H3ABioNet

Pan African Bioinformatics Network for H3Africa

16SrRNA Intermediate Bioinformatics Online Course: Int_BT

Module 2:

Introduction to the microbiome – why 16S?

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Learning Outcomes

Describe the importance of the microbiome and why it should be studied – why 16S

- Defining the term “microbiome” (and other related terminology)
- Current hypothesis around the ways we may be acquiring our microbes; how it may change due to lifetime exposures (for example, the GIT microbiome has been described as an extremely plastic entity); and how these microbial profiles may be similar or vary between individuals
- Know that different body sites have unique microbiomes
- Appreciate the importance of studying the microbiome (what are the clinical impacts).

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16SrRNA Intermediate Bioinformatics Online Course: Int_BT_2019

Module 2:

Introduction to the microbiome – why 16S?

Part 2.1

The human microbiome: meeting our microbes

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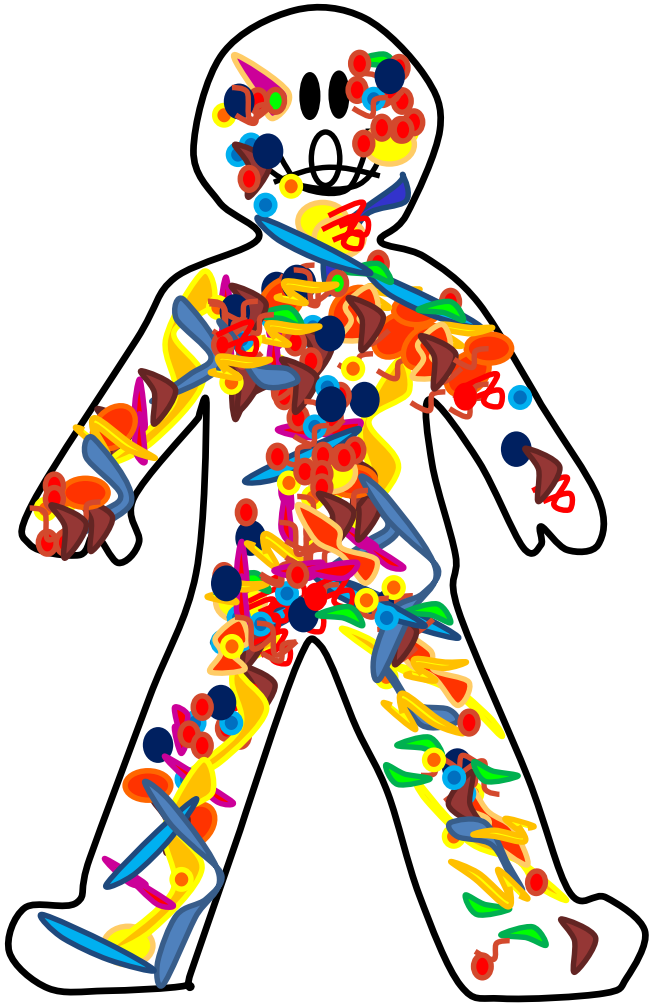
The human microbiome: meeting our microbes



