

Are Alternative Protein Foods Nutritious and Healthy?

From Dietary Modelling to Randomised Controlled Trials in Singapore

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2) Nutrient Composition of Alternative Proteins

3) Dietary Modelling of Alternative Proteins into Asian Diets

4) Acute and 8-week Dietary Intervention Comparing Alternative and Conventional Protein Foods on Nutrition and Health

5) Conclusions



Background – Alternative Proteins

A brief timeline



Meat-like organoleptic attributes to promote dietary transition





Consequences of Alternative Proteins on Health?

Unknown impacts of plant-based meat alternatives on long-term health

[Darel Wee Kiat Toh](#), [Akila SRV](#) & [Christiani Jeyakumar Henry](#) ✉

nature food



Traditional plant-based protein foods



Novel plant-based protein foods



Soybeans



Soy protein isolate



Cassava



Cassava flour



Coconut



Coconut oil



Meat-like fibers



Meat-like mince

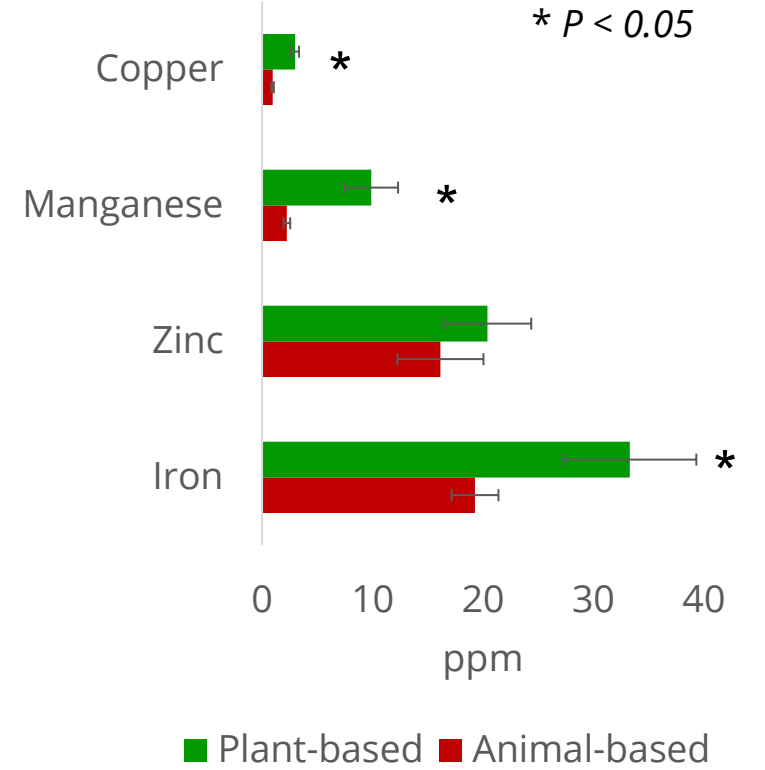
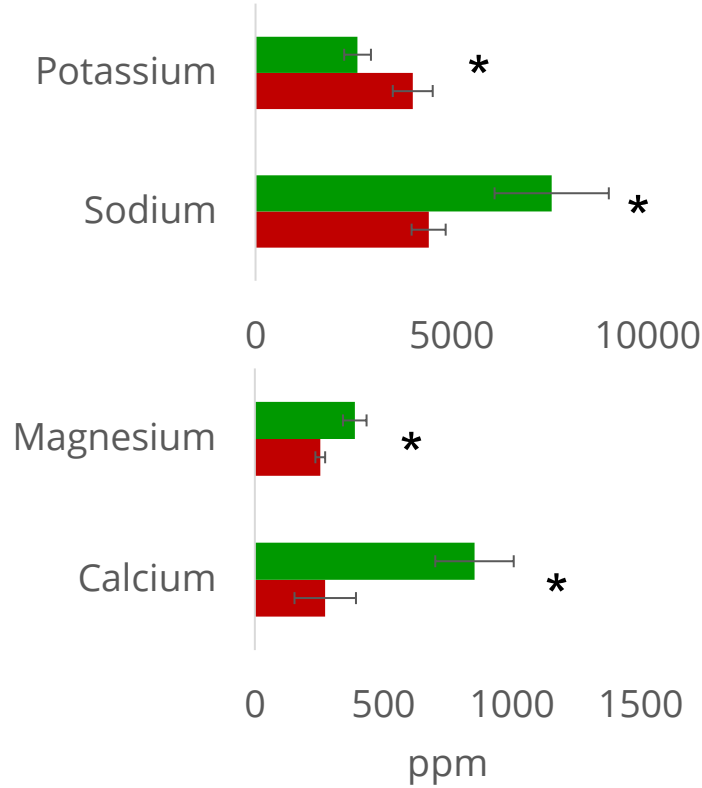
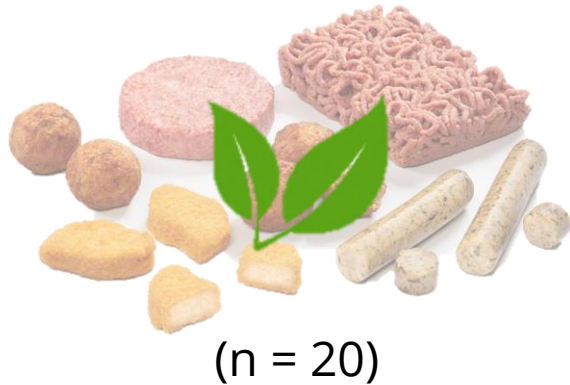
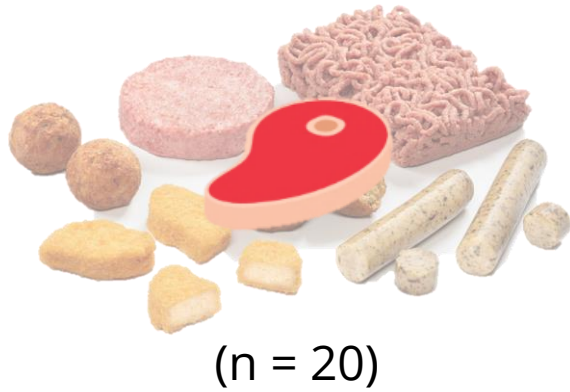


