



GENETIC RELATEDNESS OF *STAPHYLOCOCCUS EPIDERMIDIS* COLONIZING GUT AND SKIN OF NEONATES AND BREAST MILK

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BACKGROUND

S. epidermidis is commonest colonizer of

- Gut and skin of neonates
- Breast milk (BM) of mothers
 - Source of gut-colonizing staphylococci in healthy term neonates (Martin et al. 2012)

Preterm neonates hospitalized in the NICU

- Colonized with strains spreading in unit (Soeorg et al. 2017)
- Colonization with staphylococci in mother's BM ?

AIM

To determine whether and which role BM has in colonization of preterm neonates with *S. epidermidis* we aimed to describe genetic relatedness between *S. epidermidis* colonizing BM of mothers and skin and gut of BM-fed preterm neonates during the first month of life.

Term neonates and their mothers were included as a control group.

MATERIALS & METHODS

January 2014 – December 2015

Preterm neonates & their mothers (n=49)

- **Hospitalized in the NICU**
- **Started to receive mother's own BM** within the first week of life

Term neonates & their mothers (n=20)

- **Healthy**
- **Exclusively breastfed**

Once a week in the first month of life

- **Stool** and **skin swab** from neonates
- **BM** from mothers

Cultured onto salt-mannitol agar

Incubated at 37 °C for 48 h

5 colonies

MALDI-TOF mass spectrometry

S. epidermidis

Multilocus variable-number tandem-repeat analysis (**MLVA**)