https://www.bbc.com/news/health-43674270

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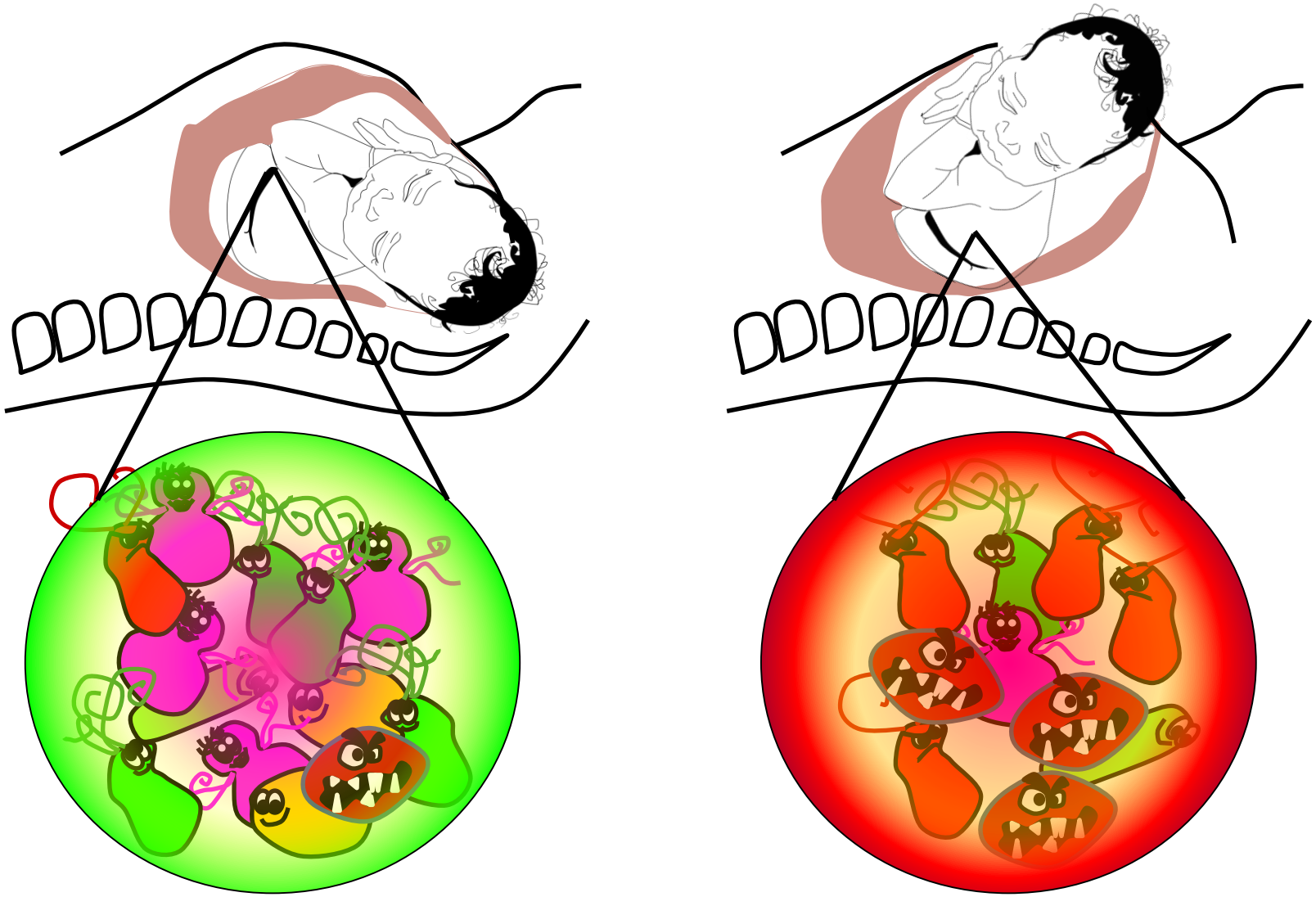
The human microbiome: meeting our microbes



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The human microbiome: meeting our microbes

