

Role of the Gut Microbiome in Vascular and Brain Health:

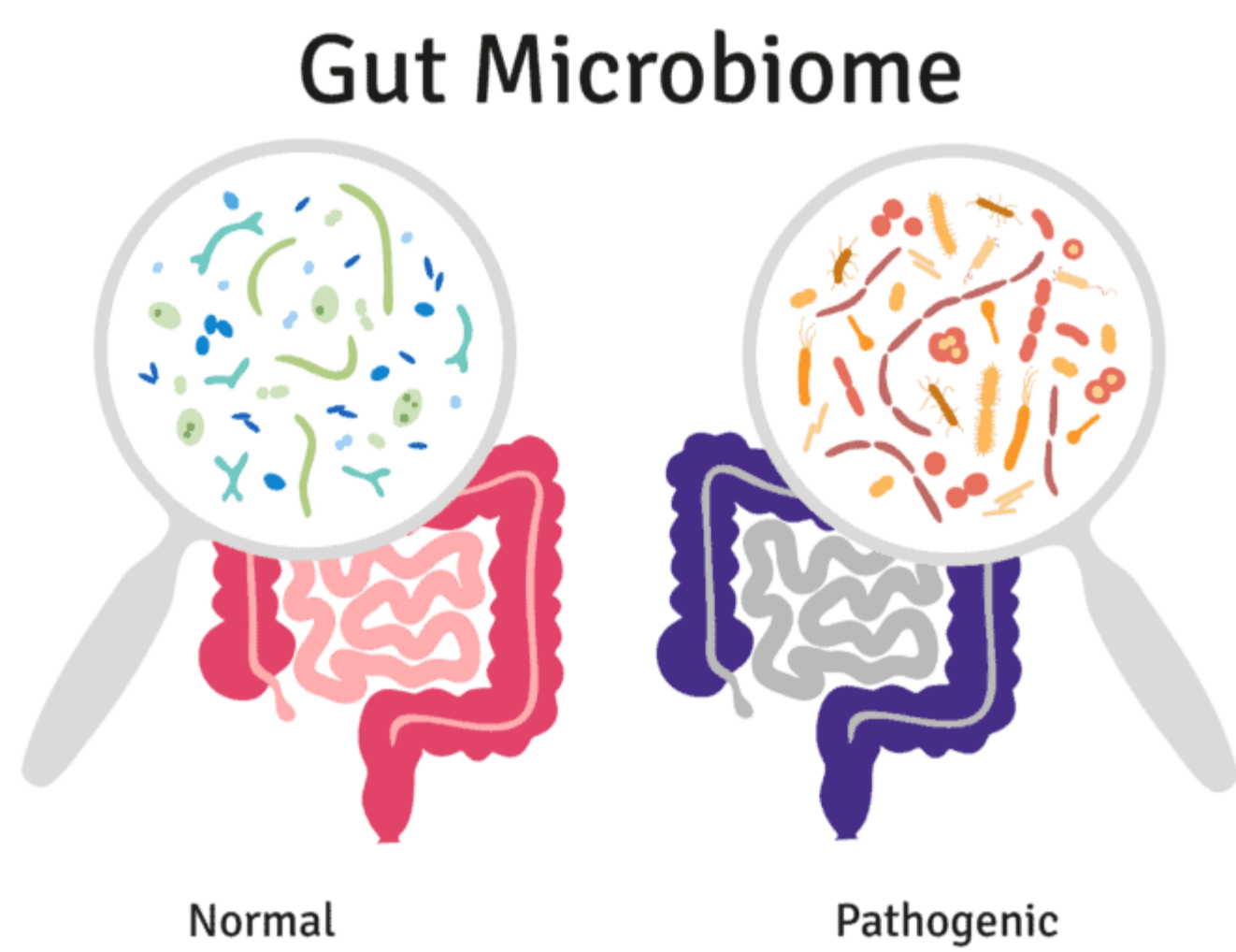
An overview of the extra-intestinal impact of the gut microbiome

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Introduction

- The **human gut microbiome** exists in close physiological partnership with its host. Consequentially, disruption of the normalcy of the gut microbiome, or ‘**dysbiosis**’, carries significant consequences that stretch beyond the influence of the gastrointestinal tract.
- Mounting research implicates dysbiosis in the development of many diseases, which has led to renewed interest in the mechanisms linking microbiome compositional change to physical harm.
- Previous research conducted by HKU Stroke found shotgun sequencing of study participants’ stool microbiota identified an inverse relationship between blood pressure and three *Bifidobacterium* species, making it a promising candidate as a regulator for blood pressure and atherosclerotic risk.



