INCREASED VAGINAL GRAM-NEGATIVE BACTERIAL DIVERSITY IN THIRD TRIMESTER OF PREGNANCY IN NHP (NON-HUMAN PRIMATES)

TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER at the Permian Basin

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ABSTRACT

Introduction: The composition of vaginal microbial community is important for pregnancy maintenance. Decreased diversity of vaginal microbiome in third trimester of human pregnancy is associated with the preterm birth. NHP have been used as a model of pregnancy-related research for decades, being especially crucial for development of therapies, counteracting effects of human teratogens. The understanding of bacterial changes in pregnancy in NHP is critical for data interpretation and analyses. We and others reported decreased presence of Lactobicilli in baboons (Papio spp), compared to human vaginal milieu, however, the reports regarding pregnancy-related changes in these species are sparse.

Methods: Vaginal swabs were taken from 5 pregnant and 5 non-pregnant baboons (Papio spp) at the end of gestation. The specimens were evaluated for the presence of colony forming units [CFU].

Results: The gram-negative bacterial CFU were increased in pregnant animals (n= 26) compared to non-pregnant (n=9) and included spp., which are probably Achromobacter, Staphylococcus spp., Diphteroids, etc., including novel subspecies.

Conclusions: Increase vaginal bacterial diversity in pregnancy might be universal evolutionary phenomenon, which is independent on presence of Lactobacilli spp.

MATERIAL AND METHODS

Figure 1. External genitalia in non-pregnant baboon (Papio spp.)

Five non-pregnant healthy female baboons (Papio spp.) and five pregnant baboons near term (165-175 days of gestation) were housed in the outdoor coral facilities. Vaginal swabs were taken according to the approved IACUC protocol, using previously described technique (SciRep 2016, PMC4880931). Swabs were placed in 10 ml of physiological solution and transported over night for further evaluation. The standard microbiological techniques were use to grow bacterial colonies.

RESULTS

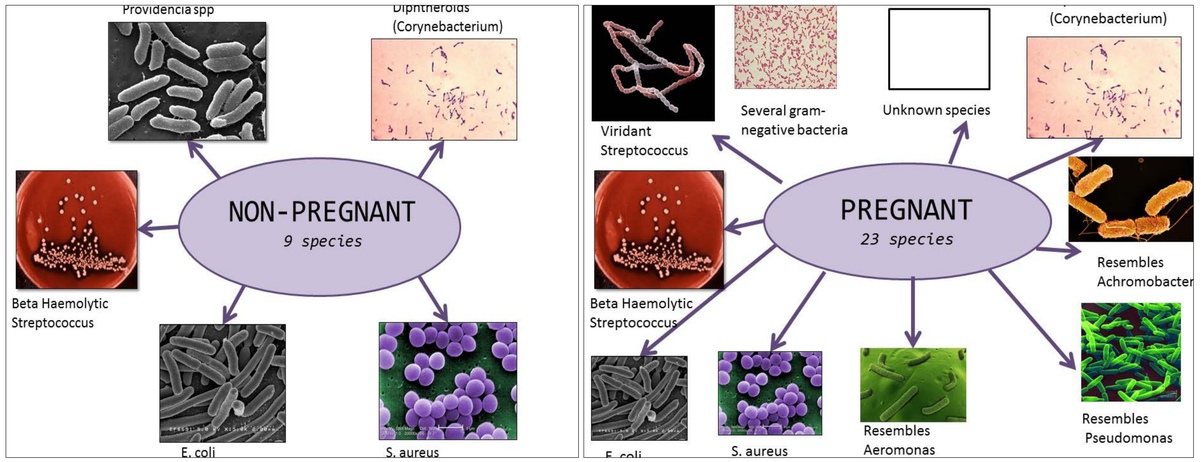


Figure 2. Graphical representation of the vaginal colony-forming units present in non-pregnant and pregnant baboons.