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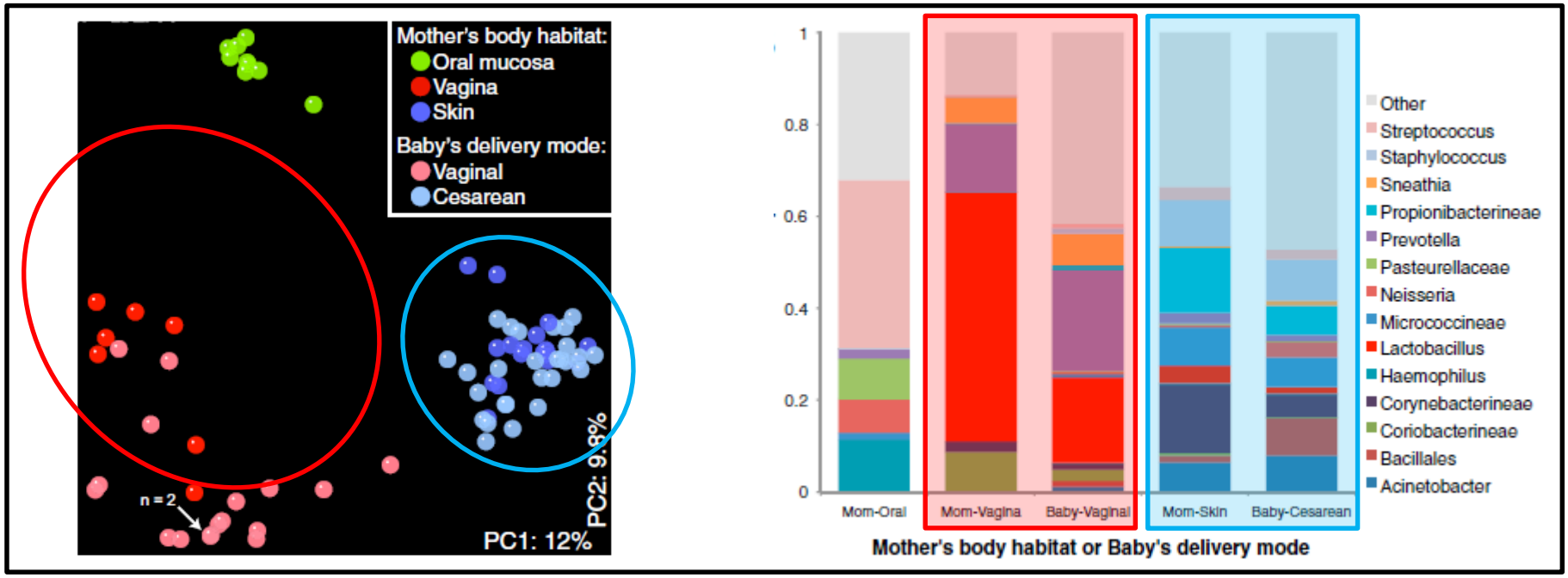

Dominguez-Bello et al. (2010). *PNAS*.107(26):11971–75, Nagpal et al. (2016). *Front. Microbiol.* https://doi.org/10.3389/fmicb.2016.01997

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The human microbiome: meeting our microbes

This baby had visitors already!!!

Satokari et al. (2009) *Lett Appl Microbiol*. 48(1):8-12;
Jiménez et al. (2008) *Res Microbiol*. 159(3):187-93;
Gosalbes et al. (2012) *Clin Exp Allergy*. 43(2):198-211;
Jiménez E et al. (2005). *Curr Microbiol*. 51(4):270-4;
DiGiulio DB. (2012) *Semin Fetal Neonatal Med*. 17(1):2-11.