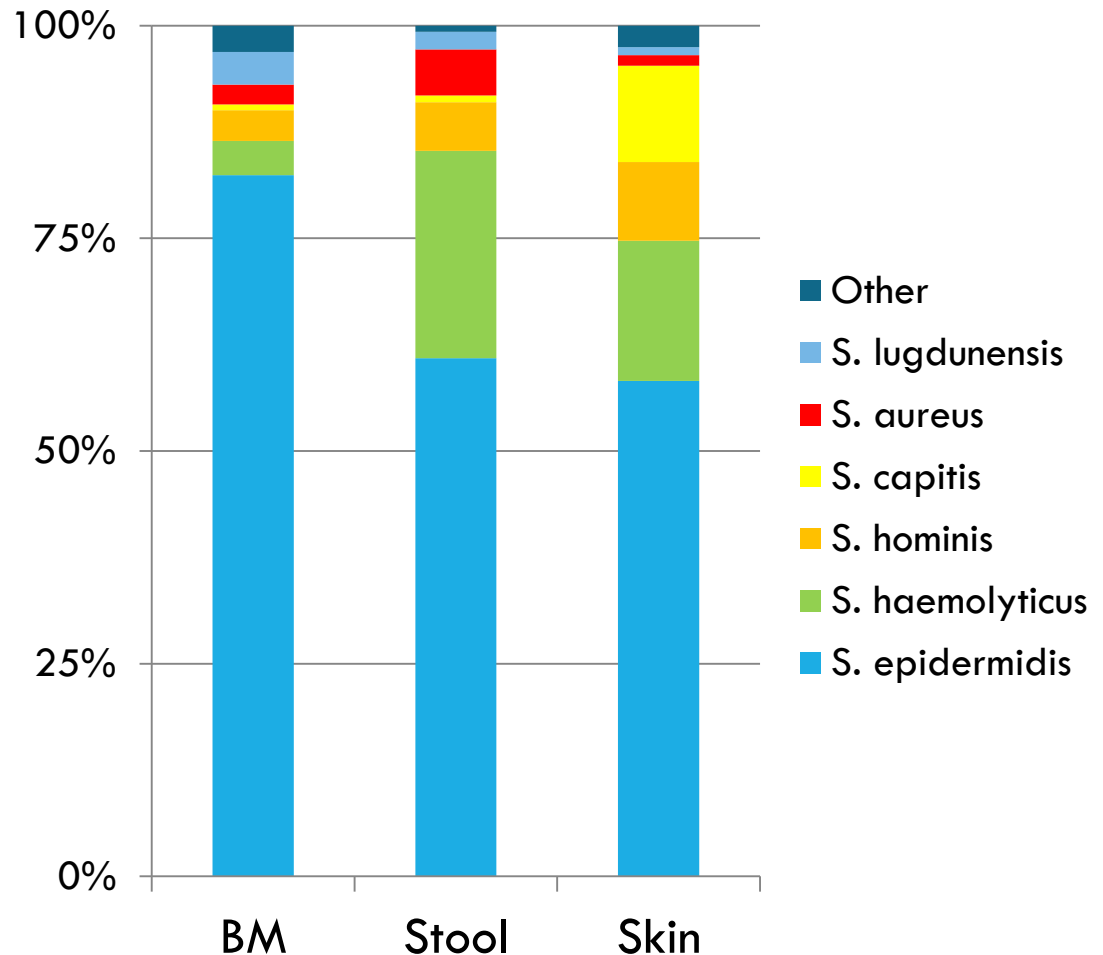
NEONATES

	Preterm neonates (n=49)	Term neonates (n=20)
Gestational age – weeks; median (IQR)	28 (25-30)	40 (39-40)
Birth weight – kg; median (IQR)	1.15 (0.81-1.56)	3.65 (3.32-3.97)
Exclusively breastfed – n (%)	3 (6.4)	20 (100)
Age at initiation of BM-feeding – days; median (IQR)	2 (1-3.5)	
Cumulative % of BM of total enteral feeds		
0-3 days – %; median (IQR)	28 (1-63)	
0-7 days – %; median (IQR)	77 (56-90)	
0-14 days – %; median (IQR)	95 (84-98)	
0-21 days – %; median (IQR)	97 (85-99)	