- Preservatives
- Emulsifiers
- Stabilisers
- Thickeners
- Flavourings
- Colourings
- Fortifications

Nutrient Composition of Alternative Proteins

Are plant-based meat analogues richer in minerals than their meat counterparts?

Michelle Ting Yun Yeo^a, Xinyan Bi^a, Christiani Jeyakumar Henry^{a,b,*}





Fortificants



Texturants

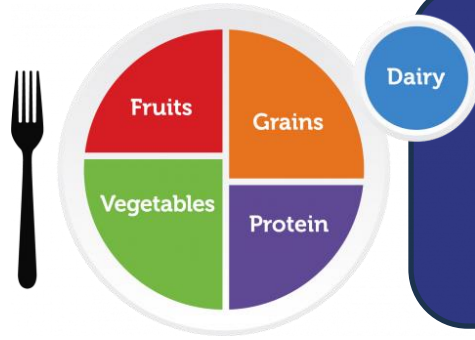


Flavour/Colour

Nutrient Composition of Alternative Proteins

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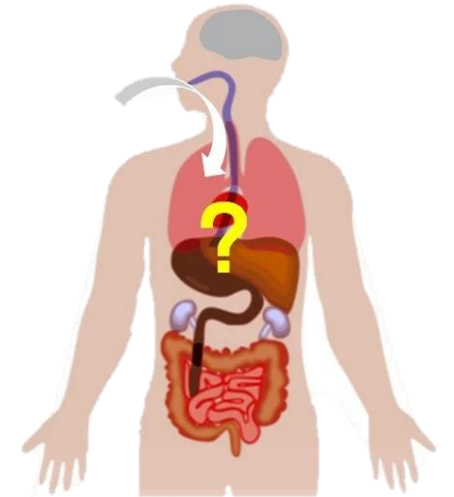
Michelle Ting Yun Yeo^a, Xinyan Bi^a, Christiani Jeyakumar Henry^{a,b,*}



Influence on Broader Diet

Nutritional Physiology

Health and Chronic Disease Risk



Hu et al., 2024





Dietary Modelling of Alternative Proteins

Plant-based alternative proteins—are they nutritionally more advantageous?

Wesley Tay¹, Rina Quek¹, Joseph Lim¹, Bhupinder Kaur¹, Shalini Ponnalagu¹ and Christiani Jeyakumar Henry^{1,2}

Objective: Simulate nutritional effects of replacing animal foods with plant-based alternatives