Source: Hamzelou, J. (2012) *New Sientist, 14 April 2012, 6-7*

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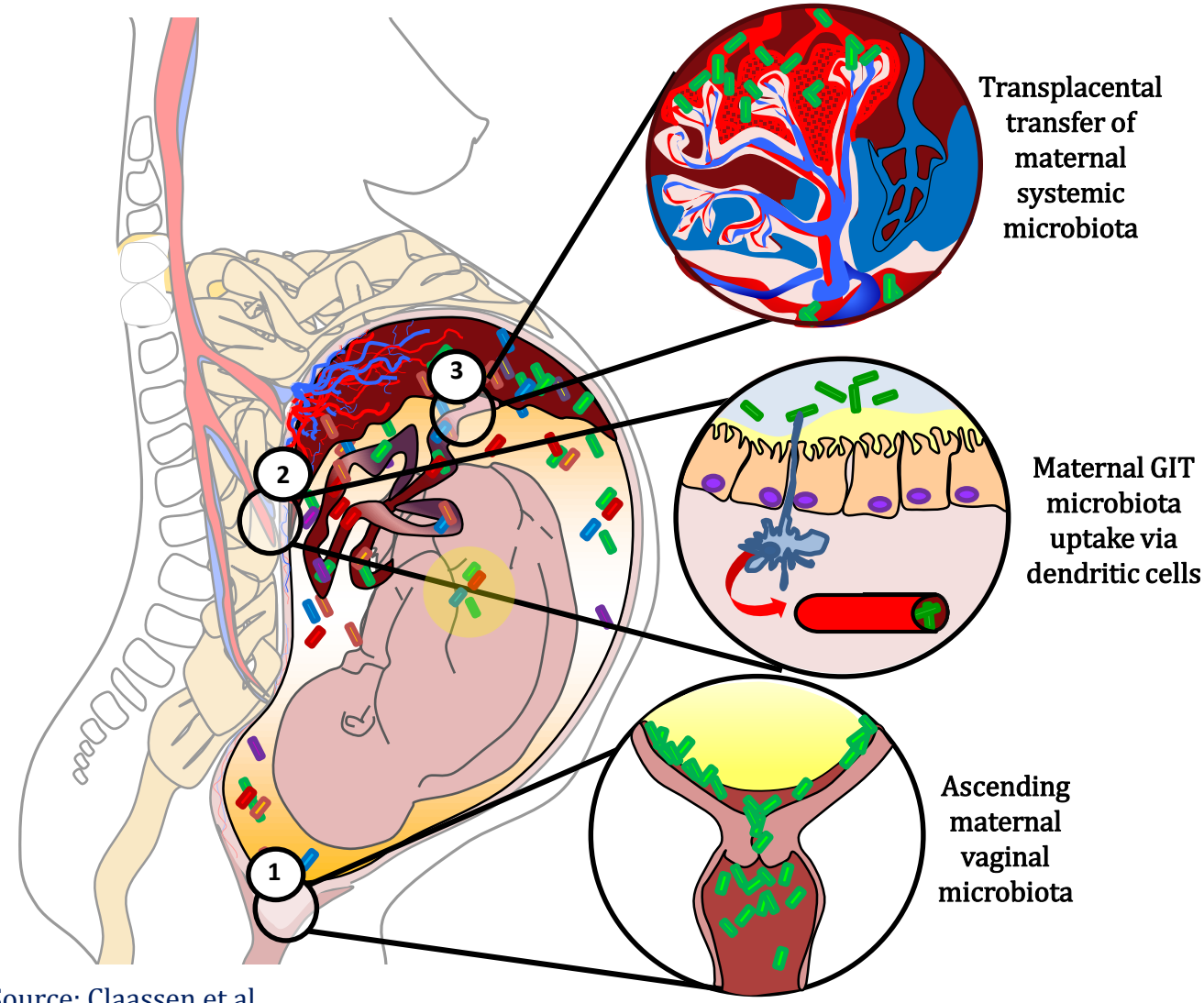
The human microbiome: meeting our microbes



Source: Claassen et al.

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The human microbiome: meeting our microbes

A critical assessment of the "sterile womb" and "in utero colonization" hypotheses: implications for research on the pioneer infant microbiome

Maria Elisa Perez-Muñoz[1], Marie-Claire Arrieta[2,3], Amanda E. Ramer-Tait[4] and Jens Walter[1,5*]

Perez-Munoz et al. (2017) Microbiome. 5(48) https://doi.org/10.1186/s40168-017-0268-4

