

Gut microbiota: roles in health and diseases and influential factors

CETL04D | 10-min teaching | Jan 16, 2019

Peng Ye, Ph.D. candidate

HKU-Pasteur, School of Public Health, LKS Faculty of Medicine

Learning Outcomes

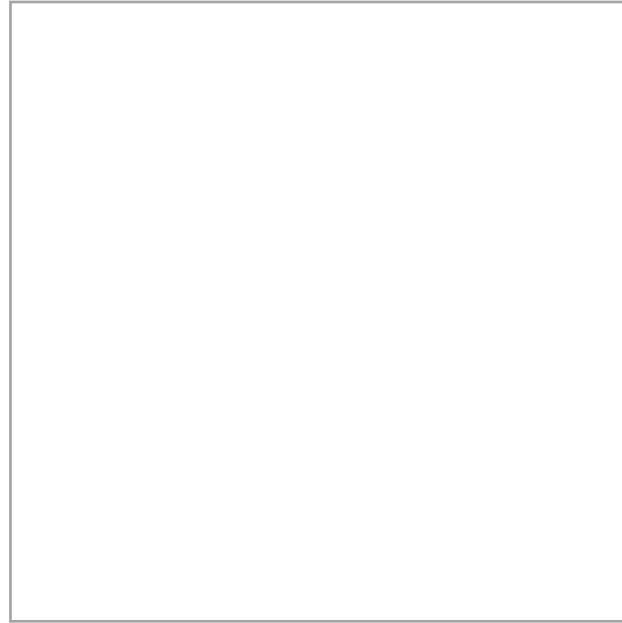
- List some examples regarding health and diseases that are associated with gut microbiota
- Suggest beneficial practices to have a healthy gut microbiota

Before we board...

1. Kindly scan the QR code on the right

2. Complete the survey on Page 1
 - This is an anonymous survey
 - The 6-digit number is for your own reference
 - Data will be used in the 15-min demonstration only

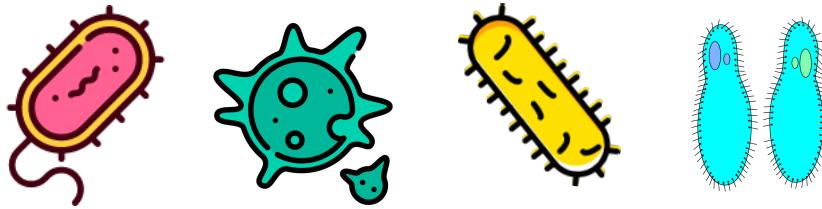
3. Please do NOT turn to next page at this moment



What is microbiota

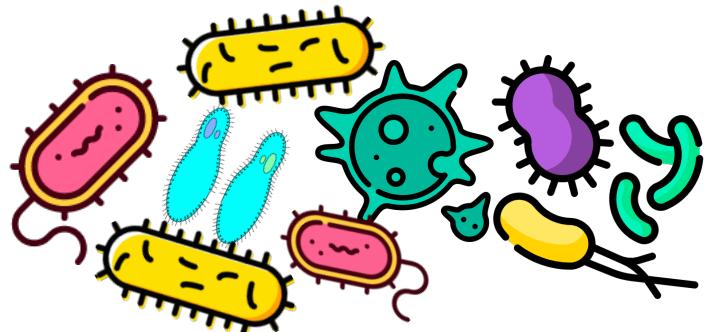
- Microorganisms/microbes

- microscopic (tiny), living organisms
- can be of bacteria, fungi, archaea, protists



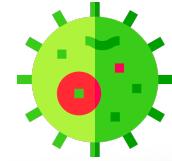
- Microbiota

- microorganisms of a particular site, habitat, or geological period



Viruses?

