

Cancer Screening & Gut Microbiome

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Liquid Biopsies & Gut Microbiome *Mar 7, 2023*

1. Liquid Biopsies 液態活檢 (CTC, CtDNA/CfDNA)
2. Molecular Microbiology 分子微生物學: Close look at our Gut Microbiome

Wellness Profiling *FEB 21, 2023*

1. Biological/Cellular Aging
2. Anti-oxidants 抗氧化劑 & Micronutrients 微量元素 Profiling
3. Heavy Metal Toxicity

腸道微生物

腸道，乃後天健康之本

Fun Facts

超過 **10000**
微生物物種

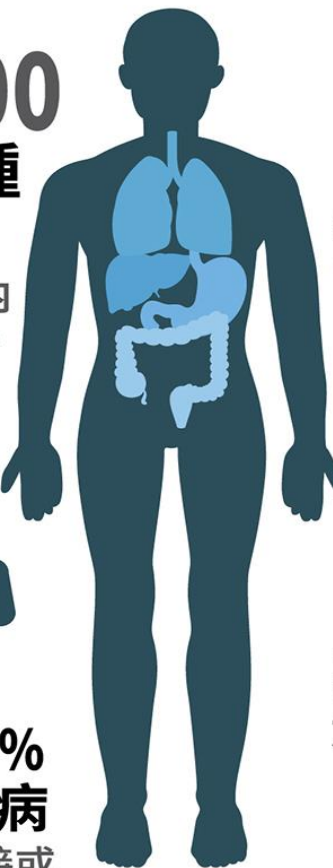
正生活在人體內



腸道微生物
重 接近
量 **2kg**



有人認為 **90%**
的 **疾病**
都直接或
間接和我們的
腸道微生物相關



我們 **95%** 的
微生物都在
腸道中



腸道微生物
基因與
我們
人體



基因的比例
大概為 **150:1**

>1000 bacterial species in the gut with 2000 genes per species yields an estimate of **2,000,000 genes**

vs

20,000 human genes in cell

腸道微生態失衡和疾病有密切關係

Gut microbiome dysbiosis (imbalanced) is associated with diseases

1. 亞健康問題

-Development and maturation of our immune system

濕疹過敏、銀屑病、慢性便秘、腹瀉, Irritable bowel syndrome, Coeliac disease

-Digestion, Metabolization & Absorption of various nutrients such as vitamins, amino acids, short-chain fatty acids

Obesity 肥胖、Diabetes 糖尿病, non-alcoholic fatty liver 脂肪肝

2. 癌症

Colorectal cancer from colorectal ulceration 潰瘍性結腸炎引發的結腸癌患, thyroid cancer

3. 傳染病

腸道益生菌 Protect us against pathogens from colonizing and overgrowing in our intestine

人體大部分的免疫細胞集中在腸道，故此腸道健康影响到我們身體免疫力

4. 神經系統疾病

Neurological diseases such as Alzheimer's Disease, Parkinson's disease, Autism, ADHD

Gut-brain axis 「腸-腦軸」，促進血-腦屏障 blood-brain barrier 正常功能，通過腸道內分泌系統、腸道的免疫系統與神經系統，影響情緒和行為

Suganya K, Koo BS. Gut-Brain Axis: Role of Gut Microbiota on Neurological Disorders and How Probiotics/Prebiotics Beneficially Modulate Microbial and Immune Pathways to Improve Brain Functions. Int J Mol Sci. 2020;21(20):7551.