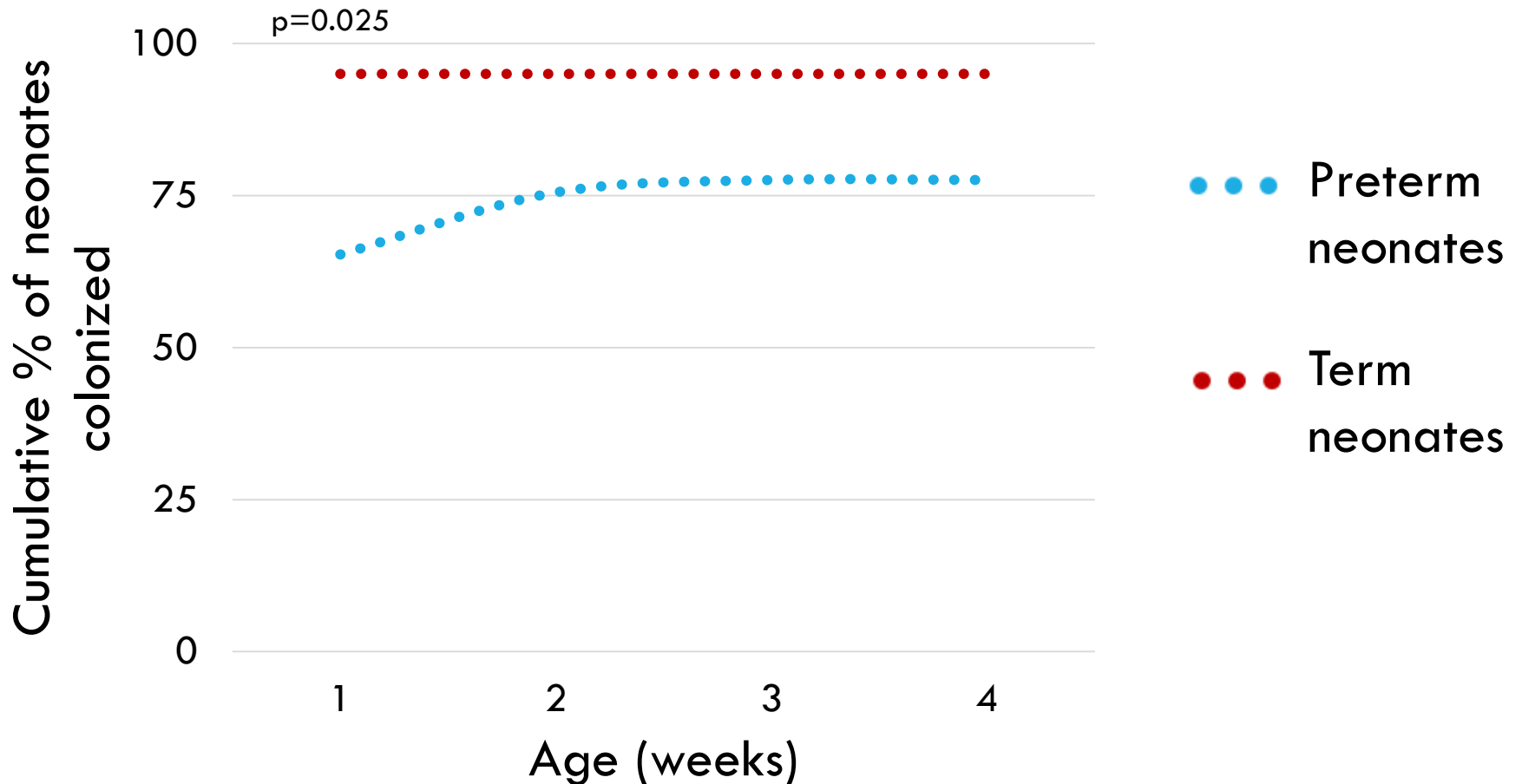
S. EPIDERMIDIS COLONIZATION

S. epidermidis
(n=2933 isolates)
colonized

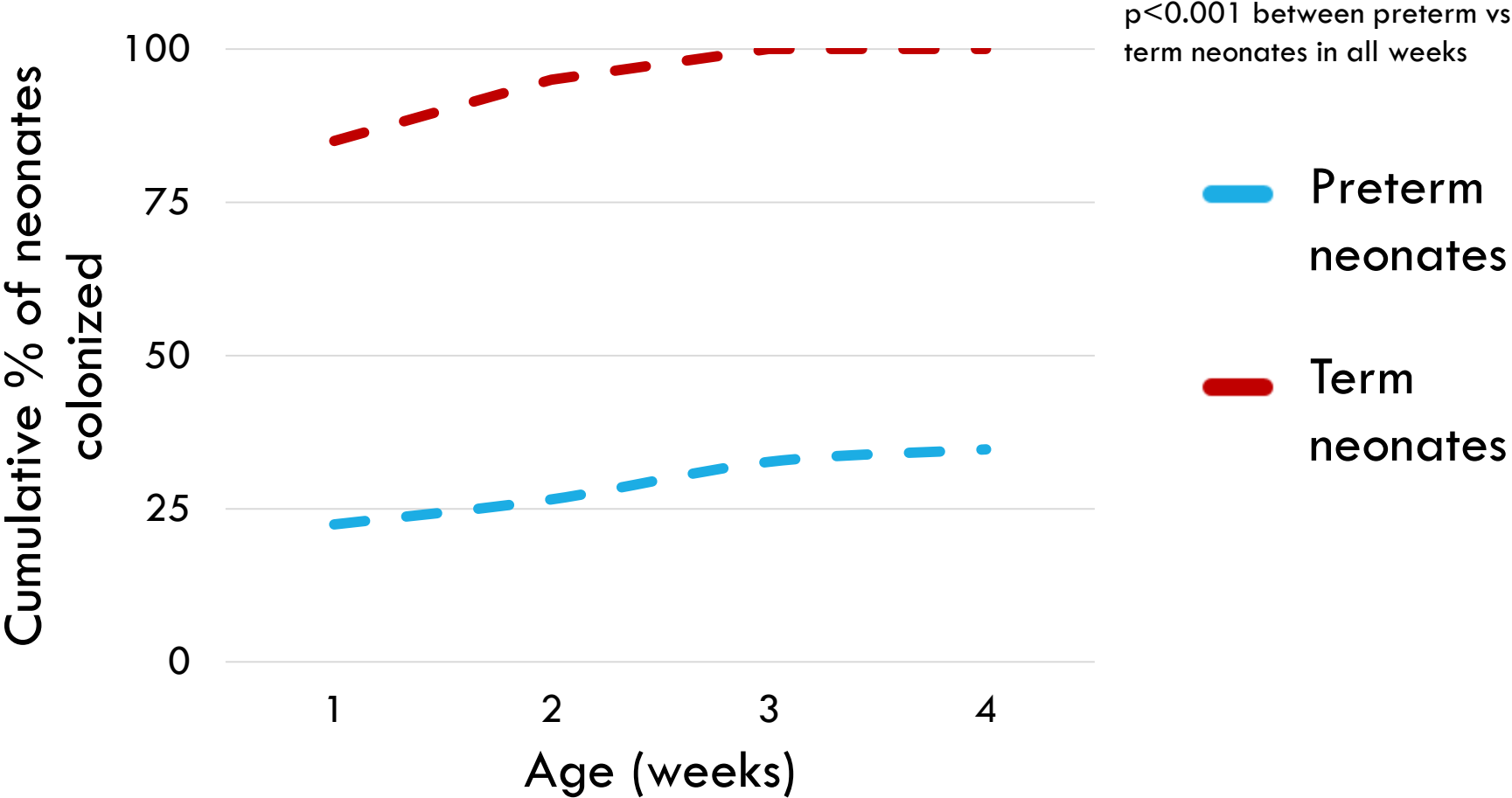
- Skin of 48 (98%) preterm and all term neonates
- Gut of 47 (95.9%) preterm and all term neonates
- BM of all mothers



