methods that require high oil usage like deep-frying, pan-frying, sweet and sour dishes, and stir-frying. For cooking oils, it is recommended to choose oils high in monounsaturated and polyunsaturated fatty acids, such as olive oil, tea seed oil, canola oil, and sunflower oil. Avoid choosing oils high in saturated fats, such as animal fats, butter, coconut oil, and palm oil. Finally, avoid alcohol consumption, as excessive drinking can easily raise triglycerides.

▲ Japanese Mixed Rice (shown on Page 214)

▲ Warm Salad (shown on Page 216)

▲ Green Tea Fruit Jelly Cake (shown on Page 218)

▲ Basil Green Zucchini Walnut Soup (shown on Page 220)

[Nutritional Analysis] Per serving 210g, this recipe contains 2 servings

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Dietary Fiber (g)
456.1	22.6	8.8	1.9	75.4	11.0	955.6	7.0

Category: Whole Grains

Cooking Time: 120 minutes

Japanese Mixed Rice

For patients with high blood lipids, it is recommended to consume more high-fiber foods. In addition to vegetables and fruits, whole grains such as brown rice or five-grain rice can be chosen to replace white rice. Brown rice has a lower glycemic index than white rice, which can delay blood sugar rise and lower cholesterol. Additionally, pairing with mushrooms provides rich polysaccharides and dietary fiber, which not only enhances the aroma of the mixed rice and lowers blood lipids but also increases immunity and protects intestinal health.

Pesto Ingredients

- Half cup of white rice ····· 60g
- Half cup of brown rice ····· 60g
- wet tofu skin ····· 50g
- dried shiitake mushrooms ····· 15g
- carrots ····· 40g
- bunapi mushrooms ····· 50g

Seasonings

- soy sauce ····· 0.5g
- mirin ····· 20g
- sesame oil ····· 5g

Instructions

1. Wash the brown rice and soak it the night before for easier cooking the next day.
2. Rinse the dried shiitake mushrooms with clean water, soak in 100cc water, and slice (reserve the mushroom water).
3. Wash the white rice and brown rice separately, then place in the inner pot of the rice cooker.
4. Shiitake mushroom seasoning water: Mix all seasonings (soy sauce, mirin, and sesame oil) in a container, then pour into the mushroom water from step 1 and mix well.
5. Cut the wet tofu skin into strips; wash and julienne the carrots; wash and separate the bunapi mushrooms, set aside.
6. Pour the shiitake mushroom seasoning water, wet tofu skin, and shiitake mushroom slices into a soup pot, bring to a boil on the stove, then pour into the rice cooker's inner pot. Cover and let it steam for 30 minutes.
7. After the rice is steamed, evenly spread the carrots and bunapi mushrooms on top of the rice, and press the cook button again.
8. After cooking is complete, do not open the lid, continue to steam for 20 minutes, then use a rice paddle to mix evenly. Serve in a bowl and enjoy.

Category: Side Dish

Cooking Time: 35 minutes

Warm Salad

Adequate dietary fiber in the diet can lower blood cholesterol and reduce cholesterol absorption in the intestines, helping to lower cholesterol and blood fats. This recipe pairs vitamin C-rich red bell peppers and anthocyanin-rich purple sweet potatoes, both being excellent antioxidants for the body, effectively preventing heart disease and maintaining cardiovascular health. Walnuts are rich in Omega-3, which has anti-inflammatory effects and is a good source of Omega-3 for vegetarians. However, be careful as walnuts are high in fat, and excessive intake may lead to high blood lipids.s.

[Nutritional Analysis] Per serving 176g, this recipe contains 2 servings

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium
209.9	**5.4**	**13.6**	**2.4**	**19.4**	**8.4**	**237.1**

Vitamin C (mg)	Dietary Fiber (g)
40.4	**2.4**

Ingredients

- red bell pepper 40g
- cucumber 25g
- romaine lettuce 30g
- cooked purple sweet potato 50g
- apple 30g
- boiled egg 55g
- wet shiitake mushrooms 25g
- walnuts 10g

Seasonings

- olive oil 15g
- Italian herbs 0.5g
- salt 1g
- lemon juice 25cc
- apple cider vinegar 5g
- sugar 10g
- water 30cc

Instructions

1. Wash the red bell pepper and cut into strips; wash the cucumber and slice; wash the romaine lettuce and cut into small sections; preheat the oven to 220°C for 10 minutes.
2. Peel and dice the cooked purple sweet potato; peel, core, and dice the apple; wash and slice the fresh shiitake mushrooms, set aside.
3. Line a baking tray with aluminum foil, evenly arrange the red bell pepper strips, cucumber slices, purple sweet potato cubes, and shiitake mushroom slices. Place in the oven and bake for about 20 minutes.
4. Wash the egg surface, place in a small pot with water (enough to cover the egg), bring to a boil over high heat, then time for 3 minutes. Turn off the heat, remove the boiled egg, let it cool, peel, slice, and set aside.
5. Mix all seasonings in a container to make the dressing.
6. Remove step 3 tray from the oven, arrange in a salad bowl according to personal aesthetics, add apple cubes, boiled egg slices, and walnuts, drizzle with the dressing from step 5, sprinkle with Italian herbs, and serve.

[Nutritional Analysis] Per serving of 220g, this recipe contains 3 servings

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium	Vitamin C (mg)
172.3	0.6	0.2	0.0	42.6	7.4	3.3	34.0

Category: Snack

Cooking Time: 40 minutes

Green Tea Fruit Jelly Cake

This recipe uses many ingredients rich in antioxidants. Green tea replaces water to enhance the jelly cake's aroma and provide catechins and green tea polyphenols. The fruit combination increases dietary fiber. Blueberries are rich in anthocyanins and ellagic acid, strawberries are high in vitamin C, anthocyanins, and ellagic acid, and golden kiwis contain abundant vitamin C and kiwi enzymes. These foods not only boost immunity but also help protect cardiovascular health. Additionally, natural honey replaces sugar, making it easier on the body. It's recommended to use this dessert as a substitute for refined, high-sugar commercial desserts.

Ingredients

- green tea bags 2
- warm water 350cc
- lotus root starch 100g
- strawberries 60g
- blueberries 60g
- golden kiwi 60g

Seasoning

- honey 30g

Instructions

1. Place green tea bags in a cup, pour in 350cc warm water, and steep for about 15 minutes to make room temperature green tea. Set aside.
2. Wash strawberries, blueberries, and kiwi. Remove strawberry stems and cut in half; slice kiwi into rounds, then cut into 1/6 small pieces. Set aside.
3. Put lotus root starch, sugar, and room temperature green tea into a blender. Mix well and set aside.Add mixture from step 3 to a saucepan. Heat over low heat, stirring constantly (be careful to avoid scorching) until it becomes a translucent paste. Turn off heat and remove. This is now the green tea jelly paste.
5. Pour the green tea jelly paste into a large square container and spread evenly. Move to the refrigerator for 15 minutes until completely cool, then remove.
6. Flip the green tea jelly onto a large plate. Cut into bite-sized pieces according to personal preference and place on dessert plates. Add strawberries, blueberries, and kiwi, drizzle with honey, and serve.

[Nutritional Analysis] Per serving of 350g, this recipe contains 3 servings

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium
196	6.5	16	2	12.5	1	62

Potassium	Alpha-linolenic acid (18:3) mg
957	1015

Category: Soup

Cooking Time: 30 minutes

Basil Green Zucchini Walnut Soup

Among plants, walnuts are rich in alpha-linolenic acid, which has protective effects in reducing cardiovascular disease risk. They can lower thrombosis formation, reduce body inflammation index, and have the effect of increasing high-density cholesterol. Notably, this green energy soup can provide 1000mg of alpha-linolenic acid, which has been proven effective in reducing heart-related diseases. It's also rich in potassium ions, which help regulate blood pressure. However, this green vegetable soup is relatively low in protein and carbohydrates, so it's recommended to pair it with two pieces of whole wheat steamed buns or bread and some soy products.

Ingredients

- green zucchinis ..... 2(400g)
- medium onion ..... 1/2(150g)
- leek ..... 1(30g)
- garlic cloves ..... 5(15g)
- bunch basil ..... 1(15g)
- walnuts ..... 8(40g)

Seasonings

- olive oil ..... 1 tbsp(10g)
- fine salt ..... 1/2 tsp(0.5g)
- white pepper powder ..... 1/4 tsp
- lemon ..... 1/2(40g)
- black pepper powder ..... 1/4 tsp

Instructions

1. Wash all ingredients. Cut zucchini into half-moons; dice onion; slice leek; peel and thinly slice garlic; chop walnuts; wash lemon, cut in half, and squeeze out juice. Set aside.
2. In a soup pot, add olive oil and sauté onion, zucchini, and leek until vegetables are translucent (and fragrant). Add 500cc hot water and simmer over medium-low heat for about 15 minutes.
3. In a small frying pan over low heat, add olive oil and fry garlic slices until golden. Add walnuts and black pepper powder, mix well, and set aside.
4. Once vegetables from step 2 are cooked through, add basil leaves and mix well. Turn off heat and use a food processor to blend until smooth, creating a green vegetable soup.
5. Season with salt, white pepper powder, and lemon juice. Add the fried garlic and walnut mixture from step 3 to enhance the layered flavors of this energizing soup.