What is gut microbiome 腸道菌群？

There are > 10,000 species of microbes 微生物 living in our body

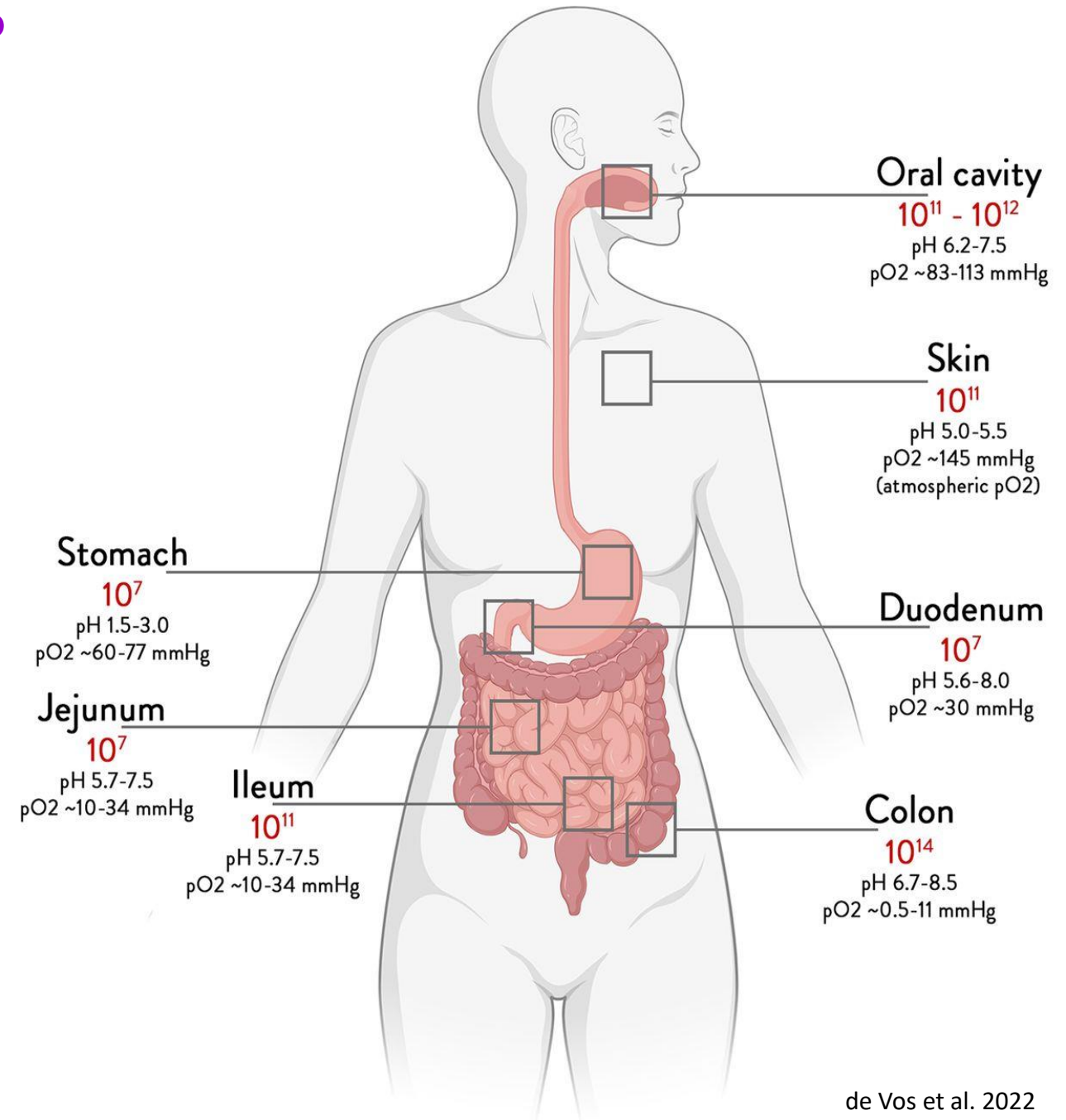
- bacteria 細菌
- fungi 真菌

95% of these microbes live inside our intestine

腸道微生物與代謝物和基因會產生交互作用，
與人體健康形成平衡共生(Symbiosis)

Gut microbiome =

- A. All Microbes
- B. Their genes
- C. Metabolites 代謝物



There are three types of Microbes 菌群的分類

維持平衡的腸道微生物可分為以下三大類別：

1. 有害菌： Pathobionts and pathogenic microbes
will cause diseases when overgrown in the intestine

E. coli 大腸桿菌

釋放有害小分子，增加疾病風險

2. 益生菌： Beneficial Microbes

Good to our health, such as *Bifidobacteria* 雙歧桿菌

釋放有益小分子，促進身體健康

3. 核心菌： Core Microbes

The major composition of human microbiome, such as *Bacteroides* 擬桿菌
平時不好不壞，會依何者佔優勢而靠攏。