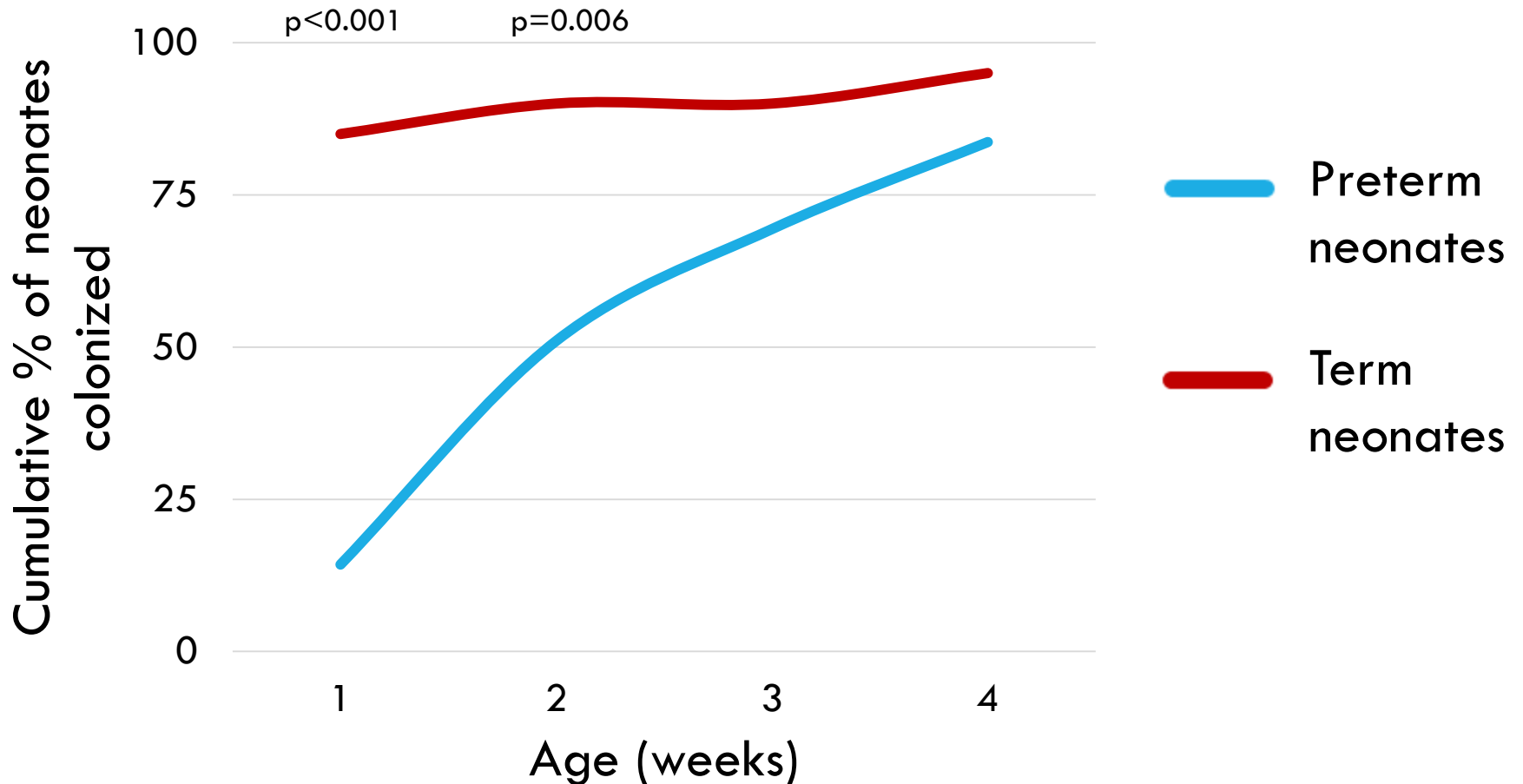
GUT AND SKIN COLONIZATION WITH GENETICALLY SIMILAR STRAINS



SKIN AND BM COLONIZATION WITH GENETICALLY SIMILAR STRAINS



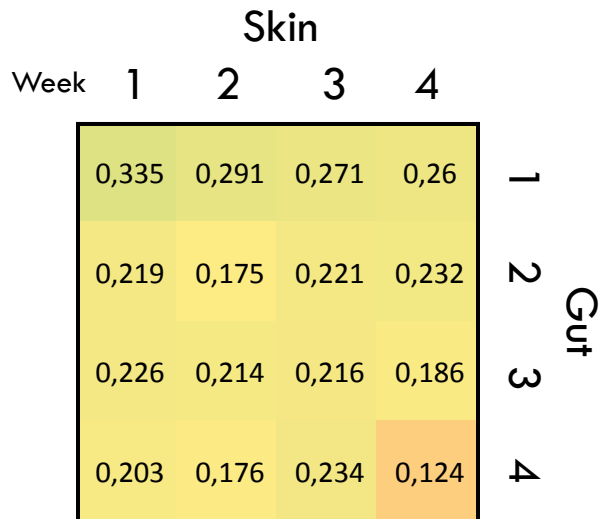
GUT AND BM COLONIZATION WITH GENETICALLY SIMILAR STRAINS



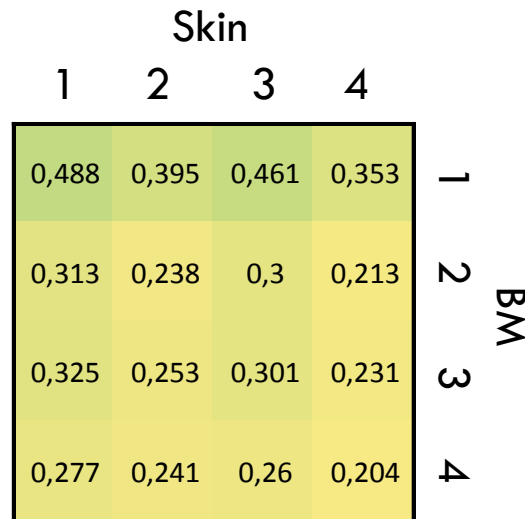
SIMILARITY OF COLONIZATION IN TERM NEONATES AND MOTHERS

In the first month of life similarity between *S. epidermidis* in

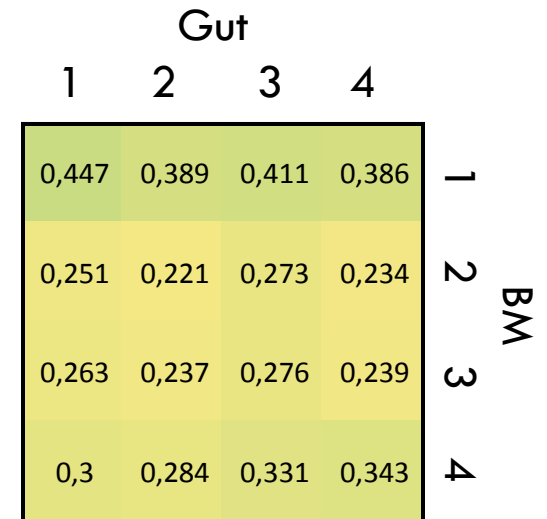
Skin and gut ↓



Skin and BM ↓



Gut and BM ↓



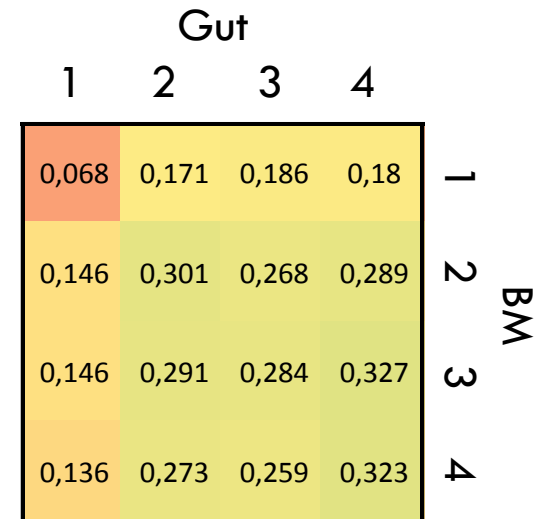
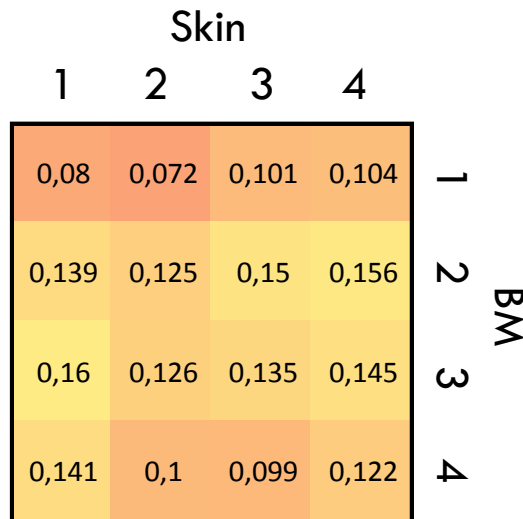
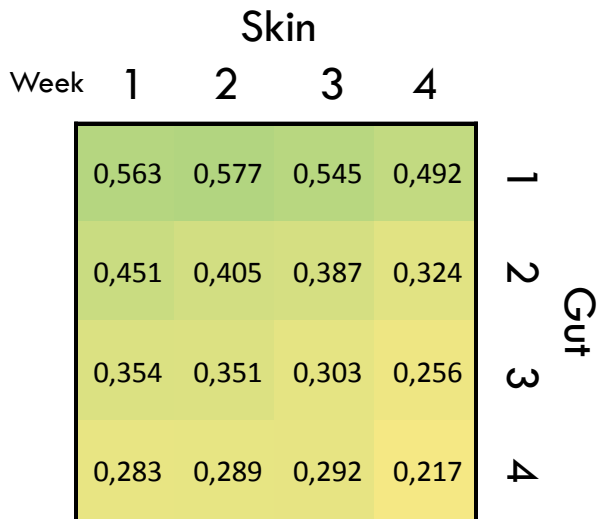
SIMILARITY OF COLONIZATION IN PRETERM NEONATES AND MOTHERS

In the first month of life similarity between *S. epidermidis* in

Skin and gut ↓

Skin and BM →

Gut and BM ↑



CONCLUSIONS

In BM-fed healthy term neonates

- BM is source of colonizing *S. epidermidis* from the first week of life
- During the first month the role of BM ↓ and the role of other sources ↑

In BM-fed hospitalized preterm neonates

- Gut- and skin-colonizing *S. epidermidis* originate from other sources than BM
- During first month of life the role of BM in gut colonization ↑



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