

## CONNECTIONS BETWEEN MICROBIOTA, THE ENVIRONMENT AND THE REPRODUCTIVE HEALTH

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The evolution of macroorganisms continuously takes place in favorable environments and in close correlation with microorganisms. The body's biological processes take place in the association with the microbial communities that have evolved within the hosts, commonly referred to as the body's microbiota. The microbiota is a valuable factor for estimating physiological states in reproduction, which is essential for the survival. Balanced interactions within and between cells of the host organism and non-host resident microbial community in the external environment are essential for reproductive health. The reproductive microbiota represents the microbial communities that populate the male reproductive tract and directly influence reproductive success. The microbiota associated with the reproductive tract is influenced by both the endogenous physiological processes and variations in the exogenous environmental factors. The main objective of this review is to highlight the interactions between the reproductive biology of animals, their microbiota and the environmental factors. Establishing the link between microbiota, the reproduction, and the environment helps to fill important gaps in the reproductive microbiota research.

In males, the semen is a complex biological fluid that contains nutrients for sperm, as well as the factors that influence sperm motility and other morpho-functional properties. The content of semen serves as an adaptive and favorable environment for microorganisms. Some microbes are associated with a reduced sperm quality, while others are associated with a higher quality sperm, suggesting that microorganisms may serve as indicators of sperm quality. The host metabolism has effects on the semen and its microbiota with further effects for the reproduction. The microbial community of the semen remains at least for a short time in the female reproductive tract after copulation, with slight modification of the vaginal microbiota, and may influence fertilization and perhaps even implantation.

The effects of beneficial microbiota vary between the host organisms and are undeniably a vital aspect of conservation breeding. The pollution and contamination of natural environments can influence the microbiota and affect the reproductive success. Some man-made compounds in natural ecosystems can alter both environmental and host-associated microbial communities, and pose significant risks for the reproductive health. At the same time, the study of the reproduction in the natural ecosystems opens possibilities for microbiota conservation and global microbial diversity preservation. The study and conservation of the reproductive microbiota is particularly relevant to the biodiversity-managed breeding programs.

Most research to date has been focused on the gut microbial communities, and only few studies examined changes in the reproductive microbiota. Further study of the reproductive microbiota may elucidate potential mechanisms of dysbiosis and, in turn, provide opportunities for integrating the microbial ecology into the reproductive practices.

A part of the microbiota present in the reproductive tract can contribute to the facilitation of reproduction. In many cases it is hard to know whether the changes in the microbiota cause the changes in the reproductive state of the host, or whether they are a by-product of physiological changes. In addition, the host-associated microbiota is influenced by exogenous factors of the environment variation, which require additional research into optimization of the breeding and conservation efforts.