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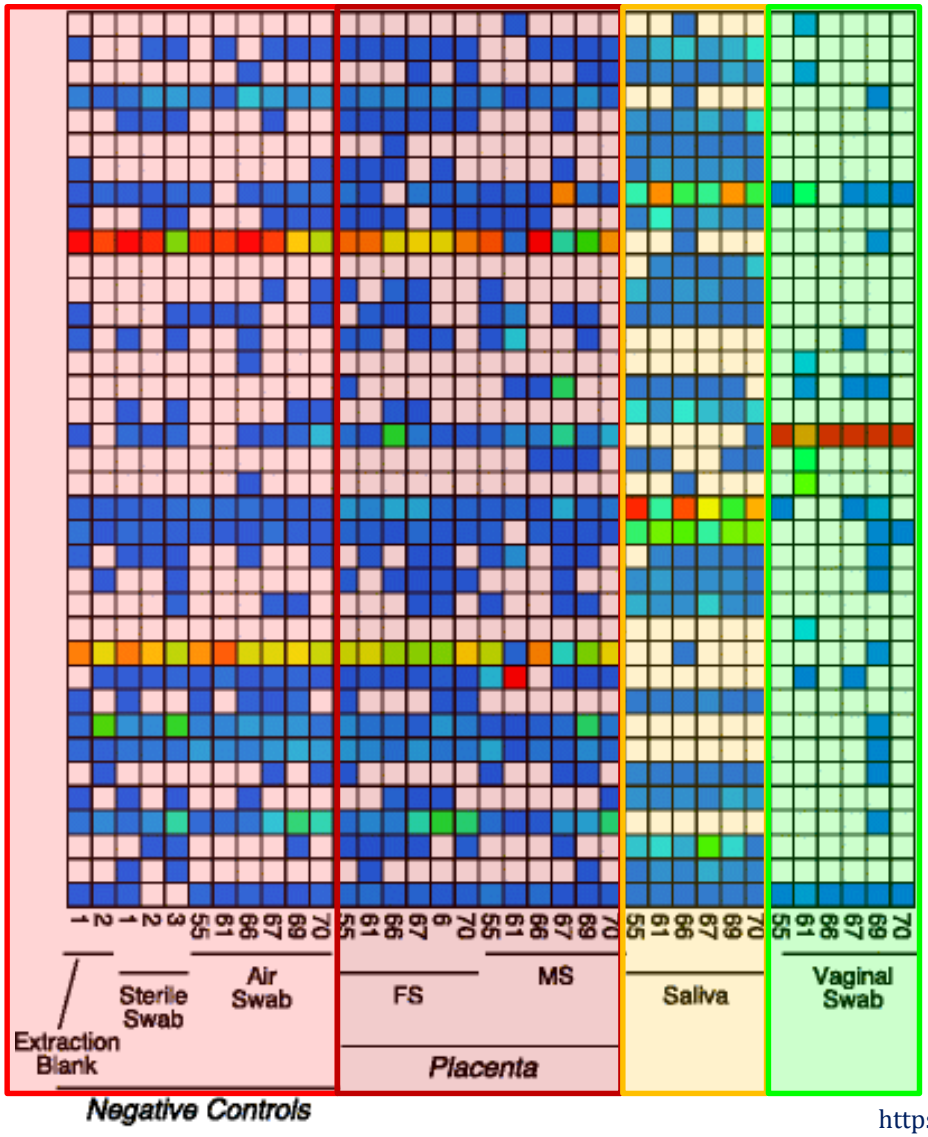
The human microbiome: meeting our microbes