The Research Gap

Hypertension: the leading risk of cardiovascular disease and death

- Adequate control has still not been achieved by over 80% of the population
- Fecal microbiota transplantation can lead to the transmission of HT, indicating some degree of causality and the potential use of probiotics in controlling hypertension.
- The use of probiotics provides an safe and effective alternative to patients who refuse conventional pharmaceutical treatments

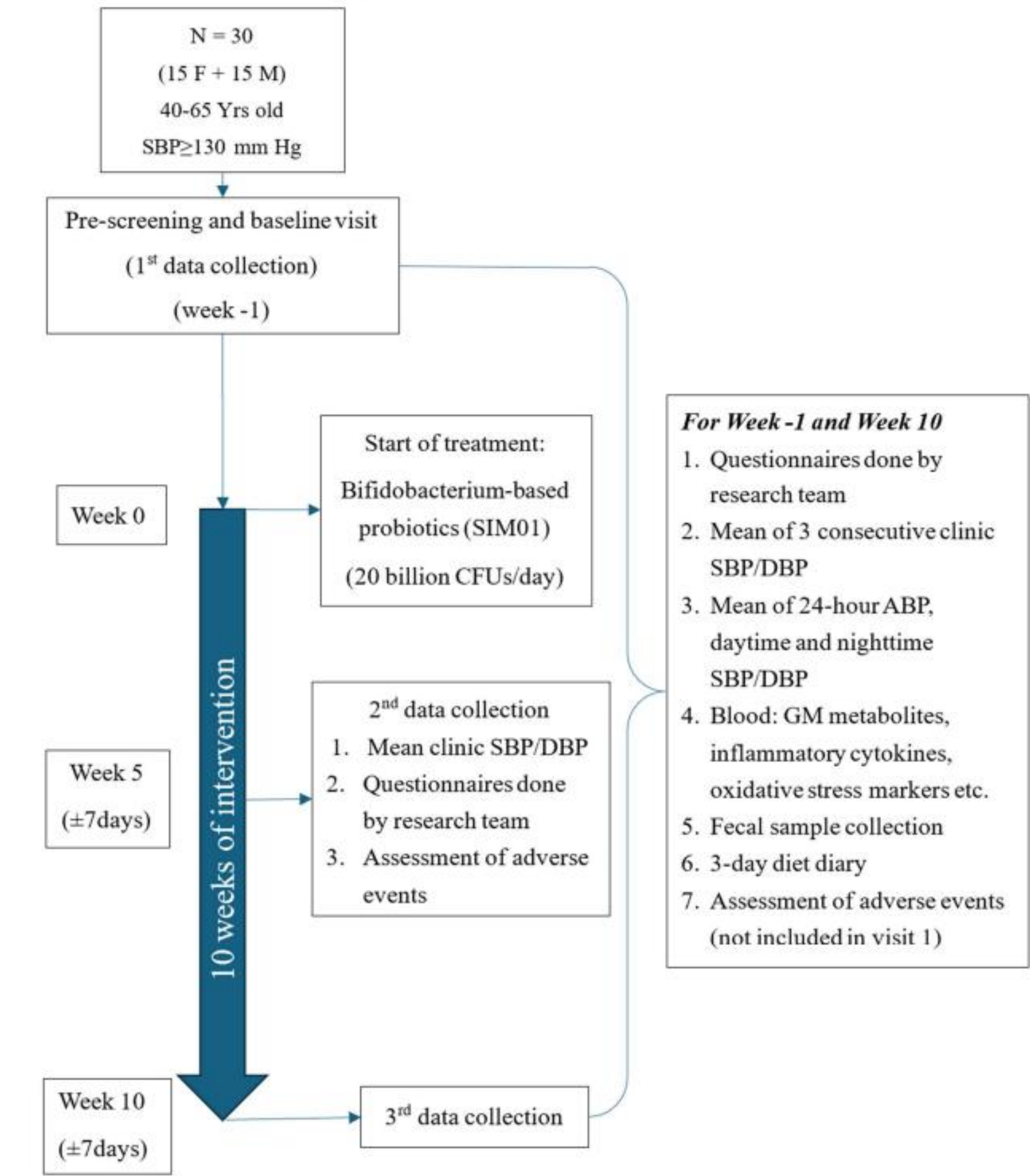
Atherosclerosis: causes over half of all deaths in Western populations

- Various associations between multiple microbiota species and carotid intima media thickness (cIMT) have been reported, but less evidence is available
- Studies have shown that dietary compounds containing *Bifidobacterium* have been able to slow cIMT progression in mouse models, making it a prime candidate for anti-inflammatory treatment and suppression of arteriosclerosis