- not regarded as living
- thus, **not microorganisms**



Sunday, January 05, 2020

Bloomberg

Business

China Reports First Death From Mysterious Pneumonia Outbreak

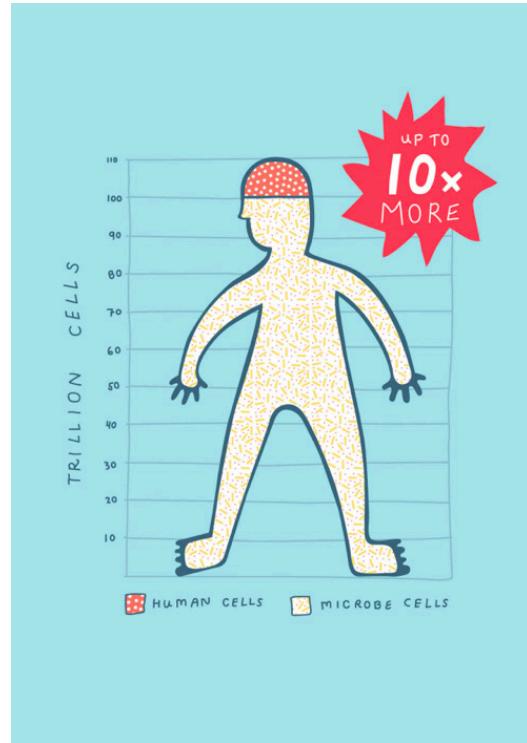
By Linly Lin

January 11, 2020, 9:29 AM GMT+8 | January 12, 2020, 8:34 PM GMT+8

World Health Organization

Can we get rid of microbiota? We can't!

We are only 10-50% human^{1, 2}



2015 estimate (Current study)

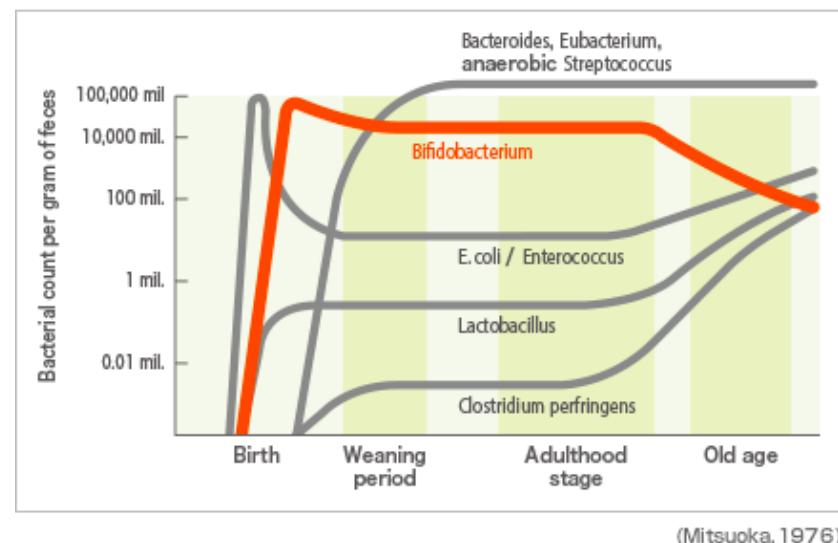
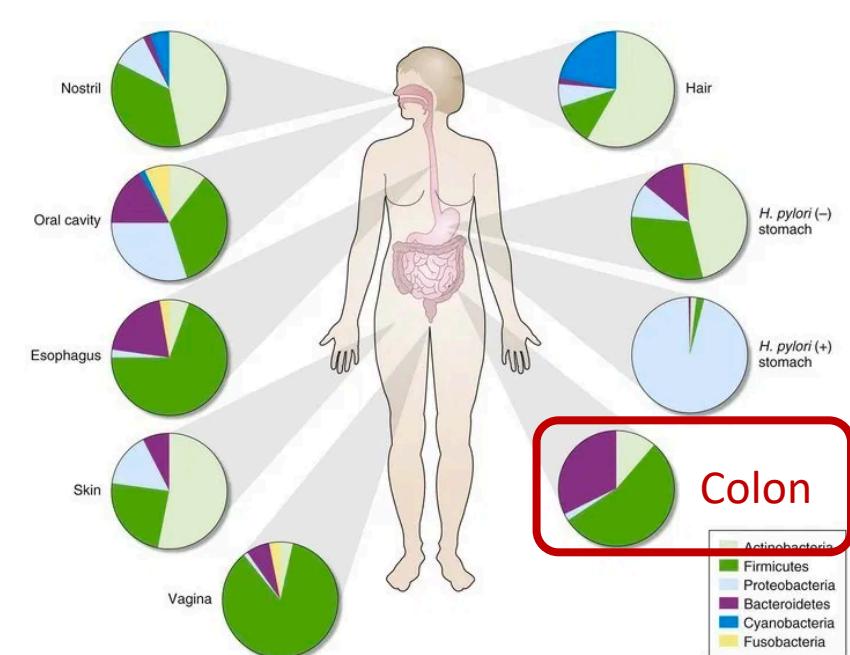
$$\frac{B}{H} = \frac{(V_{colon} \approx 0.4L) \times (n_{bact} \approx 10^{14} \text{ cells/L})}{(V_{blood} \approx 5L) \times (n_{RBC} \approx 5 \times 10^{12} \text{ cells/L})} \approx 1$$
$$\approx 4 \times 10^{13}$$
$$\approx 3 \times 10^{13}$$