Lauder et al. (2016) Microbiome. 4(29)
https://doi.org/10.1186/s40168-016-0172-3

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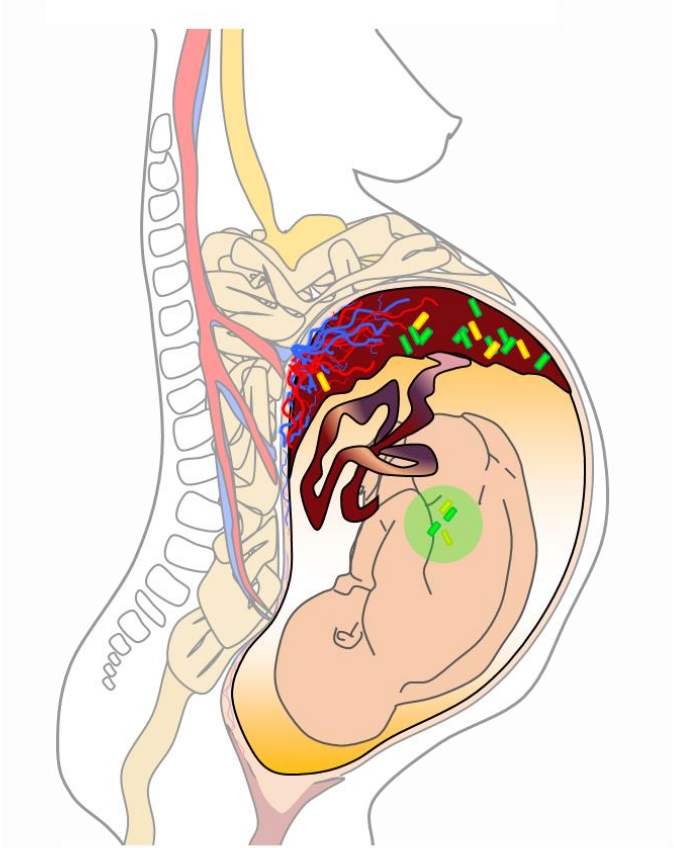
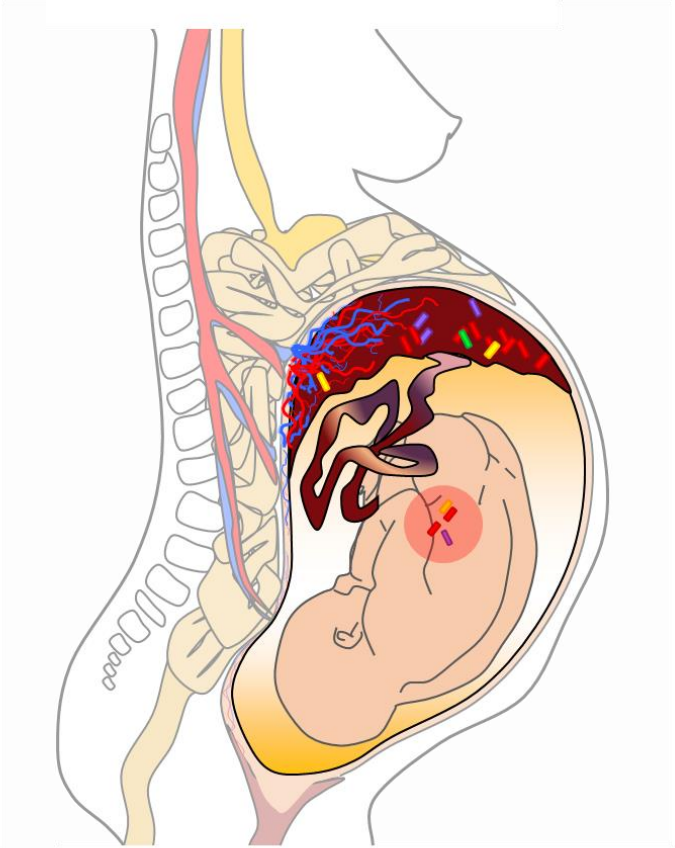
The human microbiome: meeting our microbes

Probiotics during pregnancy



Source: Claassen et al.

Placebo during pregnancy



Source: Claassen et al.

Satokari et al. (2009) *Lett Appl Microbiol*. 48(1):8-12; Jiménez et al. (2008) *Res Microbiol*. 159(3):187-93; Gosalbes et al. (2012) *Clin Exp Allergy*. 43(2):198-211; Jiménez E et al. (2005). *Curr Microbiol*. 51(4):270-4; DiGiulio DB. (2012) *Semin Fetal Neonatal Med*. 17(1):2-11