Methods

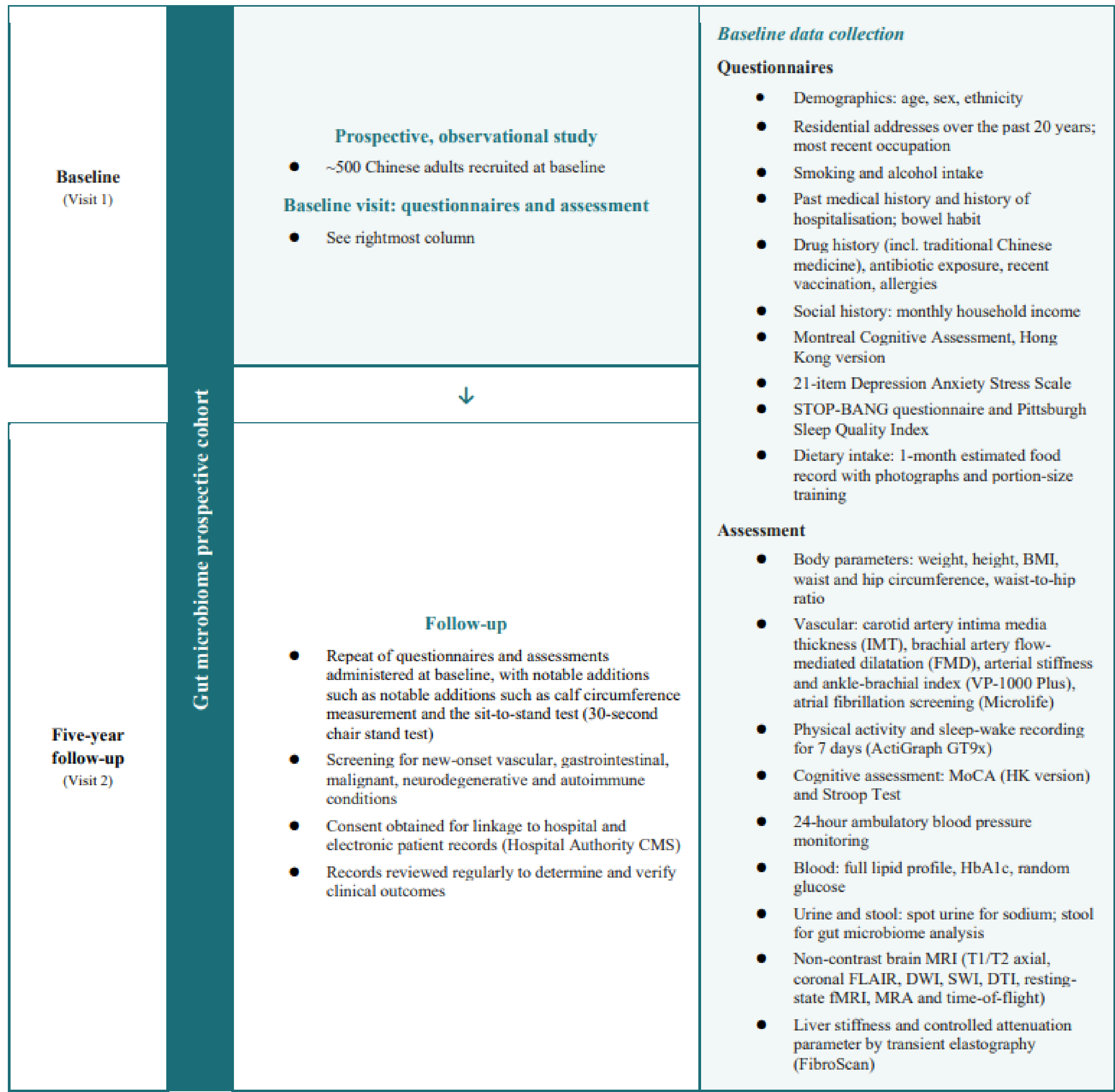
Bifidobacterium pilot study

Figure 1: Flowchart of plan of investigation.



Bifidobacterium pilot study

Figure 2: Flowchart of prospective cohort study



Conclusion / Expected Outcomes

Five-year cohort study: investigates associations between the gut microbiome and surrogate markers of vascular health

- Future analysis will involve **correlation studies** to identify specific bacterial species linked to these conditions

***Bifidobacterium* study:** aims to build on existing work regarding its blood pressure-lowering effects

- The objective is to investigate the mechanisms behind probiotic modulation and **its impact on vascular health**
- Eventually will provide evidence to support probiotics as **an alternative intervention for hypertension**

It cannot be understated that this field of investigation is crucial. Further analysis may clarify the mechanisms behind certain pathological conditions, opening the door to using probiotics to **delay the onset or slow the progression of diseases** like hypertension and atherosclerosis. This research hopes to alleviate the significant global health and economic burden of these conditions.

Thanks and acknowledgements go to Professor Gary Lau and my PhD mentor Crystal Lee for their unwavering support.



My article!