

Secretion of milk

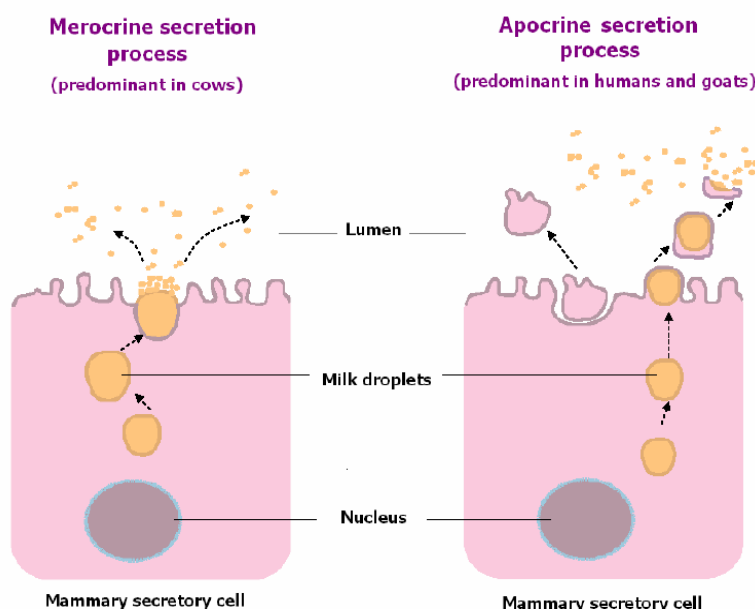
Background

Minute droplets of milk, containing casein and whey protein, lactose, minerals and vitamins, are formed within the secretory cells of the mammary gland. These milk droplets are secreted from the mammary cell by two processes:

- merocrine secretion, where the milk droplets combine with the cell membrane to release the contents without the loss of any other cell components.
- apocrine secretion, where the milk droplets are pinched off from the cell with some fragments of cells into the milk

Most milk is secreted by the merocrine process, but the apocrine process plays a much greater role in the goat (Wooding, Peaker & Linzell, 1970; Neveu et al, 2002). As a result, milk from goats contains numerous cell fragments or cytoplasmic particles that are broken off from the cell during the apocrine secretion (Wooding, Peaker & Linzell, 1970; Wooding, Morgan & Craig, 1977). Human milk also contains numerous cell fragments, whereas they are not detectable in cow milk (Boutinaud & Jammes, 2002). Thus goat and human milk share a very similar secretion process, but cow milk is different.

MEROCRINE AND APOCRINE SECRETION PROCESS



A key benefit of apocrine secretion is that it enriches milk with cellular metabolites and bioactives such as nucleotides, polyamines and free amino acids, which are important for gastrointestinal health and development. Studies confirm that goat milk contains a much greater range of cellular metabolites compared to cow milk

(Faulkner, 1980; Prosser et al, 2007). In addition goat milk has levels of many bioactives at similar concentrations to human milk. These include nucleotides, polyamines and free amino acids.

Research suggests that the apocrine secretion pathway in the goat could be related to the low levels of α s₁-casein in goat milk (Neveu et al, 2002). The fact that human milk is also low in α s₁-casein again provides an explanation for why goat milk shares a common secretion process and several compositional characteristics with human milk.

References

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