(1) Weighed food records

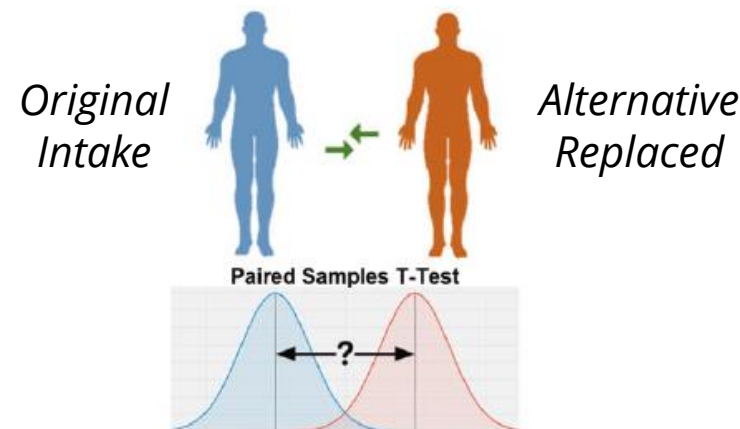


~ 600 meal events

(2) Meal breakdown → Gram-for-gram replacement



(3) Nutrient profiling and comparison

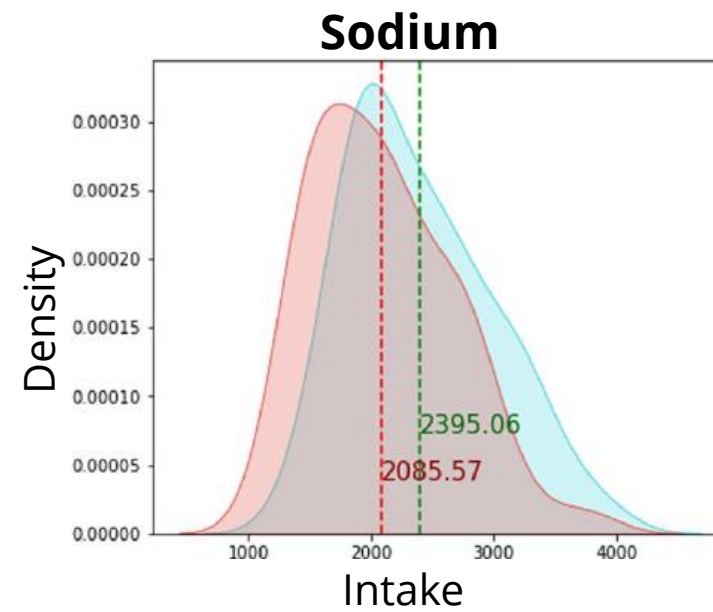