10.Dementia

[ACADEMIC PAPER]

Taiwanese vegetarians are associated with lower dementia risk: a prospective cohort study

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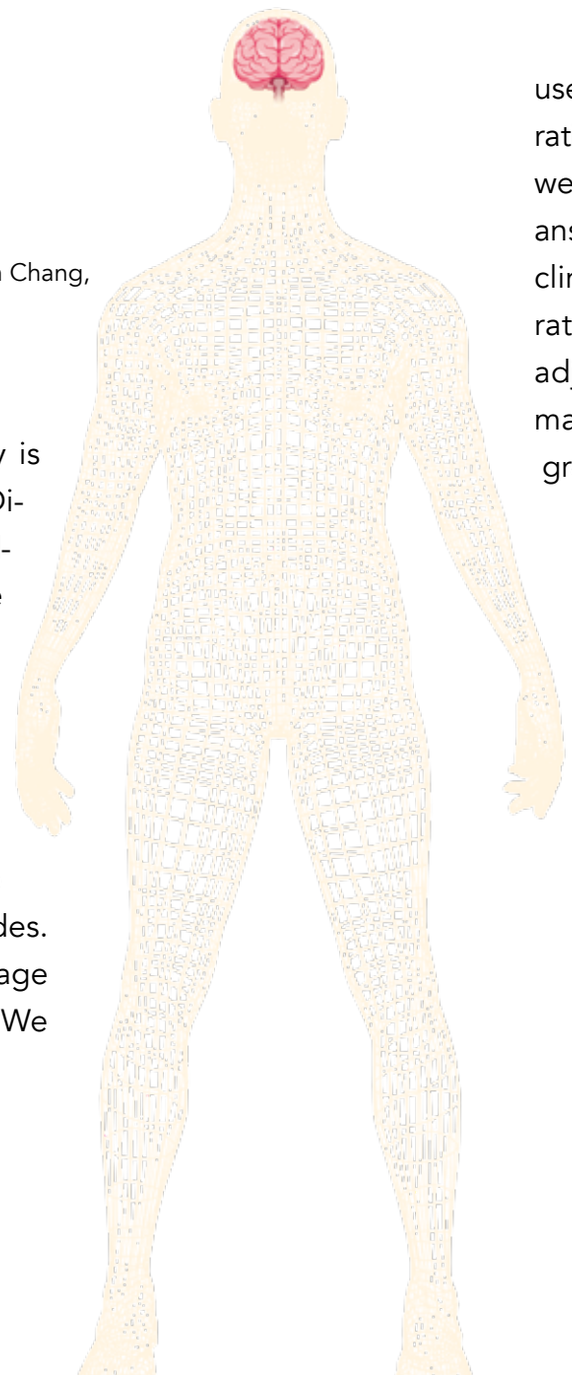
Authors Jui-Hsiu Tsai, Ching-Feng Huang, Ming-Nan Lin, Chiao-Erh Chang, Chia-Chen Chang, Chin-Lon Lin



[Abstract]

The number of people living with dementia globally is increasing rapidly, and there is no effective therapy. Dietary pattern is one important risk factor for the development and progression of dementia. We undertake this study to determine whether Taiwanese vegetarian diet in midlife affects dementia incidence in later years in a prospective cohort. We followed 5710 participants (average age less than 60) in the Tzu Chi Vegetarian Study (TCVS). We started recruiting in 2005 and followed until the end of 2014 when the database changed from ICD-9-CM to ICD-10-CM codes. The incidence of dementia was obtained through linkage to the National Health Insurance Research Database. We used Cox proportional hazards regression to estimate the hazard ratio of dementia between vegetarians and nonvegetarians. There were 121 cases of dementia (37 vegetarians and 84 nonvegetarians) diagnosed. Vegetarians were associated with reduced risk of clinically overt dementia compared with nonvegetarians (hazard ratio = 0.671, confidence interval: 0.452–0.996, $p < 0.05$) after adjusting for gender, age, smoking, drinking, education level, marriage, regular exercise, and comorbidities with stepwise regression.

Dietitian's Advice

As research on dementia continues to progress, we are becoming increasingly aware of factors that can help prevent or delay dementia. In addition to regular exercise and mental stimulation, a balanced diet can also help prevent dementia. According to the Ministry of Health and Welfare's dementia care guidelines, to maintain nutritional balance, the ideal daily food intake can be referenced as follows: 2 servings of fruits, 1.5-3 tablespoons of fats, 3-4 types of vegetables, 1-2 cups of dairy, and 3-4 servings of eggs and beans. Currently, it is not recommended to supplement vitamins or deep-sea fish oil from sources other than diet for long periods or in high doses, to avoid excessive intake and side effects.

In addition to the above prevention methods, research has proven that the MIND diet is an effective dietary approach to slow down brain aging. The MIND diet is an eating pattern based on vegetables, fruits, and whole grains, primarily aimed at promoting brain and body health. It's a combination of the Mediterranean diet and the DASH diet. The MIND diet emphasizes consuming foods beneficial to the brain, thereby delaying aging and preventing dementia.

The characteristics of the MIND diet are:

1 Fruits and vegetables	Recommend consuming large amounts of fruits and vegetables daily, especially dark-colored vegetables and berries.
2 Whole grains	Recommend consuming unrefined starches.
3 Beans, fish, eggs, and meat	Recommend consuming low-fat protein sources.
4 Oils, nuts, and seeds	Recommend consuming foods rich in Omega-3 fatty acids and nuts rich in antioxidants.
5 Reduce the intake of processed foods and red meat.	

Combining these points with antioxidants in the diet can provide a certain level of protection against the occurrence of dementia.

[Nutritional analysis] Per serving of 160g, this recipe contains 1 serving

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
252	5.7	7.2	1.9	41.4	0.88	777

Category: Whole Grains

Cooking Time: 40 minutes

Truffle Mushroom Rice

Mushrooms contain many factors that help with antioxidation, including ergothioneine, selenium, vitamin D2, and glutathione. Free radicals are produced during normal metabolism in the human body, leading to increased oxidative stress. The antioxidant indredients in mushrooms can reduce free radicals.

In addition to antioxidant factors, the polysaccharides and polyphenolic compounds in mushrooms also play an important role in delaying aging. This dish adds truffle mushroom sauce and fresh king oyster mushrooms, filling the main course with mushrooms to achieve the purpose of consuming antioxidant factors.

Pesto Ingredients

- raw rice 50g
- king oyster mushrooms 38g
- cheese 7g

Seasonings

- olive oil 5g
- truffle mushroom sauce 5g
- salt 1.5g

Instructions

1. Heat olive oil in a pan, add peeled king oyster mushrooms, and stir-fry over medium heat until slightly charred.
2. Add 50g of raw rice to the pan and stir-fry until the rice grains are fully heated, then continue to stir-fry for 6-10 minutes.
3. After stir-frying, add 150ml of hot water (or vegetable stock) in three batches. After each addition, stir-fry over medium heat until the liquid is completely absorbed (the rice will be fully cooked during this process). Adjust the rice's softness according to personal preference.
4. Add cheese, truffle mushroom sauce, and salt, mix well, and serve.

[Nutritional analysis] Per serving of 145g, this recipe contains 1 serving

Calories (kcal)	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)
215	7.0	4.3	1.29	43.4	13.8	717

Category: Side Dish

Cooking Time: 15 minutes

Mediterranean Fruit and Vegetable Salad

The Mediterranean diet relies on consuming large amounts of whole fruits and vegetables to supplement rich vitamin C, potassium, magnesium, and different phytochemicals (such as lycopene, lutein, and zeaxanthin) to achieve antioxidant effects. This Mediterranean salad contains a large amount of vegetables, and red guava is also rich in vitamin C, which not only achieves antioxidation but also provides dietary fiber. The simple olive oil and vinegar dressing makes it refreshing and light.

Ingredients

- cherry tomatoes 50g
- romaine lettuce 12g
- cucumber 53g
- red guava 25g

Seasonings

- olive oil 2g
- balsamic vinegar 1g

Instructions

1. Wash the cherry tomatoes and cut them in half; wash the romaine lettuce and cut into small pieces.
2. Wash the cucumber and slice it; wash the red guava and slice it.
3. Place the cut tomatoes, cucumber, and red guava in a salad bowl with the lettuce.
4. Mix olive oil and balsamic vinegar in a container, then drizzle over the salad bowl from step 3. Ready to serve.

[Nutritional analysis] Per serving of 600g, this recipe contains 1 serving

Calories	Protein (g)	Fat (g)	Saturated Fat (g)	Carbohydrates (g)	Sugar (g)	Sodium (mg)	Vitamin B6 (mg)
261	5.3	4.3	22.9	17.4	6.7	3.16	0.4

Category: Soup

Cooking Time: 35 minutes

Burdock Root, Red Date, and Goji Berry Soup

Burdock root contains various polyphenolic compounds that help with antioxidation. Combined with corn, goji berries, and red dates, which have natural sweetness, it brings out the natural sweetness of the ingredients after simmering and provides dietary fiber. Burdock is also rich in B vitamins, which help regulate brain cells and enzymes, improving brain health and enhancing cognitive abilities. Overall, these factors can reduce the risk of dementia.

Ingredients

- burdock root 26g
- corn 168g
- red dates 9g
- goji berries 4g

Seasonings

- salt 2g

Instructions

1. Wash the burdock root and shred it; wash the corn and cut it into sections.
2. Put all ingredients in a soup pot, add 600ml of water, bring to a boil over high heat, then reduce to low heat and simmer for 20 minutes.
3. Add another 100ml of water and continue cooking for 5 minutes, add salt to taste, pour into soup bowls, and serve.