The composition of microbiota varies

- by age^{3, 4}

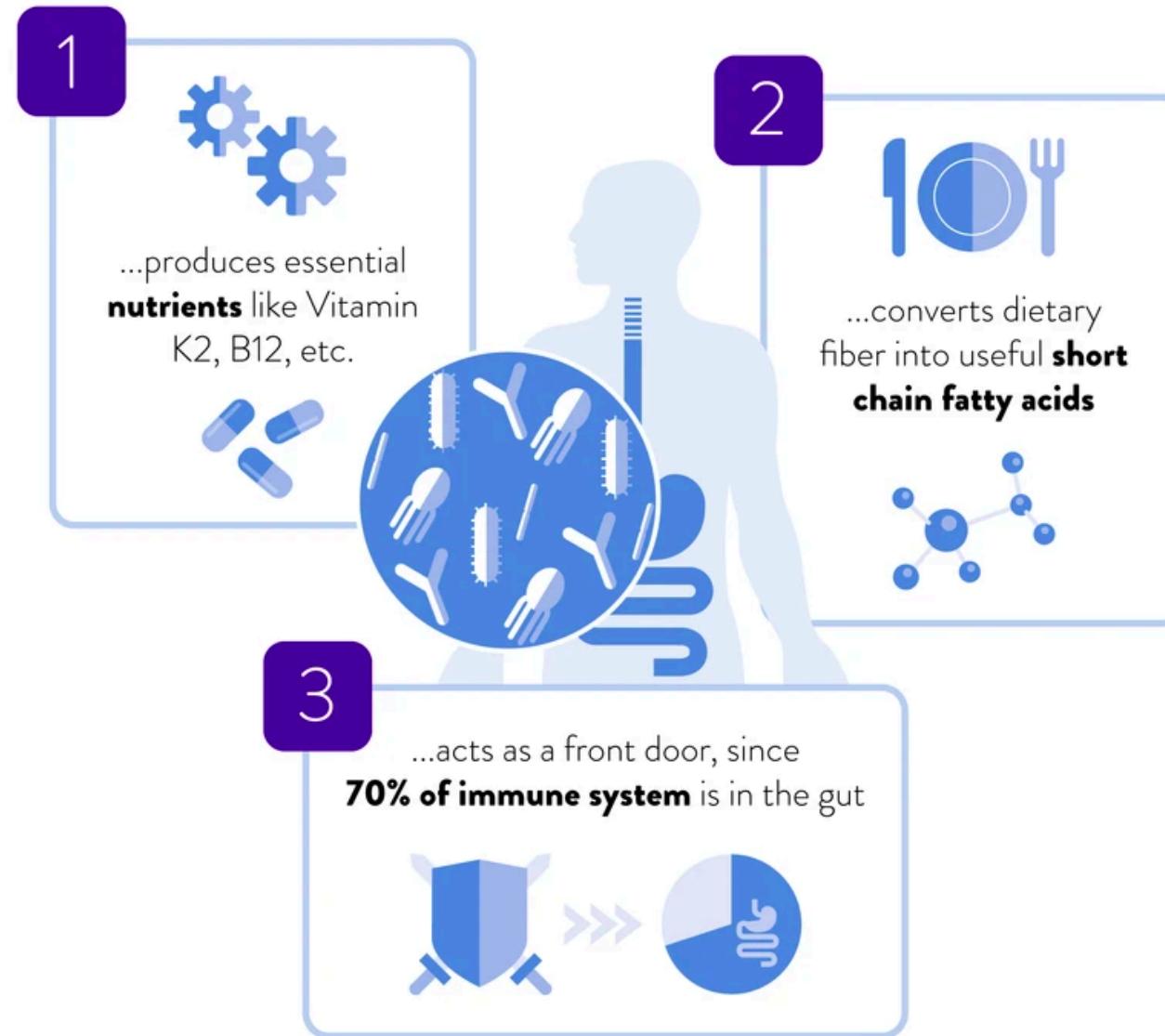


- among body sites⁵

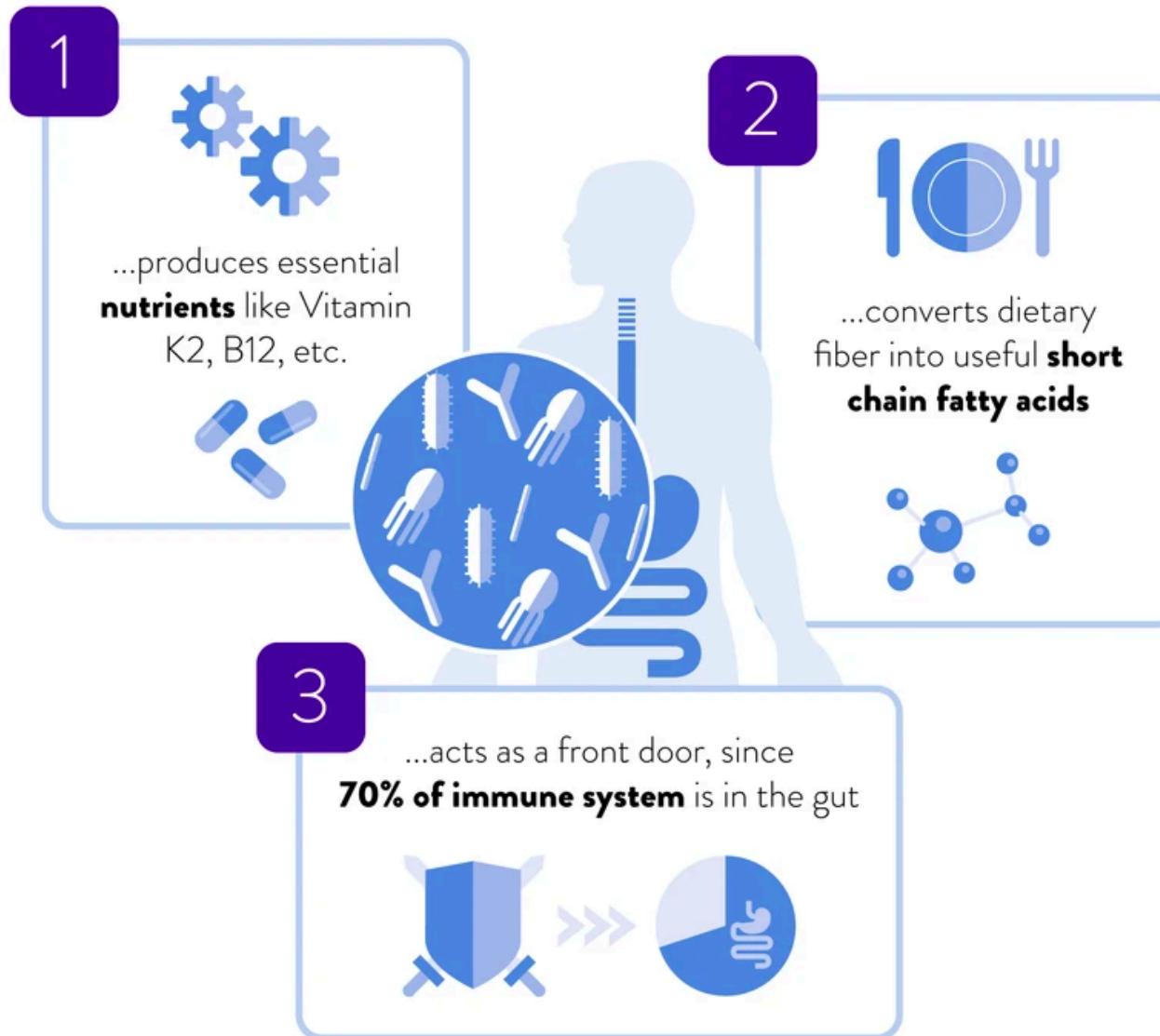


- [1] <https://rhapsodyinwords.com/tag/the