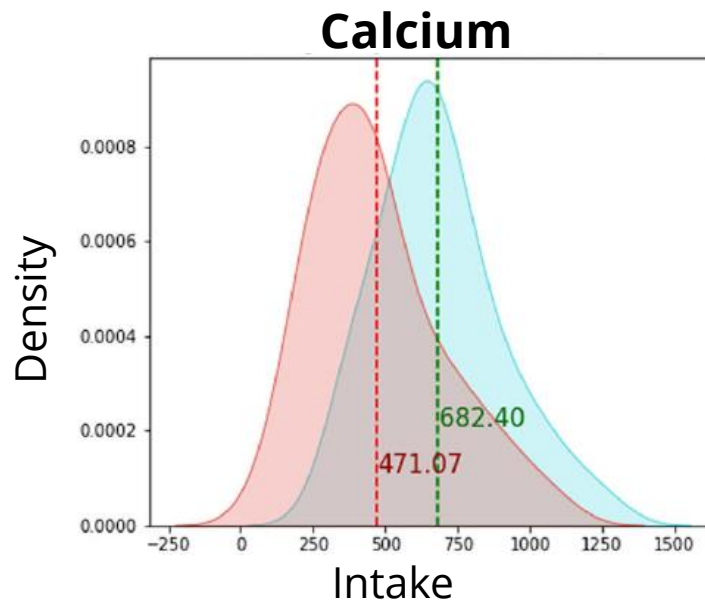
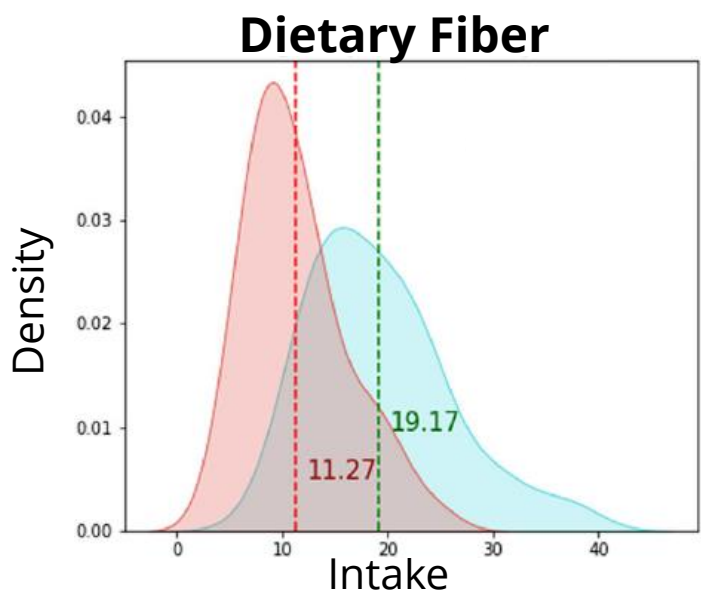
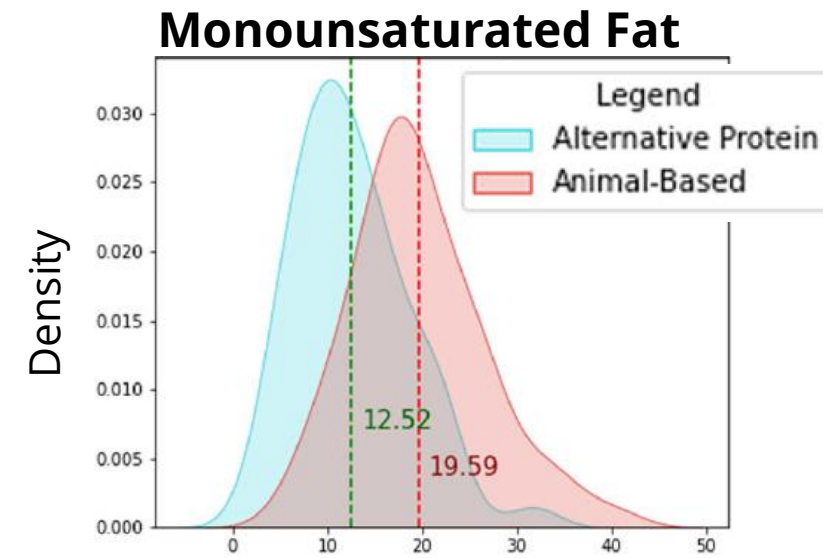
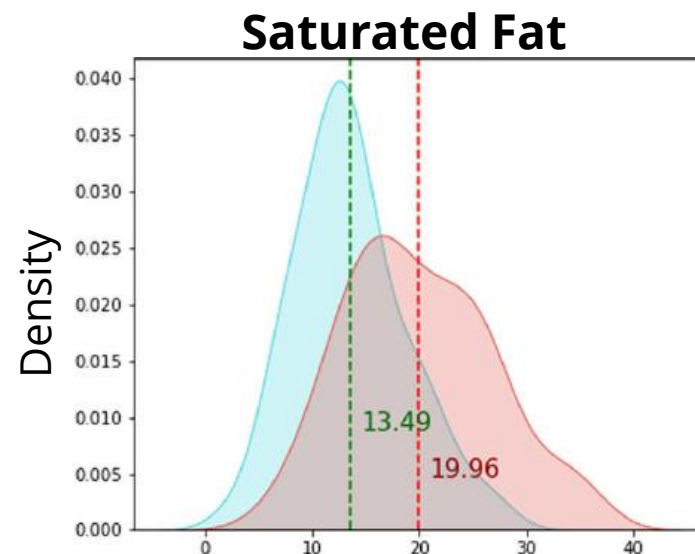
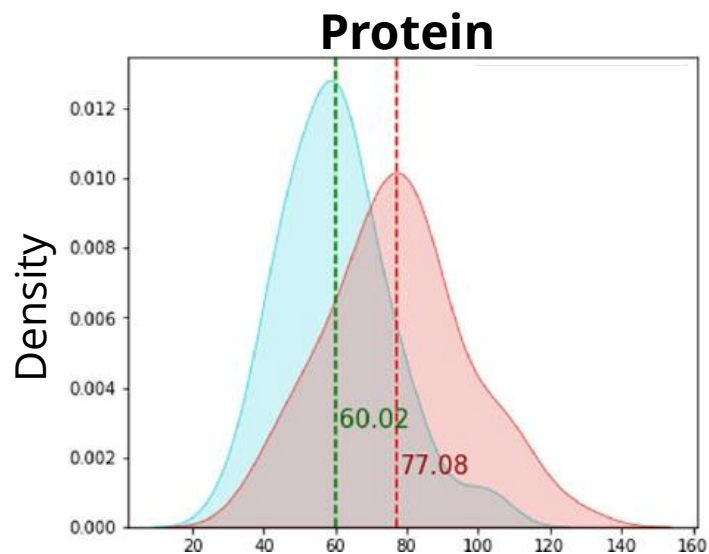