[Nutritional analysis] Per serving of 48g, this recipe contains 1 serving

Calories	Protein	Fat	Saturated Fat	Carbohydrates	Sugar	Sodium	Cocoa Polyphenols (mg)
261	5.3	4.3	22.9	17.4	6.7	3.16	200-250

Category: Snack

Cooking Time: 20 minutes

Red Berry Dark Chocolate

Dark chocolate contains the highest levels of polyphenols and flavonoids in its cocoa content. Choosing low-sugar and high-cocoa content dark chocolate helps with antioxidation. Using 85% dark chocolate effectively provides antioxidants without excessive sugar intake. Adding various nuts rich in vitamin E makes this snack not too burdensome.

Ingredients

- walnuts 5g
- macadamia nuts 8g
- cashews 5g
- freeze-dried strawberries 5g
- 85% dark chocolate 25g

Instructions

1. Melt the dark chocolate using a double boiler method to 60°C, then cool it to 27°C, and reheat it to 31°C to temper the chocolate.
2. Crush all the nuts and bake them in the oven at 150°C for 5 minutes.
3. Finally, mix the nuts into the chocolate (you can use molds for variation), decorate with dried strawberries, refrigerate until set, then remove and serve.

Follow Your Constitution, Stay Healthy with Vegetarianism

Dr. Chang Wei-Chiao

Traditional Chinese Medicine Department, Dalin Tzu Chi Hospitall

As far back as I can remember, I've never liked eating meat. The taste of meat would make me feel nauseous. However, I did enjoy some processed meats that children typically like, such as chicken nuggets, bacon, and hot dogs - foods that don't have a strong meat flavor. Because of this, my grandmother often scolded me for being a picky eater and forced me to eat meat. It wasn't until I was in elementary school that my father encountered Buddhism and vowed to become vegetarian. My grandmother also changed her perspective and began to consider how to cook nutritionally balanced vegetarian meals. In the following years, our family meals became primarily vegetarian, which allowed me the opportunity to tell my parents in sixth grade, "I want to start being vegetarian!" I'm grateful to my father and grandmother for making this possible.

My grandmother worried that being vegetarian would lead to malnutrition and stunted growth, but after becoming vegetarian, my height continued to increase from 161 cm to 176 cm.

In my Traditional Chinese Medicine clinic, I don't specifically promote vegetarianism, but if I know a patient is vegetarian, I make sure to emphasize the importance of a balanced diet and diverse food choices.

Although being vegetarian in Taiwan is more convenient and offers more choices than in many other places, I often hear that patients' diets are too simple. For example, diets primarily based on starches and vegetables can lead to insufficient protein intake, unbalanced vitamin intake, and excessive carbohydrate and fat consumption.

For lacto-ovo vegetarians who consume milk and eggs, there's no concern about vitamin B12 deficiency. Nuts provide good fats and Ome-

ga-3, and should be consumed daily for nutritional benefits. Those who don't eat eggs or dairy need to rely on legumes as their primary protein source.

Some patients ask, "Will my body become cold if I'm vegetarian for a long time?" From a Traditional Chinese Medicine perspective, most foods consumed by vegetarians are considered neutral or cool in nature, lacking the "blood and flesh" foods from animal sources that are considered warming. However, this doesn't mean that everyone who is vegetarian for a long time will develop a cold constitution, because not only do foods have hot, warm, neutral, and cool properties, but people's constitutions also vary.

For those with an originally cold constitution, I would recommend adding a little ginger to their meals to balance the cool properties of their diet. However, I don't advise people to directly equate vegetarianism with a cold constitution and drink ginger tea daily to warm the body without considering individual constitutions and seasonal appropriateness. It's best to consult a Traditional Chinese Medicine practitioner to assess your constitution and adjust your diet accordingly, ensuring a healthier vegetarian lifestyle.

Three Meals a Day: Nutritionist's Recommendations

Breakfast

Banana Berry Smoothie (shown on page 198)

+

Warm Salad (shown on page 216)

Quinoa Rice Balls (shown on page 176)

or

Buckwheat Noodle Dumplings (shown on page 148)

Lunch

Avocado Pita Bread
(shown on page 192)

Whole Tomato Rice
(shown on page 178)

Garlic Butter Wild Mushroom Roasted Bell Peppers
(shown on page 220)

Dinner

Tofu Skin with Fresh Vegetables (shown on page 118)

Basil Green Zucchini Walnut Soup
(shown on page 102)

Energizing Vegetable Soup
(shown on page 196)

NOTE

PART 4

Low-Carbon Health Science

Vegetarian Diet Reduces Medical Expenses

A paper we published confirms that in Taiwan, vegetarians spend less on medical expenses compared to non-vegetarians. By linking to Taiwan's National Health Insurance database, we compared the healthcare utilization rates and medical expenditures of vegetarians and non-vegetarians recruited from the Tzu Chi Vegetarian Study database. The research results indicate that vegetarians have 13% fewer outpatient visits and 15% lower total medical expenditures.

Currently, the annual budget of the National Health Insurance Administration is 800 billion NT dollars. If we consider that vegetarians save 15% on total medical expenses, this equals a savings of 120 billion NT dollars in medical costs for Taiwan. I have proposed to the government authorities to allocate a portion of the budget to encourage vegetarian diets. With incentive programs, more people will be motivated to adopt a vegetarian diet, maintain good health, and reduce the likelihood and frequency of doctor visits. This can relatively reduce health insurance expenditures, which is a win-win solution for all parties involved.

[ACADEMIC PAPER]
Vegetarian diets and medical expenditure in Taiwan - a matched cohort study

Database TCVS (Tzu Chi Vegetarian Study)

Authors Chin-Lon Lin, Jen-Hung Wang, Chia-Chen Chang, Tina H T Chiu, Ming-Nan Lin

Publication Nutrients. 2019 Nov 6;11 (11) :2688. doi: 10.3390/nu11112688

[Abstract]

Vegetarian diets and lifestyle have been shown to reduce the risk of many chronic non-communicable diseases, which now accounts for the major global burden of diseases. We aimed to determine the contribution of vegetarian diets and lifestyle to the actual direct medical cost in a population-based study. Through linkage to the National Health Insurance Research Database of Taiwan, we compared the health care utilization and medical expenditure of 2166 vegetarians and 4332 age-sex-matched omnivores recruited from the Buddhist Tzu Chi Foundation. Diet and lifestyle questionnaires were self-administered and prospectively collected. We used the general linear model to estimate the 5-year average medical expenditure in vegetarians versus omnivores while adjusting for age, sex, education, exercise habits, smoking, and alcohol drinking. Medical expenses related to non-diet associated lifestyle factors (smoking, alcohol drinking, active community volunteering, and religious emotional support) were estimated through a comparison with the published population medical cost data standardized to match the age and sex characteristics of the cohort. Tzu Chi vegetarians had significantly lower outpatient visits. This translated into 13% lower outpatient ($p = 0.007$) and 15% lower total medical expenditures ($p = 0.008$) when compared with the Tzu Chi omnivores, who had an additional 10% lower medical expenditure when compared with the general population. No difference in dental visits and expenses were found between diet groups. Vegetarian diets are associated with significantly lower medical care expenditure and could be an effective strategy to alleviate the medical-economic burden in selected populations.

Vegetarianism Reduces Environmental Impact and Promotes Earth's Sustainability

Tzu Chi's Climate Action, Vegetarian Diet, and Epidemic Prevention: Purity at the Source, Simple and Good Living

Yen Po-Wen, CEO of Buddhist Tzu Chi Charity Foundation

The Tzu Chi Foundation won three Gold awards at the 2023 APSAA & Taiwan Sustainability Action Awards, received by Executive Director Yen Po-Wen (center). Hualien Tzu Chi Hospital's Cancer Medical Center and Dalin Tzu Chi Hospital also earned recognition, with Vice Superintendents Hsu Wen-Lin (right) and Lin Ming-Nan (left) accepting the awards respectively.

In the past decade or so, the Earth has faced many irreversible crises, with climate change-induced natural disasters becoming more frequent and severe. In 2017, Master Cheng Yen mentioned the issue of "Ecological Debt Day" (now called "Earth Overshoot Day") during a volunteer morning meeting. The Master expressed concern that our current population is overconsuming and overexploiting resources at will, constantly depleting natural resources for production, leading to excess, waste, and contributing to a vicious cycle. She warned that the Earth's debt situation would become increasingly tight and accelerate. [Note 1]

Earth Overshoot: Reducing Carbon Emissions

Human destruction and pollution of the ecosystem could originally be balanced through natural ecology, but humans have overused Earth's resources, causing severe pollution. "Earth Overshoot Day" marks the date when humanity has used up all the biological resources that Earth can renew in an entire year. It is calculated by the Global Footprint Network, an award-winning international non-profit research organization, which integrates data to form the most reasonable assumptions to assess the state of human use of Earth's resources.

IIn 1987, Earth Overshoot Day was only 12 days early. By 2017, it had moved forward by 151 days. In 2023, it was 156 days early, meaning humans are using resources requiring 1.75 Earths each year to regenerate.".

Sustainable Development: Vegetarian Action

What indicators can we rely on to assess what efforts should be made for sustainable Earth resources? In fact, as early as 2014, the United Nations announced 17 Sustainable Development Goals (SDGs), which were officially implemented on January 1, 2016.