-human-microbiome-project/>; [2] PLOS Biology | DOI:10.1371/journal.pbio.1002533; [3] Figures adopted from Your Changing Microbiome. (2014, August 15); [4] <https://www.bb536.jp/english/basic/basic02.html>; [5] <https://oncohemakey.com/the-human-microbiome-of-local-body-sites-and-their-unique-biology/>;

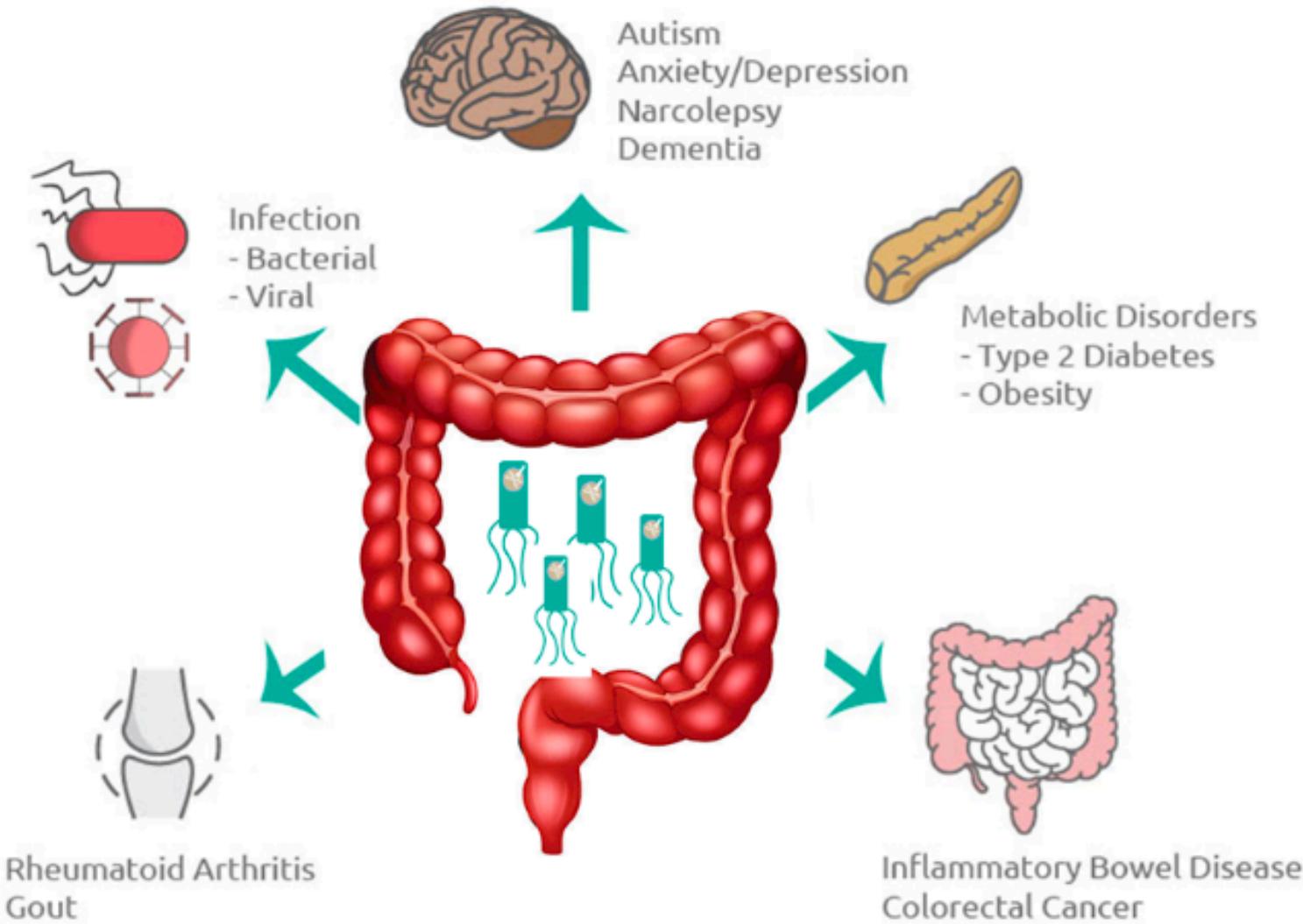
Can we get rid of microbiota? We can't! And we shouldn't!