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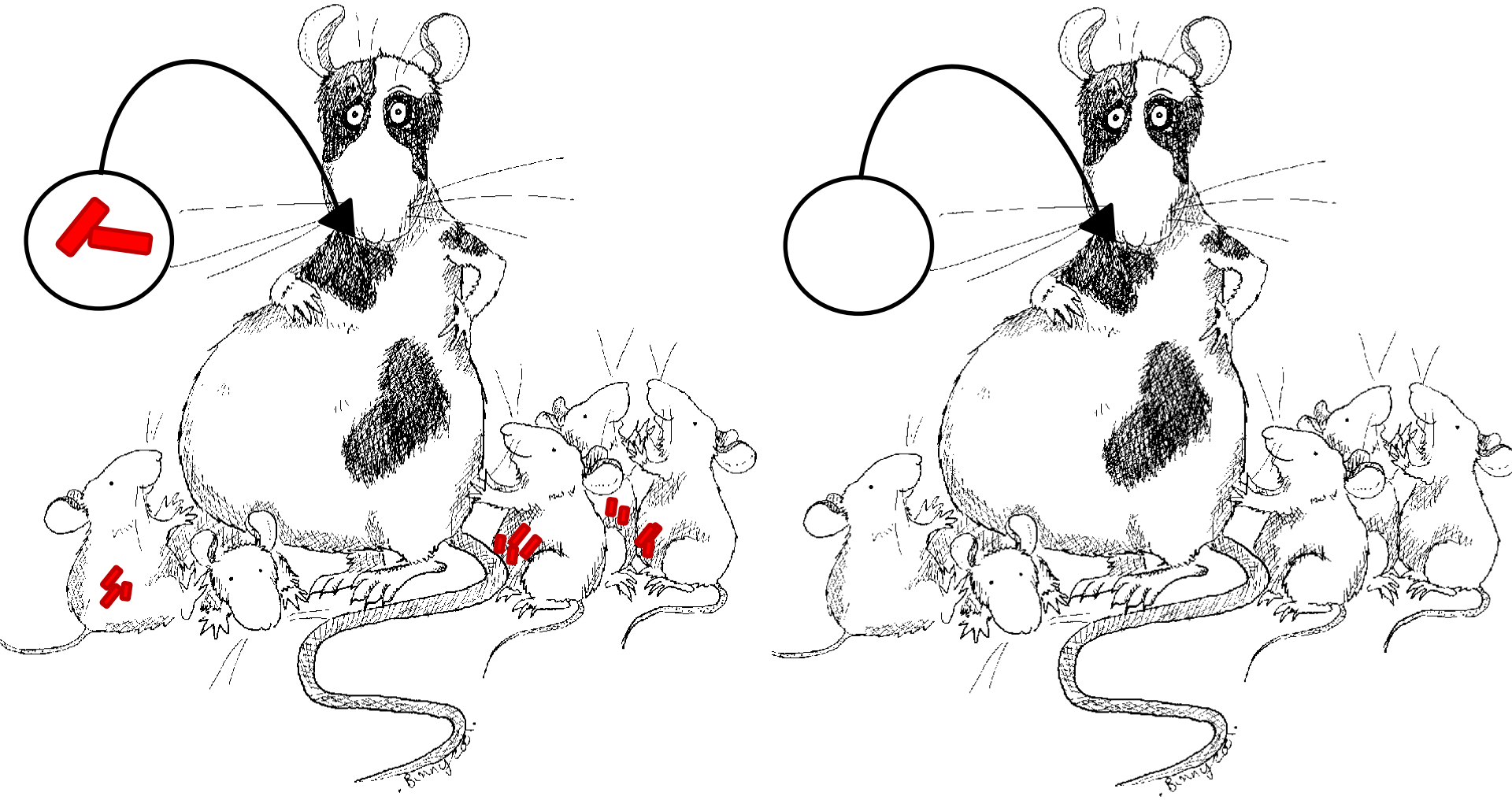
The human microbiome: meeting our microbes



Jiménez et al. (2008) *Res Microbiol.* 159(3):187-93; Jiménez E et al. (2005). *Curr Microbiol.* 51(4):270-4;

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The human microbiome: meeting our microbes

In summary:

- We are more microbes than human.
- Studies, using 16S sequencing technology, have shown that we may acquire our microbes during the process of delivery and that profiles may be dependent on delivery mode.
- In addition, studies (which include studies using 16S technology) have recently reported that in-utero colonization may occur prior to colonization during the process of delivery.
- Studies investigating samples sites such as placental samples, cord blood and amniotic fluid, which are all regarded as **"low-biomass" specimens**, need to have optimal study designs and sequencing controls in place.

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