These 17 indicators are roughly divided into three categories. The first category is protecting the vulnerable, including eliminating poverty and hunger. The second category is balancing resource development. The third category relates to ecology and partnerships. In our 2017 English special edition celebrating Tzu Chi's 50th anniversary, we compared the substantive data of Tzu Chi's "Eight Dharma Footprints" worldwide (including charity, medical care, education, humanistic culture, international disaster relief, bone marrow donation, environmental protection, and community volunteers) with the SDGs. The results showed that Tzu Chi had achieved 16 out of the 17 goals, with only "Peace & Justice" temporarily lacking supporting data. However, given that Tzu Chi's purpose is to promote peace, advocate vegetarianism, and non-killing, with the principle of "Buddha, sentient beings, and the self are not different," Tzu Chi has actually met all 17 sustainable development goals.

Severe carbon emissions cause dramatic climate change. Industries such as oil, natural gas, and animal husbandry are the main causes of exhaust emissions, along with large-scale deforestation, leading to persistently high greenhouse gas effects. Statistics show that globally, about 56 billion livestock are slaughtered annually, which translates to over 6 million animals killed every hour. Consider Texas in the United States, with its vast land area: local industries there rank first in oil, natural gas, and animal husbandry, yet on August 25, 2017, it suffered the largest inland hurricane disaster in U.S. history - Hurricane Harvey. The backlash from nature is actually humanity's greatest responsibility.

The World Economic Forum publishes the Global Risk Report every January. Although this is an "economic" forum, they point out that the most important issue today is climate change. Currently, 60% of the economic problems and risks faced by countries worldwide are related to climate change, while 20% are due to regional political tensions. The founder and executive director of the economic forum have publicly called on all business leaders to set "zero carbon emission" goals for their respective enterprises.

NASA's images of Earth, showing five health indicators including carbon dioxide concentration, average surface temperature, Arctic ice sheet area, ice sheet thickness decline, and sea level rise, indicate that Earth's health is concerning. It's no longer just a problem of Climate Change; the Earth needs to enter the emergency room. It's now a Climate Emergency! The report released by the United Nations Intergovernmental Panel on Climate Change (IPCC) states that scientists are 100% certain that human actions have caused climate warming. Master Cheng Yen calls on us to "repent, fast, and eat vegetarian," and explains that Tzu Chi has always been on the right path.

The Impact of the COVID-19 Pandemic

The COVID-19 pandemic that began in late 2019 not only caused countless casualties but also triggered global famine. Border closures due to epidemic prevention prevented crops from being transported worldwide, causing famine. In Kibera, Kenya's largest slum, residents were already living in extreme poverty, and the lockdown due to the COVID-19 pandemic caused many people to starve to death quickly.

Master Cheng Yen reminded us early on to launch epidemic prevention assistance and relief actions. By the end of 2022 (from 2019 to the end of 2022), Tzu Chi's global epidemic prevention material assistance reached 97 countries and regions in 21 countries in the Americas, 22 in Europe, 23 in Africa, 4 in Oceania, and 27 in Asia, with over 52.27 million items distributed. Economic relief reached 44 countries and regions, benefiting 5.34 million households and nearly 21.72 million people.

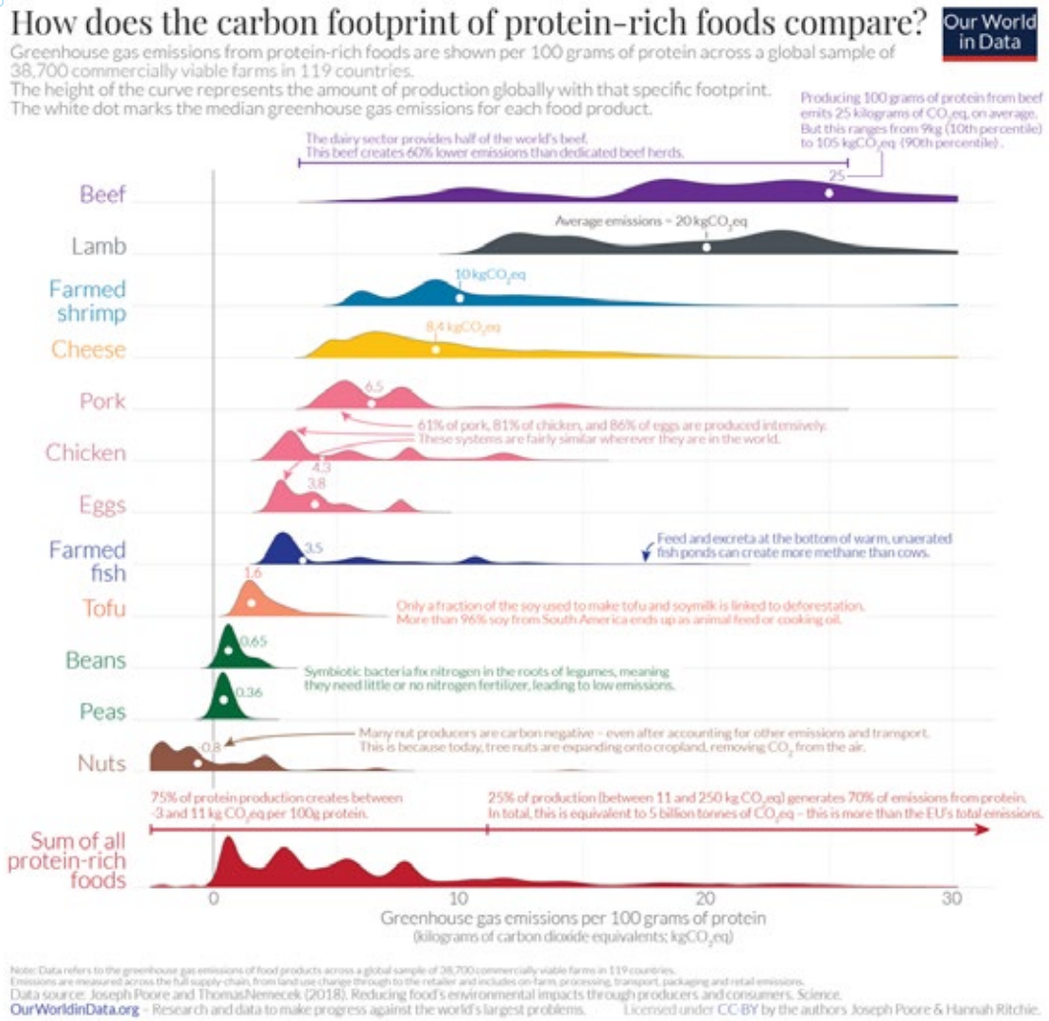
In a TED talk in 2015, Bill Gates said, "If anything kills over 10 million people in the next few decades, it's most likely to be a highly infectious virus." The virus shown in his presentation at the time was indeed a coronavirus. In April 2015, he said on social media that he became a vegetarian when he was almost 30 years old. In 2019, he further stated, "Eating more pure vegetarian food can combat climate change and save the Earth."

Climate Healers organization released a news article on March 11, 2020, titled "How the coronavirus leads us to a vegan world," quoting Einstein's words - "A clever person solves the problem. A wise person avoids it." This also echoes Master Cheng Yen's teachings that a plant-based diet is a wise choice and the best method of epidemic prevention.

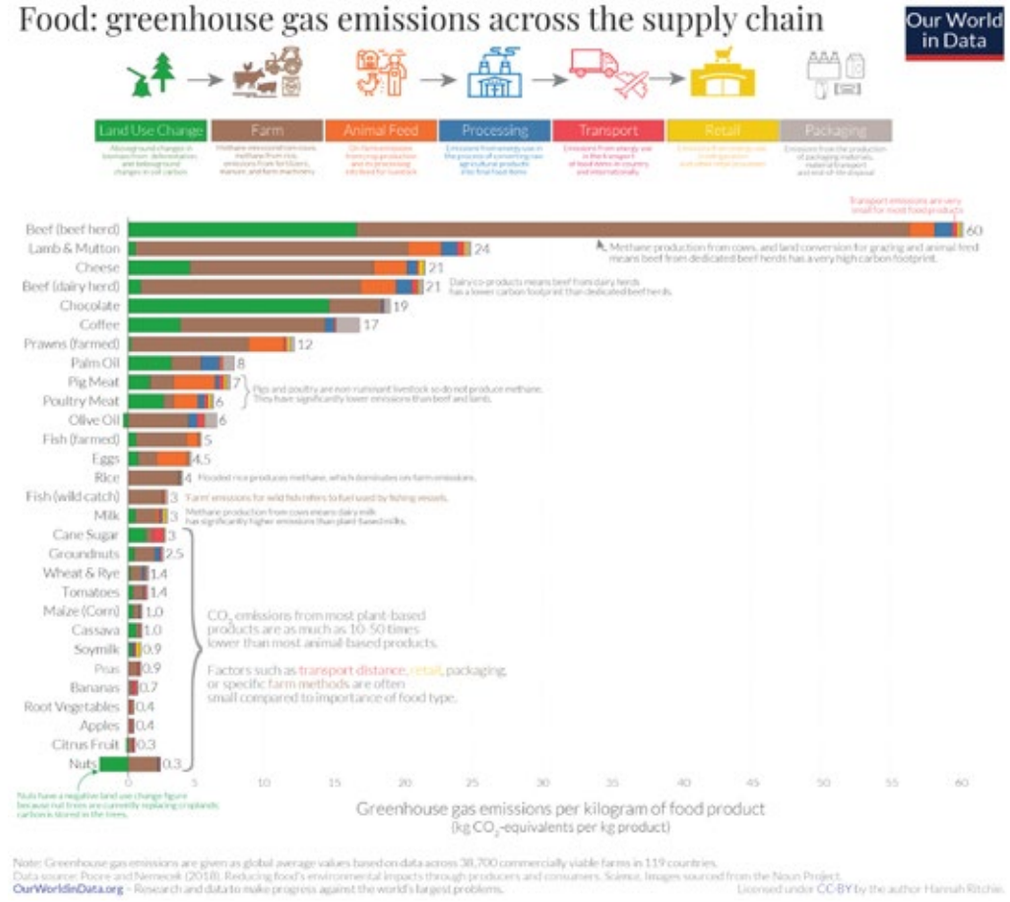
Smart Consumption of Low-Carbon Foods

The first image shows a comparison of carbon footprints for protein-rich foods. It indicates the amount of carbon dioxide produced per 100 grams of consumption. Beef has the highest at 25 kg of CO_2, while nuts have the lowest at -0.8 kg. The negative value for nuts is due to the large amount of photosynthesis occurring during their growth, which helps reduce carbon emissions.