Dietary Modelling of Alternative Proteins

Plant-based alternative proteins—are they nutritionally more advantageous?

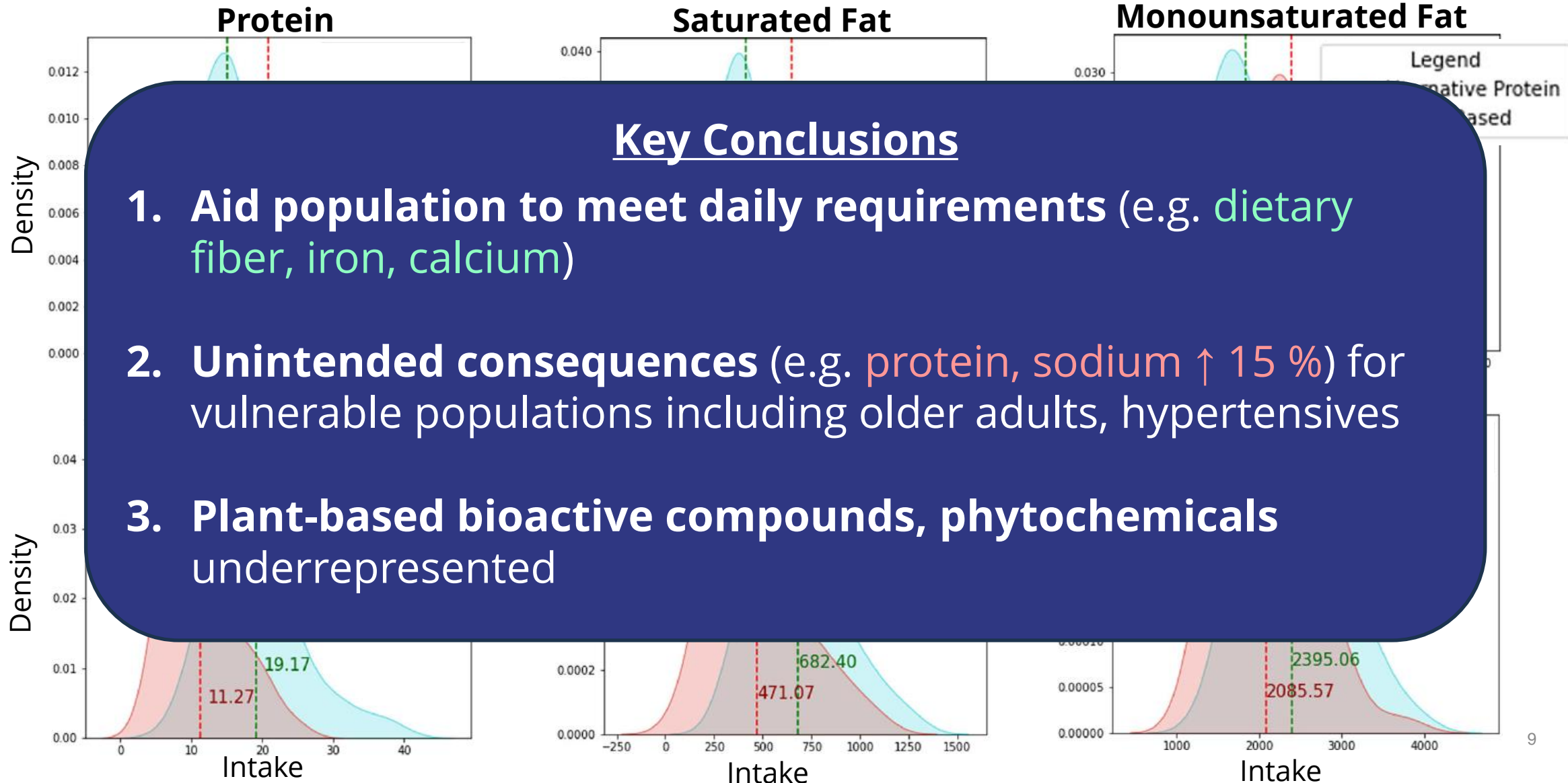
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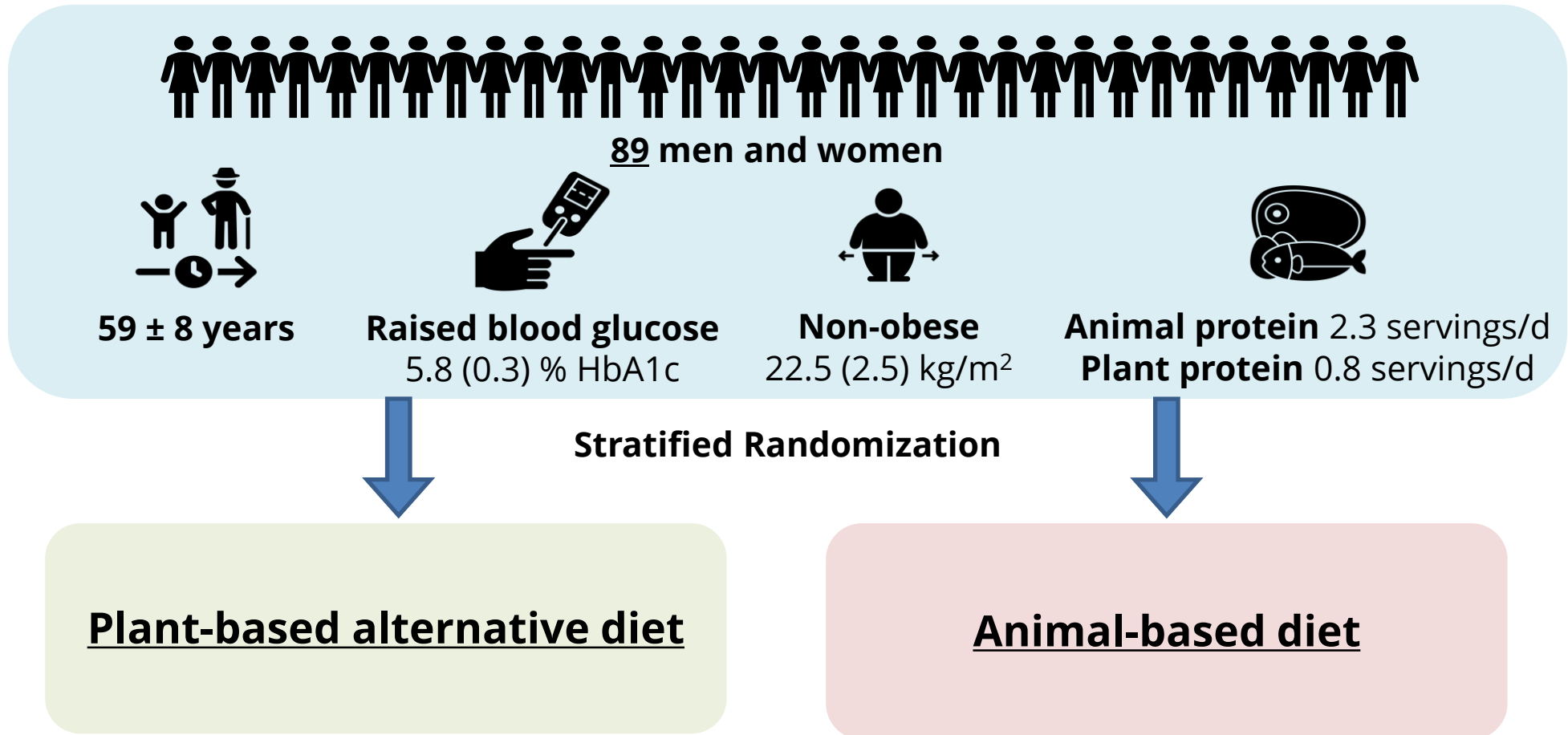
Randomised Controlled Dietary Intervention

