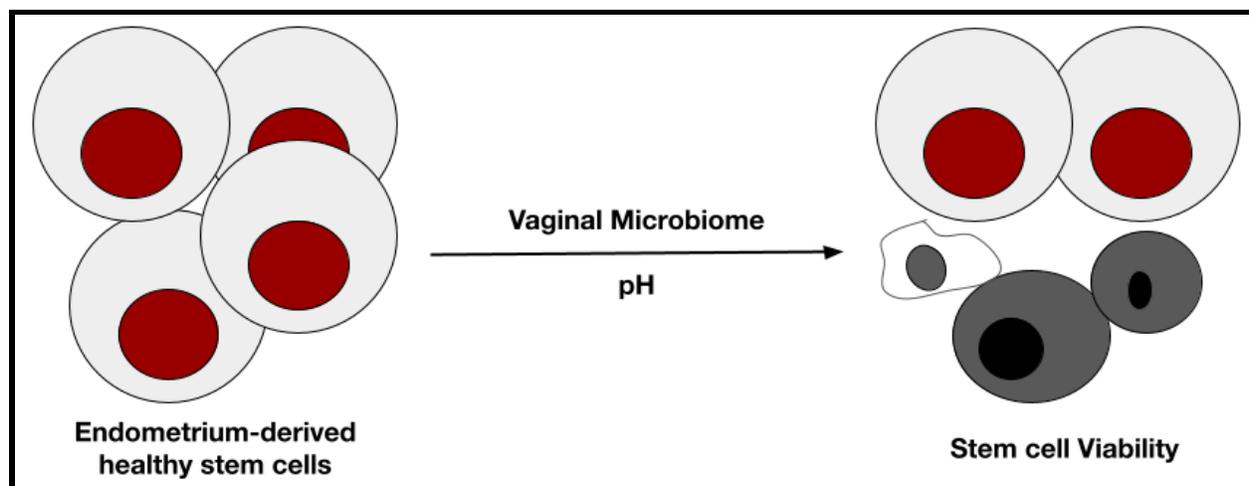


## Potential role of vaginal microbiome on the viability of endometrium-derived stem cells for organoid development.

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**Keywords:** Microbiome, stem cells, cell viability, endometrium, organoids.



**Figure 1.** Vaginal microbiome may play a role in the survival and potency of endometrium-derived stem cells.

The composition of secretions of vagina is different during different phases of the female life span and is influenced by hormones such as estrogen and also by microbiota present in it (1). Vagina is colonized by several microorganisms which constitute the vaginal microbiome (VgM) (2). These microorganisms are said to have mutualistic interactions with the host in which a balance is maintained between the microbiota in vagina and host tissue in which they reside. Any disturbance in this balance will lead to several infections and diseases like bacterial vaginosis (3). VgM plays an important role in preventing the entry and growth of pathogens and sexually transmitted diseases (STD) (2). The composition of the VgM differs during different phases of life, and also in people from different parts of the world (4).

This difference might be genetically determined or due to the influence of lifestyle or environmental factors. Sequencing of vaginal swabs showed that the VgM is predominantly colonized by the species of lactobacillus which play a role in carbohydrate metabolism (5). It is also shown that many species of lactobacilli can inactivate HIV-1, HSV-2, etc, by producing hydrogen peroxide, and also showing bacterial antagonism by production of bacteriocins (6). Apart from lactobacilli there are also other species of bacteria present, but less dominant in most groups when compared to lactobacilli species (5). The pH of the vagina during phases of women's life is regulated and determined by these microorganisms (7). Acidic pH is maintained during puberty and infant, and neutral pH during menopause indicates that

there is a cross talk between VgM and the female reproductive health (7).

Several hypotheses have also been put forward to understand how and why the composition changes and why only certain bacteria are found to be predominant and not others. However, no single hypothesis is found to answer this question with proper reasoning. Therefore, understanding what metabolism they are involved in and how they protect the female reproductive tract might reveal many interesting facts about VgM that can help to develop probiotics and therapies to treat bacterial infections caused due to any disturbance.

Menstrual fluid secreted during menstrual cycles also include vaginal secretions that are secreted when endometrium ruptures and passes through vagina (8). This also means vaginal secretions might also influence the composition of menstrual fluid. Therefore we can say that there might be some influence of VgM directly or indirectly on the viability of endometrial stem cells extracted from menstrual fluid (as shown in Figure 1). However, further research is still needed to prove this. As a part of our project on stem cells, we are integrating the study on the vaginal microbiome and whether it shows any effect on the viability of endometrial stem cells. We are in the process of collaborating with hospitals to collect vaginal swabs. This approach can help us to explore more about the activity of vaginal microbiota.

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## How to cite this article?

Addala, S. and Yedidi, R.S. (2021). *TCABSE-J*, Vol. 1, Issue 2:31-32. Epub: Oct15<sup>th</sup>, 2021.

**Acknowledgements:** The authors thank TyiDE-Toronto, Canada for helping to write this manuscript. The authors thank TCABS-E, Rajahmundry, India and TyiDE-Toronto, Canada for financial support.

**Conflict of interest:** The strategic communication presented here is an ongoing project currently at TCABS-E, Rajahmundry, India. The authors invite collaborations without any conflict of interest.