The second image compares greenhouse gas emissions throughout the food supply chain, from land use for planting, animal husbandry, livestock feeding, manufacturing processes, transportation, retail, to packaging. Beef again ranks first in harmful effects, followed by lamb, cheese, and dairy cattle. Chocolate and coffee also rank high, due to land use requirements, cultivation processes, or transportation. Foods exported overseas incur not only inland transportation costs but also sea or air freight, with longer distances resulting in higher carbon mileage.



※Image source：The Noun Project. https://ourworldindata.org/less-meat-or-sustainable-meat
OurWorldinData.org —— Research and data to make progress against the world's largest problems.
Licensed under CC-BY by the authors Joseph Poore & Hannah Ritchie.



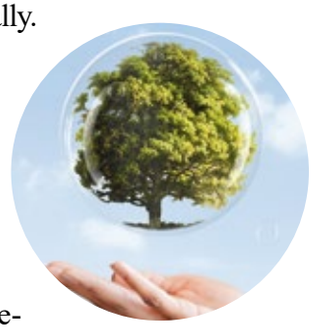
※Image source：The Noun Project. https://ourworldindata.org/food-choice-vs-eating-local
OurWorldinData.org —— Research and data to make progress against the world's largest problems.

Licensed under CC-BY by the author Hannah Ritchie.

Health, Environment, and Economy: Vegetarianism is the Best Solution

From the perspectives of health, environment, or economy, vegetarianism is the best approach. In terms of health, many studies have proven the benefits of vegetarianism. Environmentally, vegetarianism reduces air pollution, water pollution, carbon footprint, land use, and energy use.

Economically, Professor Marco Springmann of Oxford University and others published a RESEARCH paper in 2016 titled "Analysis and valuation of the health and climate change cobenefits of dietary change." They compared the economic costs of three different dietary groups: "controlled diet," "vegetarian," and "vegan." Compared to a regular diet, all three can save global economic costs, with "vegan" saving the most. It is predicted that by 2050, over $1.6 trillion in global economic costs can be saved annually. [Note 2]



Global risks have evolved from climate change to climate disaster. To lessen the impact of climate change, people's actions are needed. Humanity urgently needs to change, practice vegetarianism, and implement 5R environmental protection.

Today, human use of Earth's resources has gradually shifted from a linear economy practice of obtaining raw materials, manufacturing, using, and discarding, to a circular economy emphasizing regeneration, reuse, and recycling. The 5R spirit of purity at the source (Refuse, Reduce, Reuse, Repair, and Recycle) effectively reduces waste by not using resources when unnecessary, using less when possible, using second-hand items when available, repairing when possible, and recycling when feasible.

Tzu Chi's environmental action began in 1990 when Master Cheng Yen called for "using applauding hands to do environmental protection," and has now persisted for over thirty years. We are grateful for the hundreds of thousands of Tzu Chi environmental volunteers who work hard with smiles on their faces. Many people, after engaging in environmental protection, have become more cheerful and diligent in daily labor, gradually recovering from various ailments, chronic diseases, and even psychological illnesses. Accordingly, Master Cheng Yen often says, "The best long-term care is doing environmental protection."

In October 2021, the Tzu Chi team traveled to Glasgow, Scotland's largest city, to attend the COP26 26th United Nations Climate Change Conference. Tzu Chi was invited to attend 4 conferences and meetings, and hosted 9 press conferences, exploring various aspects of climate change impacts, solutions, and cooperative experiences with global industry, government, academia, and civil organizations, while demonstrating Tzu Chi's environmental actions. On April 7, 2022, Tzu Chi officially joined the United Nations Framework Convention on Climate Change "Climate Neutral Now Initiative" to jointly promote climate action. [Note 3]

Tzu Chi's environmental mission has protected the Earth for over 30 years through resource recycling and regeneration. To more actively shoulder social responsibility, Tzu Chi took the first step from Taiwan, leading NGOs in announcing the "Net Zero Emissions" plan in mid-2021.

This plan uses the Science-Based Targets (SBT) method, starting with greenhouse gas inventory to set carbon reduction targets, aiming for zero growth in carbon emissions by 2025, 50% reduction in carbon emissions by 2040, and net zero emissions by 2050.

The environmental mission has evolved from environmental recycling and circular economy to net zero emissions, seeking sustainability for all humanity and the Earth. Only when everyone starts with improving their own actions, practicing environmental protection, vegetarianism, and simple living, can we achieve fundamental epidemic prevention and a sustainable solution for humanity.

【Note 1】Vast Vows and Peaceful Practice Dharma Talk by Dharma Master Cheng Yen Delivered August 1-19, 2017 Tzu Chi Monthly, Issue No. 610

【Note 2】Analysis and valuation of the health and climate change cobenefits of dietary change by Marco Springmann, H. Charles J. Godfray, Mike Rayner, and Peter Scarborough https://www.pnas.org/doi/full/10.1073/pnas.1523119113

【Note 3】At COP28, the 28th UN Climate Change Conference in November 2023, Tzu Chi partnered with over 20 organizations to hold more than ten side events, interview programs, interfaith dialogues, and prayer gatherings. Exhibitions displayed concrete results in environmental protection and plastic reduction, healthcare emission reduction, and public environmental awareness. Through cross-sector collaboration, Tzu Chi aimed to inspire wider action on climate change to save our planet.

Net Zero Carbon Emissions -- For the Earth, We Are Willing to Change

Lin Ming-Nan

Family Medicine Physician & Deputy Superintendent of Dalin Tzu Chi Hospital

In 1986, the preparation, planning, design and construction of Hualien Tzu Chi Hospital followed the concepts of 'green building'. The same concepts applied to Dalin Tzu Chi Hospital, which opened in 2000.

In 2007, under the leadership of then-Superintendent Lin Chin-Lon, Dalin Tzu Chi Hospital joined the "International Network of Health Promoting Hospitals & Health Services" of the World Health Organization (WHO Collaborating Centre). In 2012, it received the "International HPH Award" from the International Network of Health Promotion, becoming the first hospital in the world to receive this award. In 2020, it was awarded the "1st International Contribution Award for Health Promotion" by the Health Promotion Administration. In 2021, in response to the United Nations carbon reduction campaign, it became the first hospital in Asia and the only hospital in Taiwan to declare participation in the net-zero

carbon emissions goal by 2050. At the end of 2022, it was awarded the "IHF Excellence Award for Green Hospitals - Bronze" by the International Hospital Federation (IHF) at the "45th World Hospital Congress". In early 2023, for systematically promoting green hospitals, it received the 25th National Biotechnology and Medical Care Quality Award SNQ National Quality Award - Bronze Award in the Medical Management Category for Medical Institutions, making it Taiwan's number one green hospital.

Dalin Tzu Chi Hospital has achieved remarkable results in health promotion and green hospital management, actively participating in related collaborations, including those with international organizations such as Health Care Without Harm (HCWH), Global Green and Healthy Hospital (GGHH), Conference of the Parties (COP, the conference of the parties to the United Nations Framework Convention on Climate Change), CMUSA: CleanMed USA (or Sustainable Healthcare USA Conference), CMEU: Clean Europe (CleanMed Europe Conference, or Sustainable Healthcare Europe Conference), UNEP (United Nations Environment Programme), and Sustainability Health and Education Foundation, working towards global sustainable development. For many years, it has been dedicated to promoting green hospitals, with nine environmental indicators ranking first in Taiwan, and reporting on an annual total carbon emissions reduction of over 1,470 tons.

I have attended the United Nations World Climate Summit five times -- Paris in 2015, Spain in 2019, Poland in 2020, Glasgow, Scotland in 2021, and Egypt in 2022. At the 2021 UK Climate Summit, five key warning messages were delivered. First, we will exceed 1.5°C warming before 2040. Second, human activities are causing extreme weather, such as more intense heatwaves, glacier melting, and ocean warming. Third, there is an urgency to understand regional climate impacts, with warming in the Arctic and high latitudes of the Northern Hemisphere occurring two to four times faster than overall global warming. Fourth, we are closer to irreversible tipping points, for example, as temperatures rise, forests may begin to die, reducing their ability to absorb carbon dioxide, leading to further warming. Fifth, methane is a significant crisis, with livestock accounting for nearly 20% of global total greenhouse gases. Because climate change continues to worsen and is very urgent, all projects for carbon reduction work must be accelerated to achieve carbon neutrality by 2050.