Plant-Based Meat Analogs and Their Effects on Cardiometabolic Health: An 8-Week Randomized Controlled Trial Comparing Plant-Based Meat Analogs With Their Corresponding Animal-Based Foods

Darel Wee Kiat Toh^{1,*}, Amanda Simin Fu¹, Kervyn Ajay Mehta¹, Nicole Yi Lin Lam¹, Sumanto Haldar^{1,2}, Christiani Jeyakumar Henry^{1,3}

The American Journal of **CLINICAL NUTRITION**

Objective: Impact of omnivorous **plant-based meat alternative** vs **animal-based meat** diets on (1) cardiometabolic health, (2) biological micronutrients status, (3) metabolome



Values presented as mean (SD)



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Plant-based alternative



Nuggets



Pork mince



Chicken fillet



Patty



Beef mince



Sausage

Animal-based meat



Nuggets



Pork mince



Chicken fillet



Patty



Beef mince



Sausage

Protein matched

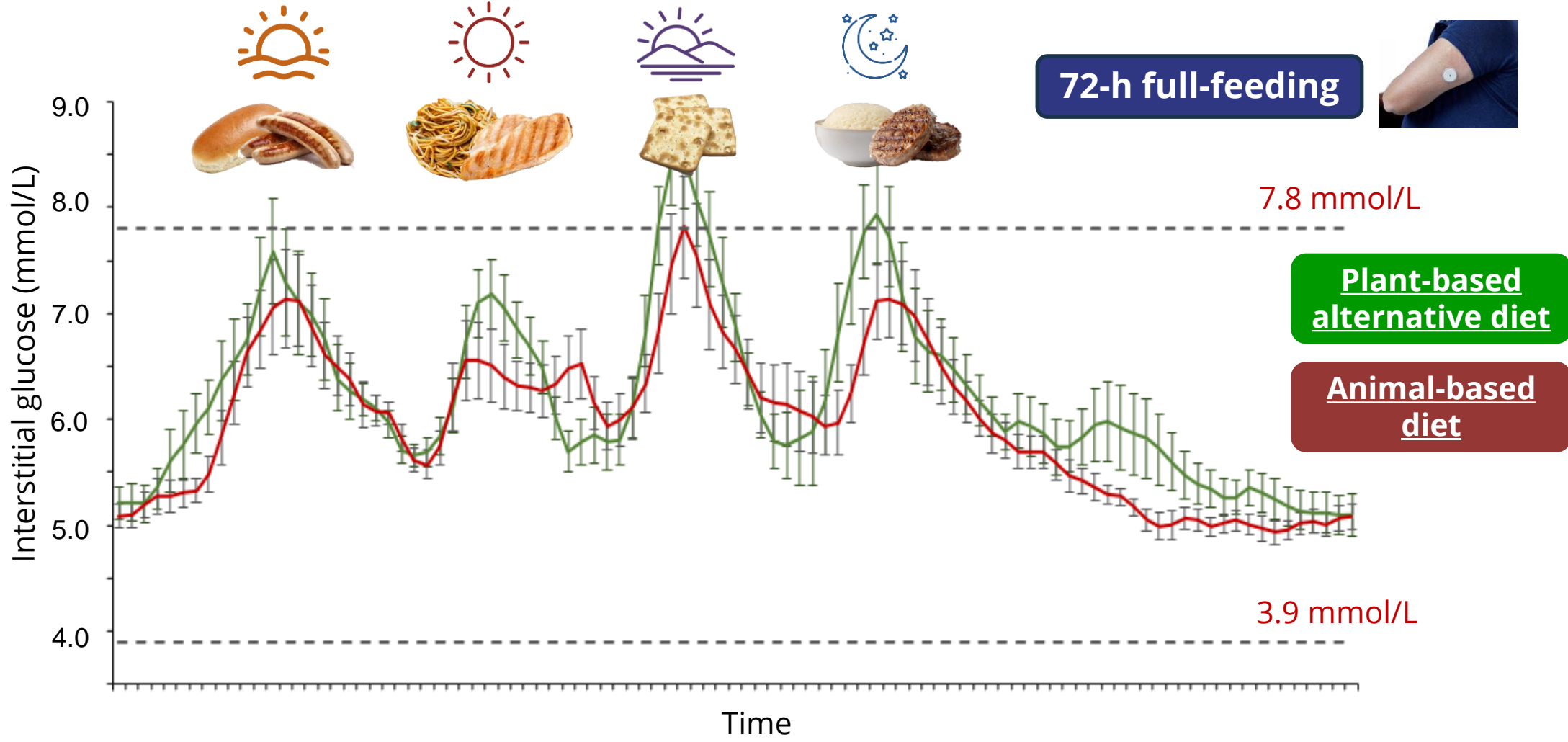


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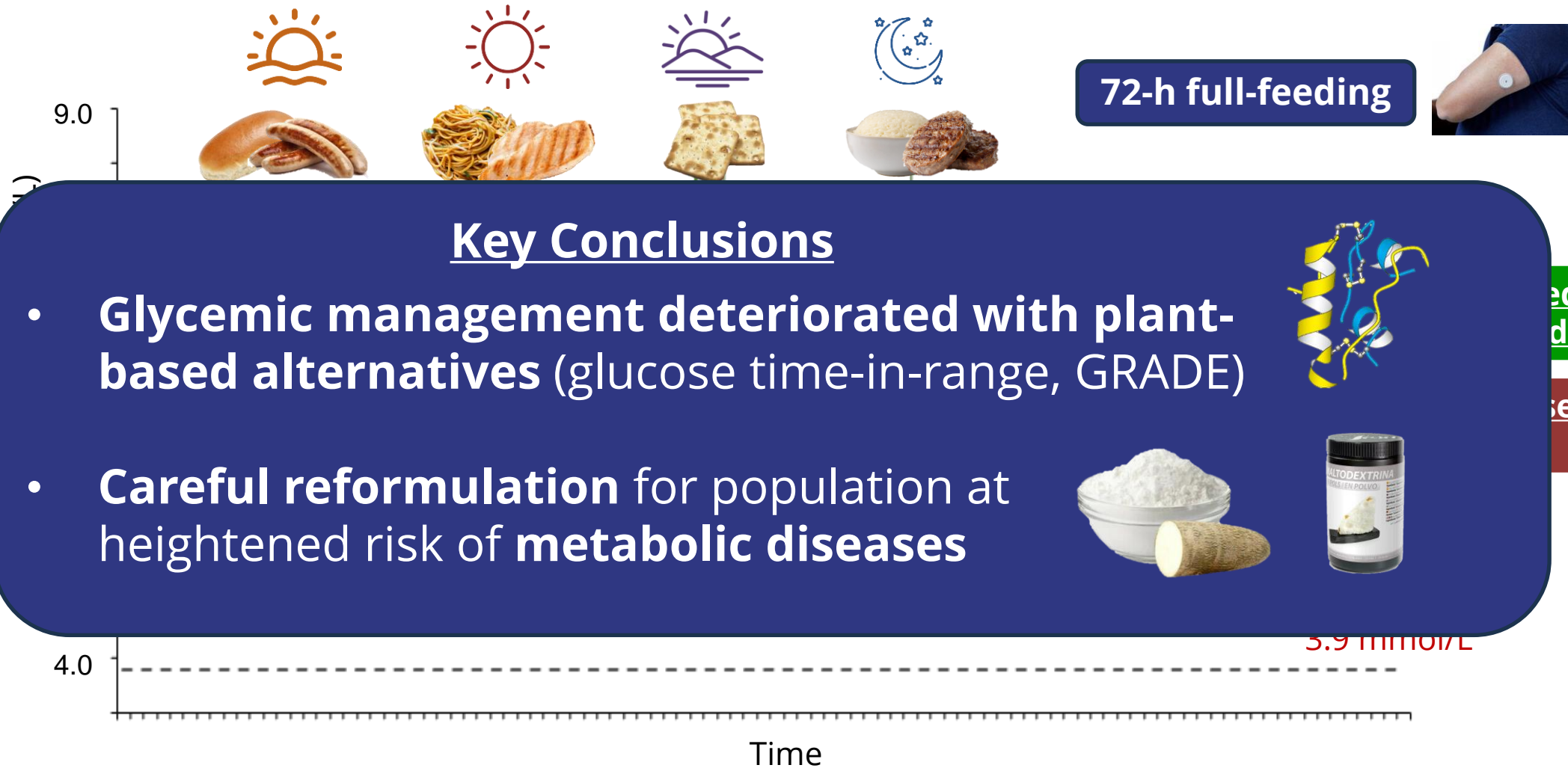