What if the gut microbiota is unhealthy?



What if the gut microbiota is unhealthy?



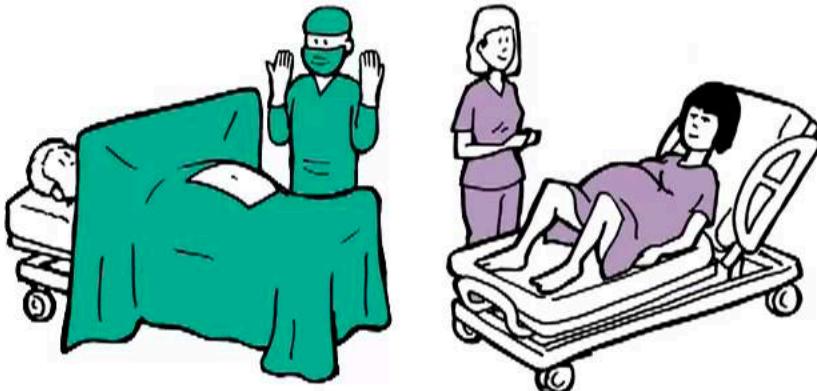
Roles of gut microbiota in health and diseases

Roles of gut microbiota in health and diseases

Influential factors on gut microbiota

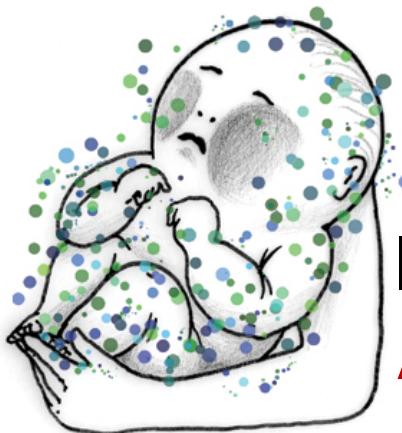
- Microbiota are "ecological communities of commensal, symbiotic and pathogenic microorganisms" found in and on all multicellular organisms from plants to animals.
- Microbiota includes bacteria, archaea, protists, fungi and viruses.

Planned C-section Planned Vaginal Birth



Summary

Born vaginally

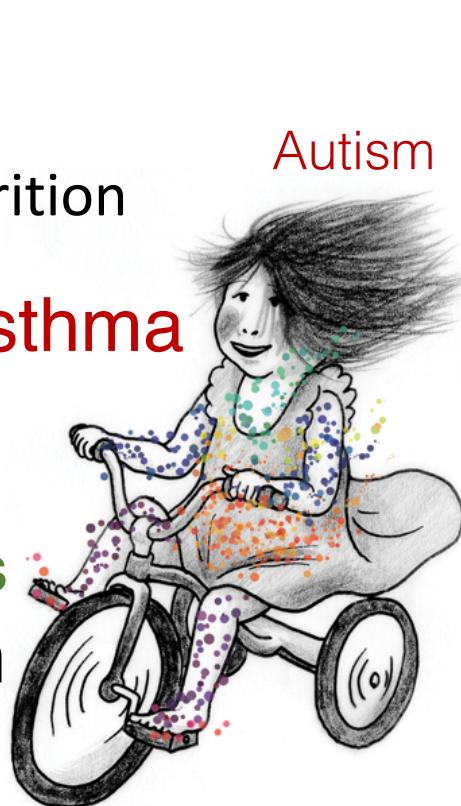


Breastfeeding



Nutrition

Asthma



Autism

Less antibiotics
Immune System

Atopic dermatitis



Pets

Obesity



Diabetes

Not too clean

IBD

Get the slides

Thank you!

Any questions you may have?