▲ Vice Superintendent Lin Ming-Nan of Dalin Tzu Chi Hospital and his wife, Ms. Chu Chiu-Hua, are both vegetarian and environmental protection practitioners.

Often we talk about environmental protection as a means to save the Earth, but upon careful consideration, the Earth doesn't need human protection at all. About 66 million years ago in the Cretaceous period, the Earth was hit by an asteroid, causing the extinction of dinosaurs, who had been present since the Jurassic period. Yet, the Earth is still fine. What we should be doing now is actually saving humanity.

The crisis of climate change has led to various previously unimaginable natural disasters occurring frequently, and epidemics are also emerging one after another. In 2015, dengue fever broke out in Tainan, and that year, there were tens of thousands of additional dengue fever cases across Taiwan, with up to 200 people dying from it. There are also zoonotic infectious diseases like SARS and COVID-19 viruses, which are inextricably linked to climate warming and diet.

The temperature of global warming is at a critical point. Currently, the decrease in the Earth's ability to absorb carbon dioxide and the increase in carbon dioxide production are interacting, creating a vicious cycle.

It is precisely the greenhouse effect that maintains the Earth's average temperature at 15°C. However, the current excess of greenhouse gases has caused the Earth's average temperature to exceed 15°C, and in 2023, it even surpassed 17°C. At present, human activities have increased the concentration of greenhouse gases in the atmosphere. Due to the burning of fossil fuels and the emission of gases such as water vapor, carbon dioxide, and methane, which absorb and retain energy through infrared radiation, the global surface temperature rises, intensifying the greenhouse effect and causing global warming.

The Earth's permafrost has been frozen for years, but global warming is causing the permafrost layer to begin thawing; everyone has heard news about Arctic ice melting causing survival difficulties for polar bears. There is a large amount of methane beneath the permafrost, and climate warming leads to methane emissions. Its greenhouse gas effect, in terms of "100-year Global Warming Potential (GWP)," is more than 20 times that of carbon dioxide, and the "20-year Global Warming Potential (GWP20)" is more than 70 times. One of the main sources of methane is the livestock industry, including gases emitted from cattle and pig excrement, as well as ruminant gases, all of which contain large amounts of methane.

According to a survey report on the Climate Nexus website of the Rockefeller Philanthropy Advisors, the livestock industry raises over 70 billion animals for human consumption, consuming 30% of the world's land and 16% of water resources, and destroying rainforests and forests. Producing one pound of beef requires nearly 7,000 liters of water. Many countries and regions around the world are either suffering from severe water shortages or severe flooding. The Food and Agriculture Organization of the United Nations (FAO) report also points out that direct carbon dioxide emissions from the livestock industry account for 18% of greenhouse gases. If we add the deforestation needed for grazing land, the freezing storage, transportation, and cooking of meat products, the carbon emissions caused by the livestock industry amount to 51% of all greenhouse gases. Therefore, a plant-based diet that doesn't include meat is truly the simplest direct method to stop climate change.

In Taiwan, in recent years, it feels like there's almost no winter; we no longer experience an entire season of cold weather. If we don't actively reduce carbon emissions, we might really never have winter again. Moreover, hot weather leads to a surge in electricity consumption, which

in turn causes more carbon dioxide emissions. All of this requires human action and support to have a chance of improvement.

Dalin Tzu Chi Hospital is the first hospital in Taiwan and Asia to join the United Nations "Race to Zero" net zero carbon emissions initiative. To encourage colleagues to reduce carbon emissions and protect the Earth together, related activities have been held on World Earth Day for several consecutive years. On the eve of World Earth Day, April 22, 2023, the " For the Earth, I'm Willing to Change" event, part of the 2023 Dalin Tzu Chi Green Forest initiative, invited colleagues to adopt energy-saving and carbon-reducing practices in their daily lives. These practices included turning off lights and computers when not in use, conserving water, taking the stairs instead of elevators, walking or cycling more, avoiding plastic cups, straws, and paper cups, refraining from bottled drinks, reusing plastic bags, bringing personal utensils when dining out, choosing eco-friendly products, and especially promoting vegetarianism. The event emphasized the importance of green living and taking active steps to combat climate change. In my family medical clinic, many patients have diabetes, hypertension, and high cholesterol, and develop some chronic complications, which are actually closely related to diet. After coming to serve at Dalin Tzu Chi Hospital in 2005, I joined the Taiwan Vegetarian Nutrition Society in 2009. I wasn't originally someone who liked to eat a lot of meat, but since becoming a member of the vegetarian society, I started eating completely vegetarian. After becoming vegetarian, my health actually got better and better. Because of this, our whole family, including my mother, started eating vegetarian together.

At the end of 2015, the World Health Organization announced that processed meat is a Group 1 carcinogen for colorectal cancer, while red meat is a Group 2A carcinogen. Because meat contains excess cholesterol, which leads to cardiovascular diseases, cerebrovascular diseases, diabetes, kidney diseases, and hypertension, meat eating is correlated with bad physical health. Vegetarian food, that is, plant-based diets, contains no cholesterol, and plant-based diets have a lot of fiber, which has a protective effect on the body. So for good health, a very important factor is a plant-based diet, which is vegetarianism.

All Tzu Chi hospitals under the Tzu Chi Medical Foundation have, since their founding, provided vegetarian meals in both employee cafeterias and patient meals, continuously working to cool down the Earth.

Note: Global Warming Potential (GWP) is a measure of the impact of each greenhouse gas on global warming; it defines the GWP of carbon dioxide as 1, usually set over a 100-year period, comparing the warming impact of each gas relative to carbon dioxide.

Cultivating Wellness | A Doctor's Green Prescription

Simple Vegetarian Diet, Simple Life

Dr. Chen Chin-Cheng
Deputy Superintendent and Director of Neurosurgery, Dalin Tzu Chi Hospital

At the 45th anniversary of the Tzu Chi Foundation, from late 2011 to 2012, we were preparing to participate in the sign language interpretation of the "Water Repentance Adaptation." One day during that period, I went home and told my wife, "We're going to participate in the Water Repentance Adaptation, and the performance is in 100 days, so we should start eating vegetarian." The next day, we began our vegetarian diet. Because I've always been a simple person, making this decision was also simple. It's been over a decade since we started eating vegetarian.

For me, becoming vegetarian was very simple - it was just a change of mindset. Once that mindset changed, I became vegetarian.

Before becoming vegetarian, my health check-up showed slightly high blood sugar and lipid levels. The normal value for blood lipids is 200, and mine was a little over 200. After a few months of vegetarian diet, my blood lipids noticeably decreased, and now they consistently stay within the normal range of around 100.

To be vegetarian, you need to accept it in your mind. If you're always craving delicacies, it's hard to maintain a vegetarian diet. To be honest, I used to eat a lot of delicacies, but I'm simple and determined - when I decided to be vegetarian, I just changed.

This act of being vegetarian can change the world because of us.

In the past, the greenhouse effect maintained the Earth's average temperature at 15°C. Now, with the intensified greenhouse effect and global warming, we all know the Earth has a fever. "Climate change" has become a global concern, with expressions of hopes to control the Earth's rising temperature. I think we should now call it a "climate crisis" - the term "change" doesn't alert people enough; it's actually a "crisis." The 2015 and 2018 climate agreements originally aimed to control the temperature rise to 2°C by the end of the century, but this proved difficult to implement, so the goal was set to a temperature rise of 1.5°C to avoid a sea-level rise that could cause some countries and regions to disappear. Although it's only a 0.5°C difference, it could mean over 10 million more people submerged under rising sea levels.

Being vegetarian can save a lot of unnecessary deforestation and reduce carbon emissions. If one person eats vegetarian for a day, they can reduce 2.4 kg of carbon emissions. With Taiwan's population of 23 million, we could save 56,510 tons of carbon emissions in a year. Personally, after being vegetarian for over a decade, I've only reduced about 10,000

kg of carbon emissions. If we could combine everyone's efforts, the effect would be considerable.

Now, the four elements - earth, water, fire, and wind - are out of balance. Strange extreme weather events are occurring. In recent years, Taiwan has experienced unprecedented heavy rainfall, with flooding in places that have never flooded before. Many people say, "It's impossible! We've never encountered such heavy rain!" But now it is possible.

Why did we have the COVID-19 pandemic? Why is everyone wear-

ing masks? We were so happy before, not needing to wear masks at all. During the pandemic, wearing masks, I couldn't even recognize people's faces - I just mistook someone on the street.

We can each make a small effort - the simple act of eating vegetarian can reduce about 20-30% of carbon emissions.

Seeking a simple life can also help ourselves; not killing nurtures compassion and wisdom. I work in healthcare, a profession that saves lives. I hope all patients get better, but if I still eat meat, it's like I'm still killing, which seems contradictory. I hope more and more people will become vegetarian, for the Earth's benefit, for a better environment for our future generations. I wish everyone good health, a slowdown in global warming, and peace for all beings.

Vegetarian Diet Effectively Reduces the Probability of Severe COVID-19 in the Elderly

During the COVID-19 pandemic in Taiwan, from 2020 to September 2022, Taipei Tzu Chi Hospital treated over 1,700 infected patients. The medical team published 32 research papers on environmental disinfection, patients' dietary habits, disease-related complications, and adjuvant treatments for COVID-19 in various Taiwanese and international medical journals. A research team led by nutritionist Hou Yi-Cheng from the Nutrition Department of Taipei Tzu Chi Hospital conducted a retrospective study on the proportion of severe COVID-19 cases among elderly vegetarians. The study confirmed that patients over 65 years old could, by being vegetarian, effectively reduce their probability of contracting severe COVID-19. The research results were published in "Frontiers in Nutrition."