當好菌多時，核心菌會轉為好菌，當壞菌多時，核心菌會轉成壞菌。

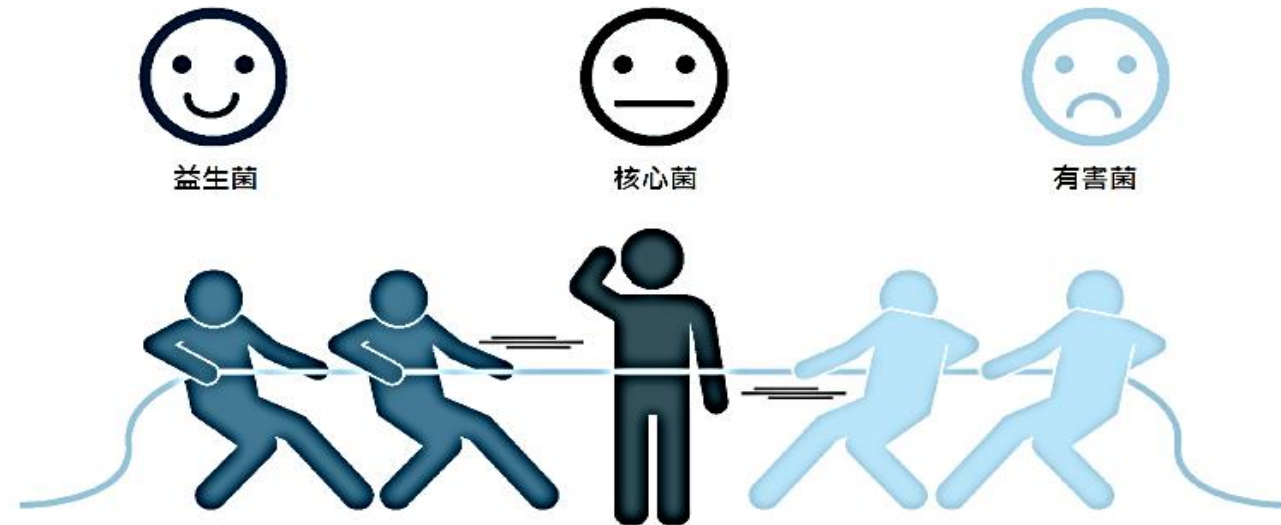


A Health Balanced Gut Microbiome

3歲以後，可以持續透過良好的作息、飲食習慣，以及精準補充益生菌，調整腸道微生態，維持平衡的健康狀態

每個人缺乏的腸道「益生菌」有所不同，要改善亞健康問題，可從精準補充相應益生菌

1. Have a balanced composition of these three types of microbes
2. High richness (high number of species and in abundant amount)
3. Diversity
4. Pathobionts level should be kept relatively low



當菌群處於平衡狀態，能有效發揮多重功能，並降低不同健康問題的風險。

de Vos WM, Tilg H, Van Hul M, et al. Gut microbiome and health: mechanistic insights. Gut 2022;71:1020-1032.

Rinninella E, Raoul P, Cintoni M, et al. What is the Healthy Gut Microbiota Composition? A Changing Ecosystem across Age, Environment, Diet, and Diseases. Microorganisms. 2019;7(1):14.

Laboratory test for gut microbiome

- The status of our gut microbiome can be tested by checking the DNA of the microbes in our stool

1. Can be done by qPCR (實時螢光定量 real time quantitative PCR)

利用實時螢光定量PCR技術，針對特定腸道菌種進行定量檢測，解讀腸道主要及特定菌群的狀況

2. Can be done by Next generation sequencing (次世代基因測序)

By detecting the unique DNA sequences of each gut microbe, these tests can reveal:

1. The number of microbe species present in the gut (richness and diversity)
2. Their relative quantities

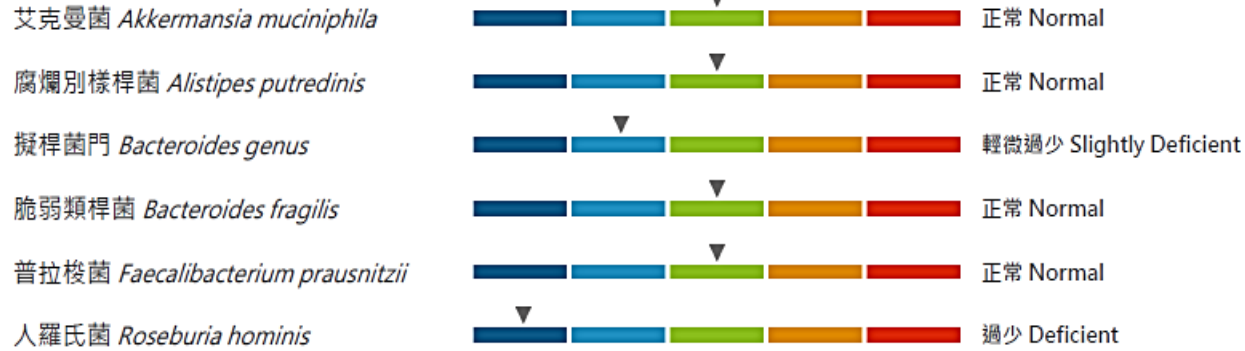
Reference:

Lv Y, Qin X, Jia H, Chen S, Sun W, Wang X. The association between gut microbiota composition and BMI in Chinese male college students, as analysed by next-generation sequencing. *Br. J. Nutr.* 2019;122(9):986-995.