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Plant-based alternative



Nuggets



Pork mince



Chicken fillet



Patty



Beef mince



Sausage



8-weeks partial feeding

Protein matched

Animal-based meat



Nuggets



Pork mince



Chicken fillet



Patty



Beef mince



Sausage



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Metabolic Health

Type 2 Diabetes Risk



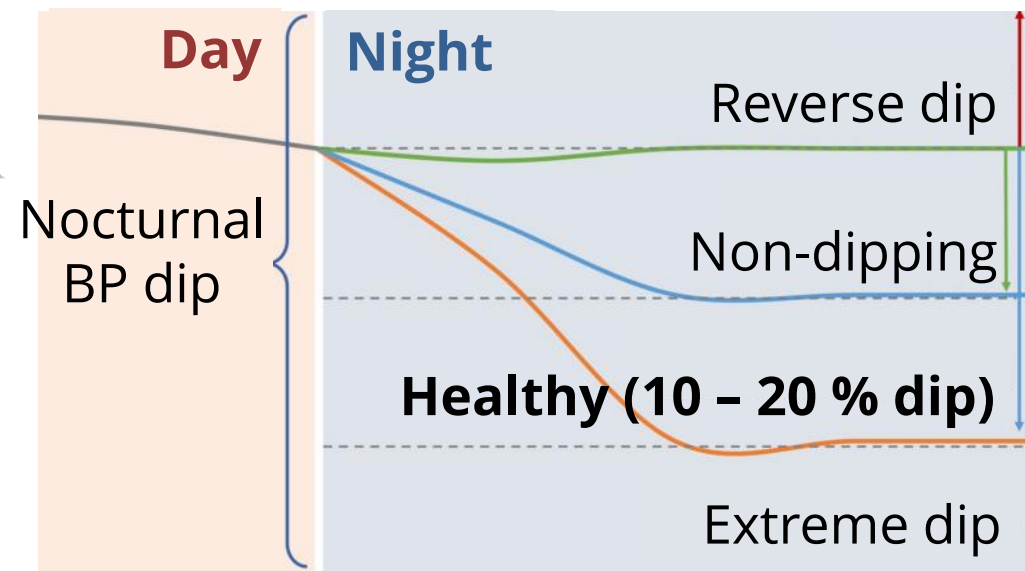
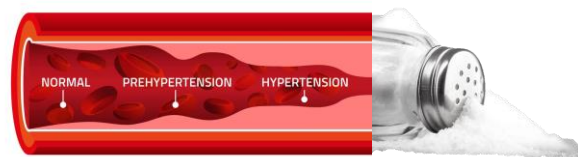
Cardiovascular Health

Cardiovascular Disease Risk



Plasma Metabolomics

Mechanistic elucidation



Tang et al. (2024)

- **Blood pressure management worsened (nocturnal dip) with plant-based alternatives**
- **Sodium reduction with flavour optimisation**



Conclusion and Acknowledgements

Alternative proteins designed to optimise nutrition
≠ Plant-based diets

Bioavailability and functionality
cannot be undermined (proteins, micronutrients etc.)

Redeveloped to consider unintended impact on **glycemic regulation**

Sodium refinement for cardiovascular health and hypertension control

Nutrition must be considered alongside the current focus on **sustainability** and **organoleptic** attributes to evolve our next generation of **healthier alternative protein foods**





CREATING GROWTH, ENHANCING LIVES



THANK YOU

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