During Taiwan's first major COVID-19 outbreak in 2021, the risk and severity of the disease varied greatly and depended on individual lifestyle habits and pre-existing conditions. The British Medical Journal had previously conducted a study on 2,884 healthcare workers from six European and American countries with different dietary habits, including those following vegetarian, pescatarian, and omnivorous diets. The study found that vegetarians could reduce the proportion of severe COVID-19 cases by 73%. Based on this, nutritionist Hou Yi-Cheng conducted further research on how vegetarianism helps reduce the probability of severe COVID-19 in the elderly. The study evaluated the relationship between vegetarian diets and the severity of COVID-19 symptoms, using the dietary patterns of patients over 65 years old from the previous year as the assessment data source.

Referencing the classification standards of the U.S. National Institutes of Health, patients were divided into three groups. Those with mild upper respiratory tract infections, possibly accompanied by fever, cough, and sore throat, were classified as mild cases. Those with severe clinical pneumonia symptoms meeting any of the following criteria: respiratory rate greater than 30 times per minute, blood oxygen concentration less than 94%, oxygenation index less than 300, or lung infiltration greater than 50%, were classified as moderate cases. Those with acute respiratory distress syndrome, respiratory failure requiring ventilator

▲ Taipei Tzu Chi Hospital nutritionist Hou Yi-Cheng and her team published a paper proving that a vegetarian diet can reduce the probability of severe COVID-19 in the elderly.

assistance, sepsis, or septic shock were classified as severe cases. Finally, logistic regression statistics showed that among vegetarian patients, the number of severe COVID-19 cases was significantly lower than among non-vegetarians, especially in patients over 65 years old.

Diet has a crucial impact on gut microbiota and is closely related to the risk and severity of infectious diseases. Previous reports have indicated that vegetarian diets are nutritionally rich, including high concentrations of polyphenols, carotenoids, cellulose, vitamins A, C, E, folic acid, iron, potassium, and magnesium. Nutritionist Hou Yi-Cheng stated, "A vegetarian diet can strengthen the immune system, prevent hypertension, inflammation, and oxidative stress, and reduce the risk of cardiovascular diseases and complications." Future studies will include more detailed investigations considering vaccination status and the use of nutritional supplements.

[ACADEMIC PAPER] COVID-19 illness severity in the elderly in relation to vegetarian and non-vegetarian diets: a single-center experience

Authors Yi-Cheng Hou, Wen-Lin Su, You-Chen Chao

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[Abstract]

The first wave of the coronavirus disease 2019 (COVID-19) outbreak in Taiwan occurred in May 2021. The risk for and severity of this disease vary and are highly dependent on personal habits and comorbidities. Moreover, the gut microbiome, which may be affected by diet, is highly susceptible with regard to the risk and severity of infectious diseases such as COVID-19. The relationship between dietary habits, nutritional status, and the effects of these factors on the immune system in the context of a global pandemic is an extremely important topic of immediate concern. Hence, the aim of this study was to explore the effect of vegetarian and non-vegetarian diets on COVID-19 severity during the pandemic. We conducted a retrospective evaluation of 509 patients who had been diagnosed with COVID-19 at a single medical center between May 2021 and August 2021. Patients were divided into three groups according to disease severity. For patients aged ≥65 years, COVID-19 symptom severity was statistically significantly and inversely associated with the adherence to a vegetarian diet ($p = 0.013$). Moreover, subgroup analysis results showed that older COVID-19 patients and those with a non-vegetarian diet had a higher risk of contracting critically severe COVID-19 [adjusted odds ratio (OR) = 5.434, $p = 0.005$]. Further research is needed to determine the effects of dietary habits on COVID-19 risk and severity during the global pandemic.

PART 5

Additional Health Benefits of Vegetarian Diet

Our series of vegetarian research studies have once again confirmed that a vegetarian diet is beneficial to physical health. The most basic principle of a healthy diet is to balance the intake of the six essential nutrients that the human body needs: carbohydrates, proteins, fats, vitamins, minerals, and water.

In addition to a balanced diet, attention should also be paid to whether vitamin B12 and vitamin D are sufficient. The methods of intake are as follows.

Balanced Intake of Six Essential Nutrients

least 60% of the human body's energy needs come from carbohydrates, which equals 300 grams of carbohydrates for a daily 1200 kcal diet. It is recommended that refined sugars should be less than 10% of this intake.

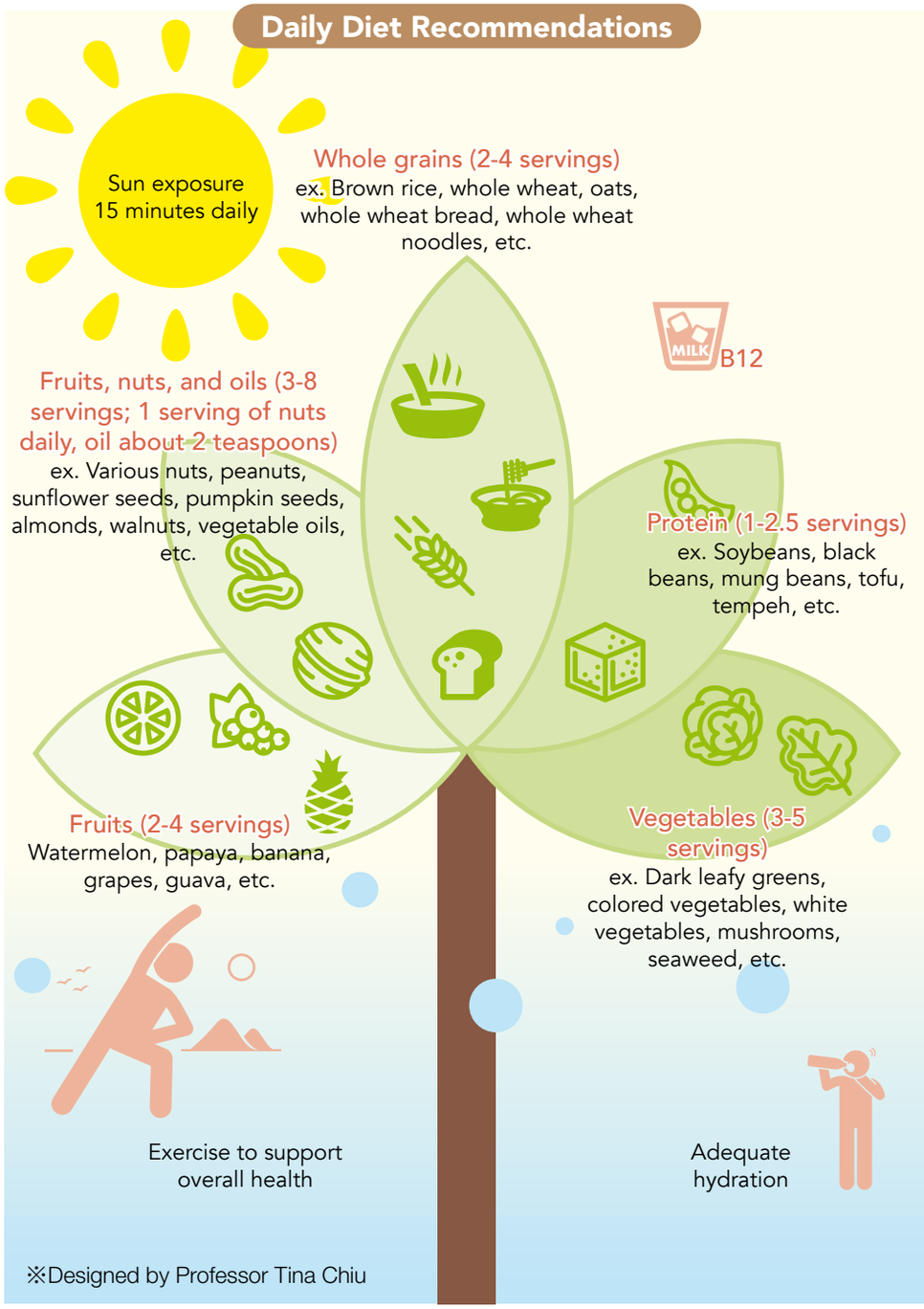
Plant-based diets contain abundant carbohydrates, from monosaccharides to polysaccharides, which are sufficient to meet human needs and help with digestive function and energy metabolism.

Eating adequate amounts of legumes and whole grains daily can provide sufficient protein and calories. As long as one doesn't have a overly selective diet, there won't be a lack of protein.

Plant-based diets not only contain lower fat and sufficient protein but also high amounts of complex carbohydrates and fiber. This can reduce calorie absorption in the intestines, prevent fat accumulation, and prevent nutritional imbalances caused by excessive calories in food. Moreover, plant-based foods contain rich antioxidant vitamins such as B1, C, E, and beneficial minerals like potassium, magnesium, calcium, and phosphorus.

Everyone needs to drink 2,500cc of water daily. Vegetables and fruits have high water content, so eating more fruits and vegetables also helps with water intake.

You can visit the Taiwan Vegetarian Nutrition Society website's "My Healthy Vegetarian Blueprint" to calculate a suitable dietary combination for yourself.