NON-PREGNANT BABOONS (Papio spp., n=5)	PREGNANT BABOONS (Papio spp., n=5) NEAR TERM
1)Presumptive E.coli. Gram Negative Enteric species, probably Enterobacter. Staph auerus.	6)Two types of Staphylococcus aureus Staphylococcus spp. Yellow mucoid oxidase positive (resembles aeromonas). White mucoid NH oxidase positive (resembles pseudomonas aeruginosa). Gray waxy spread oxidase positive (resembles achromobacter).
2)Culture overgrown with Proteus mirabilis. Able to isolate staphylococcus spp.	7) Probable *Staphylococcus spp#1 (NH,mannitol positive, LAT=,CONS *Diptheroids (Eg. Corynebacterium spp or other) * Gram-negative bacillus (OX+) most likely pseudomonas aeruginosa Staphylococcus spp #2 slight H, LAT= , mucoids, CONS Staphylococcus spp #3 S.auerus 4+H, M+1, LAT+ Staphylococcus spp #4 yellow NH but LAT+, M+1, chromogenic NOT S.auerus Diptheroids#2
3)Staphylococcus aureus. Diptheroids (Eg. Corynebacterium or other). Beta Haemolytic Streptococcus.	8) Probable E.coli Pseudomonas Viridans streptococci Streptococcus spp Staphylococcus auerus Diptheroids X2 or 3 species Beta haemolytic Strep
4)Probable Providencia spp Staphylococcus aureus Beta haemolytic Streptococci	9) Probable Pseudomonas spp x2(or more) Mucoid coliform (Enterobacter spp or E.coli) Red gram-neg bacillus Staphylococcus spp Other gram –negative bacilli
5)Staphylococcus spp (not Staph aureus) Coliform- probably not .coli Beta- haemolytic streptococcus sp Diptheriods (eg. Corynebacterium spp	10) Probable Staphylococcus auerus Coliform NOT E.coli Staphylococcus spp “CONS” white NH Other organisms

Table 1. List of different bacterial species found in the vagina of non-pregnant and pregnant baboons.

DISCUSSION

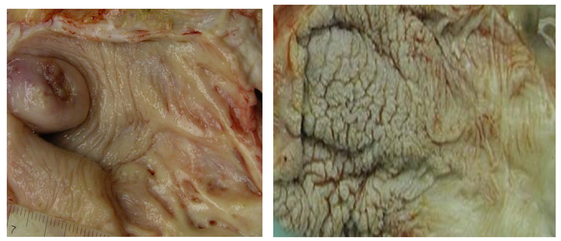
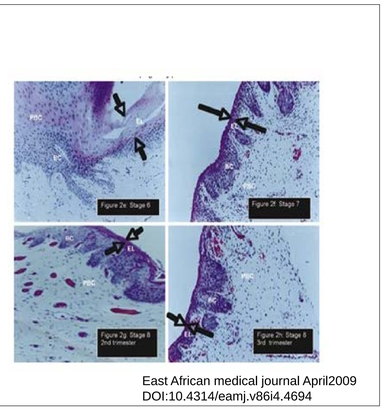


Figure 3. The vaginal epithelial folding in non-pregnant and pregnant baboon



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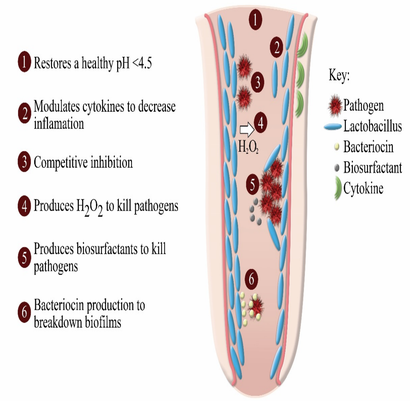
The vaginal squamous epithelium layer becomes thin during the luteal phase (stage 6, Figure 2e) menstrual phase (stage 7, Figure 2f) and during pregnancy (stage 8, Figures 2g and 2h).

The decreased vaginal epithelial thickness, reported in the baboons and humans, (DOI:10.4314/eamj.v86i4.46946), might change properties of the vaginal bacterial biofilm, described by us in humans (Fig. below) and transform bacterial life stages.



(Letbetter et al., 2017; Ventolini et al., 2017)

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