



Gram-negative opportunistic microorganisms colonising the skin and gut of neonates and breast milk of their mothers

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Background

Breast milk (BM) and skin does not normally contain Gram-negative (GN) microorganisms but if it does it could be a source of infection in premature neonates.

Aim

To describe the prevalence of GNs, their antibiotic resistance (AR) and genetic relatedness (GR) between strains colonising BM of mothers and skin and gut of healthy term and hospitalised preterm neonates.

Results

GRAM-NEGATIVES ON SKIN AND GUT OF NEONATES AND IN BM OF MOTHERS

Colonisation by GN-s occurred at similar frequency in term and preterm neonates in studied locations, and we did not find non-fermentative microbes in gut (Table 1).

Altogether 93 strains used in this study (75 *Enterobacteriaceae* and 18 non-fermentatives) were isolated. The most frequently isolated organism was *E. cloacae* (35.5%) and *E. coli* (9.7%).

ANTIBIOTIC RESISTANCE

While all microbes were susceptible to meropenem and ciprofloxacin the AR enterobacterial species were isolated from hospitalised preterm and from two healthy term neonates with no differences in prevalence between isolation sites (Table 1).

Table 1. Frequency of colonisation and resistance to relevant antibiotics of colonising strains in term- and preterm neonates.

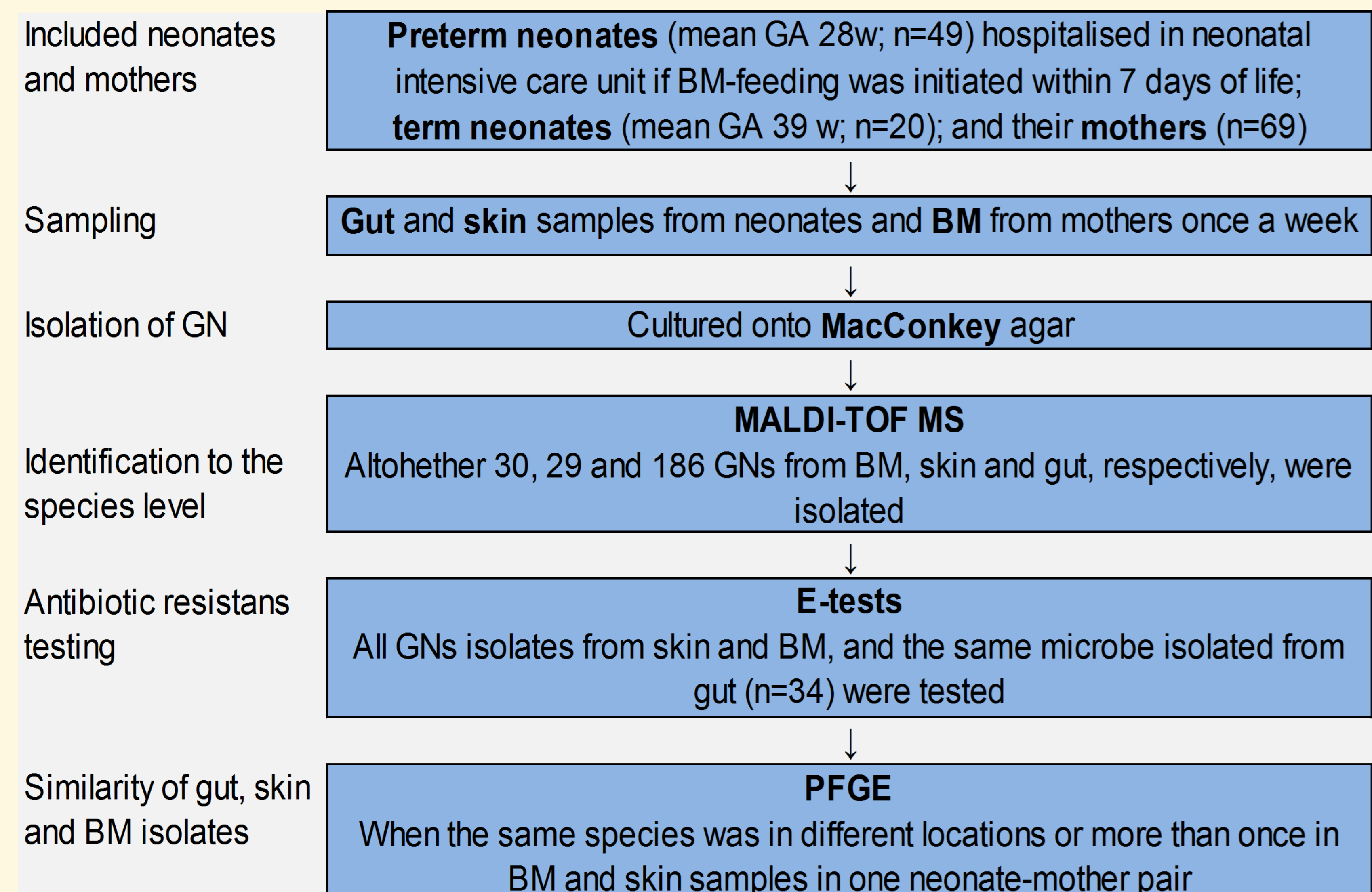
	Preterm neonates			Term neonates		
	N = 49			N = 20		
	BM	Skin	Gut	BM	Skin	Gut
Number (%) colonised patients						
<i>Enterobacteriaceae</i>	9 (18)	13 (27)	13 (27)	1 (5)	3 (15)	2 (10)
Non-fermentative organisms	8 (16)	2 (4)	0	2 (10)	3 (15)	0
Number (%) of isolates						
<i>Enterobacteriaceae</i>	17 (35)	18 (37)	31 (63)	1 (5)	5 (25)	3 (15)
Non-fermentative organisms	10 (20)	2 (4)	0	2 (10)	4 (20)	0
Number (%) of AR <i>Enterobacteriaceae</i> and NF organisms isolated from particular site						
CTX-R <i>Enterobacteriaceae</i>	2 (12)	2 (11)	4 (13)	0	0	0
GEN-AR <i>Enterobacteriaceae</i>	3 (18)	2 (11)	3 (10)	0	0	0
CXM-AR <i>Enterobacteriaceae</i>	1 (6)	4 (22)	4 (13)	0	0	0
AMC-AR <i>Enterobacteriaceae</i>	10 (59)	10 (56)	13 (42)	1 (100)	0	2 (67)
GEN-AR nonfermentative	1 (10)	0	0	0	0	0