Vitamin B12 Intake

Vitamin B12 is produced by bacteria (microorganisms), and the human body cannot synthesize vitamin B12 on its own.Severe vitamin B12 deficiency can lead to numbness in hands and feet, epilepsy, and even depression or cognitive dysfunction.

The human body absorbs vitamin B12 through the gastrointestinal tract, so as we age and our digestive system deteriorates, B12 deficiency may occur. Research shows that the incidence of B12 deficiency in people over 65 is about 30-40%.

Vitamin B12

Vitamin B12 is not directly produced by animals or plants. It is produced by "bacteria (microorganisms)".

Both humans and animals need to obtain vitamin B12 produced by bacteria, either directly or indirectly.

Sources of Vitamin B12

Nutritional yeast

B12 supplements

According to the "Dietary Nutrient Reference Intake for Taiwanese" by the Ministry of Health and Welfare, the daily intake of vitamin B12 should be 2.4 micrograms, equivalent to one egg or two cups of milk per day. For those who don't eat eggs or dairy, or those with lactose intolerance, additional vitamin B12 supplementation is needed.

Two Main Reasons for Vitamin B12 Deficiency:

1. Poor Absorption: Unable to Release B12 Bound to Food Proteins

The digestive system lacks intrinsic factor and cannot properly absorb vitamin B12, or the elderly have reduced absorption due to atrophic gastritis/ lack of gastric acid.

2. Insufficient Intake

Mistaking foods that don't contain vitamin B12 as sources, long-term consumption of these foods cannot supplement vitamin B12 and instead causes deficiency. Foods often mistakenly thought to contain B12 include: tempeh, fermented products, edamame, brown rice, brewer's yeast, wheat germ, etc.

For people over 50 years old, about 10-30% have difficulty absorbing B12 from food.

The U.S. National Academy of Medicine recommends that men and women over 50 should use supplements or B12-fortified foods as reliable sources of vitamin B12. Regardless of diet pattern, crystalline forms (supplements, B12-fortified foods) should be the "main source of B12" for those over 50.

To check if you're deficient in vitamin B12, regular blood tests can be done. In addition to vitamin B12 levels, it's recommended to test for homocysteine, holotranscobalamin, and methylmalonic acid.

Important Considerations Before Using Vitamin B12 Supplements

Before supplementation, it is recommended to schedule an appointment and have blood tests done to understand your actual needs and appropriate dosage. Depending on individual circumstances (such as deficiency/malabsorption issues), patients with chronic kidney disease must consult with a dietitian and physician to confirm the appropriate form and dosage.

Vitamin B12	Primary Test	Additional Recommended Tests
	1 Homocysteine (Hcy)	Elevated Hcy may indicate concurrent folate/B6 deficiency
	2 Holotranscobalamin	Extremely sensitive to recent intake levels
	3 Methylmalonic Acid (MMA)	Highly sensitive marker and an extremely sensitive indicator of B12 deficiency

Reliable B12 foods include

Nutritional yeast (flakes)

Plant-based milk fortified with B12

It's recommended to consume these 2-3 times daily to ensure adequate dosage.

Vitamin B12 Fortified Foods

Daily Recommended Intake for Individuals Without Malabsorption Disorders

Ages 14 and above: 2.4 mcg
Pregnant women: 2.6 mcg
Breastfeeding women: 2.8 mcg

Each serving of fortified food should provide 2 mcg (μg) of B12

(May vary by brand; please read nutrition labels carefully)

B12 Fortified Foods 2 to 3 times daily

Nutritional yeast (powder/flakes)

1 tablespoon (4.5g) = 7 μg

B12-fortified imported plant milk

1 cup (250ml) = 1.2 μg

Note: Unless there are specific health conditions (such as kidney disease), healthy individuals don't need to worry about excess intake as unabsorbed B12 will be excreted in urine.

Supplementing Vitamin B12: Brewer's Yeast or Nutritional Yeast?

Vitamin B12

Vitamin B12 is produced by a few bacteria and archaea. Yeast, being a fungus, cannot produce vitamin B12. Most brewer's yeast is not artificially fortified and doesn't contain vitamin B12. However, most nutritional yeast is artificially fortified and contains vitamin B12.

Brewer's Yeast

Brewer's Yeast is a common health food found in organic food stores and department store counters. It's a by-product of malted barley fermented by the fungus Saccharomyces cerevisiae. The fermentation process produces rich B-vitamins and trace elements, making it a valuable nutritional supplement. Brewer's yeast can also be used as a lactation aid, helping postpartum women secrete breast milk.

▲ Brewer's Yeast

Nutritional Yeast

Nutritional Yeast is rarely sold in regular stores and usually needs to be purchased online. It's produced by fermenting cane sugar or beet molasses with Saccharomyces cerevisiae. Unlike brewer's yeast, nutritional yeast is not a by-product; it's manufactured specifically as a nutritional supplement. Therefore, in addition to the B-vitamins produced by the yeast itself, facto-

ries artificially enhance the B-vitamin dosage and add vitamin B12 to improve overall nutritional value. Nutritional yeast has a slightly salty, umami flavor that some say is cheese-like. It's suitable for pairing with thick soups, white sauce pasta, sprinkling on rice, or mixing into hummus or nut butter. People who dislike supplements can consider using nutritional yeast as a reliable source of vitamin B12.

Name	Brewer's Yeast	Nutritional Yeast
Fermentation Method	Fungi + Sprouted Barley	Fungi + Cane Sugar
Production Purpose	By-product of beer brewing	Nutritional supplement, artificially fortified with additional B vitamins, including B12
Taste & Texture	Slightly bitter, powdered	Savory/umami flavor, can be added to soups, pasta
Vitamin B1	✓	✓✓
Vitamin B2	✓	✓✓
Vitamin B3	✓	✓✓
Vitamin B6	✓	✓✓
Vitamin B9	✓	✓✓
Vitamin B12	—	✓✓
Trace Elements	✓	✓

* Nutritional value may vary by brand. Always check the nutrition facts label on the packaging before purchasing.

Nutritional Comparison

Product	Brewer's Yeast Per 15g	Nutritional Yeast Per 15g
Strain	Saccharomyces cerevisiae	Saccharomyces cerevisiae
Viability	Non-viable, product contains dead yeast *Cannot be used to ferment other products*	Non-viable, product contains dead yeast *Cannot be used to ferment other products*
Growth Medium	Malted barley	Beet molasses, cane sugar
Taste & Texture	Slightly bitter, powder form	Slightly salty, available in powder and flake forms
Calories	Approximately 50 kcal	60 kcal
Protein	6 g	8 g
VitaminB12	0.01 microgram	17.6 microgram (fortified)
VitaminB1	1.65 milligram	11.8 milligram (fortified)
VitaminB2	0.6 milligram	9.7 milligram (fortified)
VitaminB3	6 milligram	46 milligram (fortified)
VitaminB6	0.22 milligram	6 milligram (fortified)
VitaminB9	351 microgram	1080 microgram (fortified)

* Nutritional values vary slightly between brands. Please check nutrition labels before purchasing.

Vitamin D Fortification

Vitamin D deficiency can lead to diabetes, cardiovascular diseases, neurodegenerative diseases, upper respiratory tract infections, and immune system diseases, so it's important to ensure adequate vitamin D intake.

Vitamin D can be generated through sun exposure; the skin can produce vitamin D after exposure to ultraviolet (UVB) light. There are few foods that contain vitamin D, so the best method is to get 15 minutes of sun exposure daily.

Additionally, research shows that mushrooms or wood ear mushrooms can greatly increase their vitamin D content when sun-dried after harvesting. People who are prone to deficiency should consider vitamin D supplements.

Sources of Vitamin D

Sun-dried Mushrooms	Sunlight	Vitamin D Supplements

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Scientific Evidence for Vegetarianism:

Sustainable Diet for Disease Treatment and Prevention

Authors:

Dr. Lin Chin-Lon CEO of Buddhist Tzu Chi Medical Foundation
Yen Po-Wen CEO of Buddhist Tzu Chi Charity Foundation
Dr. Yu Cheng-Chan General Surgeon & Deputy Superintendent, Taichung Tzu Chi Hospital
Dr. Wu Sheng-Teng Nephrologist & Deputy Superintendent of Kuanshan Tzu Chi Hospital
Dr. Wang Yi-Chun Nephrologist, Taipei Tzu Chi Hospital
Dr. Chang Shun-Chin Geriatric Medicine Department, Dalin Tzu Chi Hospital
Dr. Chang Chun-Ming General Surgeon, Hualien Tzu Chi Hospital
Dr. Yeh Ming-Hsien Director of Chinese Medicine Department, Dalin Tzu Chi Hospital
Dr. Chang Huai-Ren Cardiologist, Hualien Tzu Chi Hospital
Dr. Chen Yen-Chang Anatomical Pathologist, Hualien Tzu Chi Hospital
Dr. Chang You-Kang Radiation Oncologist, Taipei Tzu Chi Hospital
Dr. Chen Ching-Yuan Director of Nuclear Medicine Department, Taichung Tzu Chi Hospital
Dr. Chang Wei-Chiao Chinese Medicine Department, Dalin Tzu Chi Hospital
Dr. Chen Chin-Cheng Neurosurgeon & Deputy Superintendent of Dalin Tzu Chi Hospital
Dr. Lin Ming-Nan Family Medicine Department & Deputy Superintendent of Dalin Tzu Chi Hospital

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