Sample Results

菌種 Species name 檢測結果 Test Result

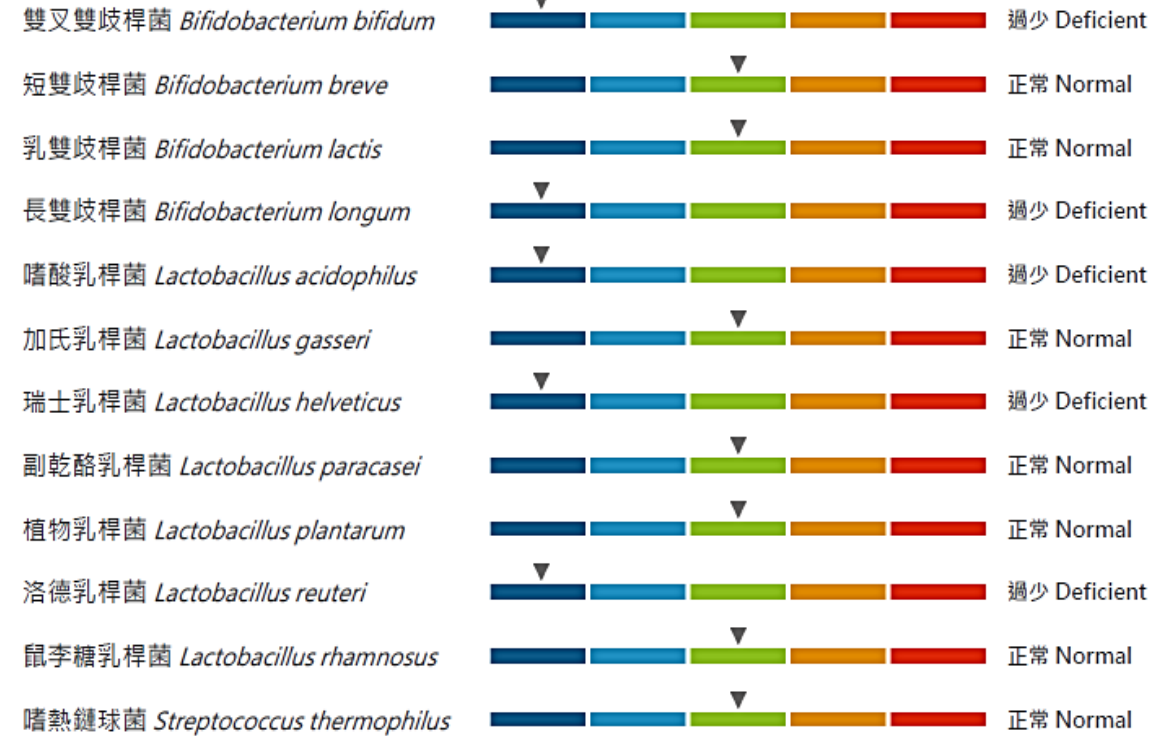
☹️ 核心菌



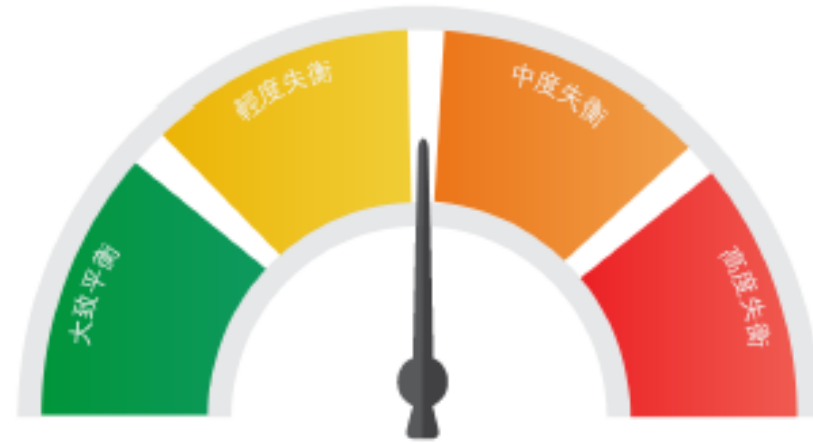
☹️ 有害菌



😊 益生菌



Sample Results



大致平衡：您的核心菌，有害菌和益生菌於腸道中的比例大致達到平衡的狀態，請繼續保持健康的飲食和生活習慣，以維持良好的腸道菌群狀態。

輕度失衡：您的核心菌，有害菌和益生菌於腸道中的比例有少許失衡的狀態，雖然未必會造成健康問題，但仍要多注意飲食和生活習慣，以維持良好的腸道菌群狀態。

中度失衡：您的核心菌，有害菌和益生菌於腸道中的比例有中度失衡的狀態，有機會造成相關的健康問題，因此應注意飲食和生活習慣，以維持良好的腸道菌群狀態。

高度失衡：您的核心菌，有害菌和益生菌於腸道中的比例有高度失衡的狀態，有很大機會造成相關的健康問題，請立即注意飲食和生活習慣，以維持良好的腸道菌群狀態。