CTX – cefotaxime; GEN – gentamicin; CXM – cefuroxime; AMC – amoxicillin/clavulanic acid

Conclusions

In neonates BM is not a source of colonisation with nonfermentative microbes. However, *Enterobacteriaceae* colonising BM may sometimes end up in neonatal gut and eventually cause infection in neonates. Colonisation of BM and gut/skin with AR strains is exclusively observed in hospitalised preterm neonates and is not site specific.

Material and methods



GENOTYPICAL SIMILARITY IN NEONATE-MOTHER MICROORGANISM PAIRS

In 16 neonate-mother pairs the phenotypically same GN microbe in different sites (BM, skin and gut) were observed. Two different GNs were detected in 2 children's skin and 3 mother's BM swabs. In two child-BM pairs the phenotypically same microbe were isolated in all three sites.

Genotypically similar (results of PFGE) *Enterobacteriaceae* were detected in 5/9 preterm neonates in BM-gut (Figure 1A); in 9/11 in skin-gut, and in 1/1 skin/BM (A21) swabs pairs but no between-site similarity was observed among non-fermentative organisms (Figure 1B). There was one case of neonatal sepsis in which similar *K. pneumoniae* (B06) was found in BM and blood.

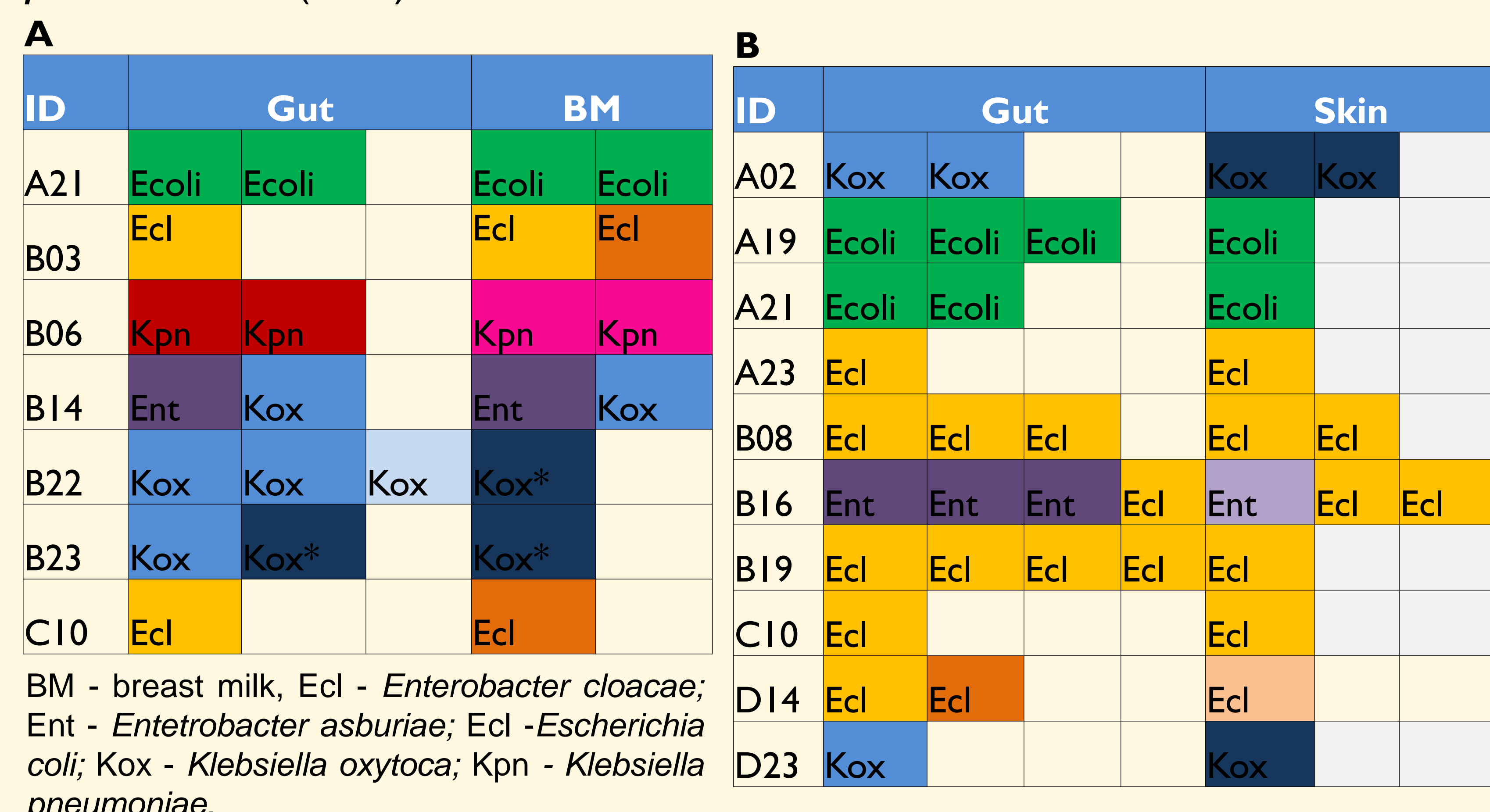


Figure 1. GN-s in neonate-mother gut-BM (A) and neonate gut-skin (B) swabs. The intensity of different colours present different genotypes in one neonate-mother pair; * - the same genotype in different neonate-mother pair; ID "D" presents term neonates.

Acknowledgments

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