

# Apocrine secretory processes in the goblet cells of rat colon following stimulation with carbamylcholine

Ainory Peter Gesase

Department of Anatomy/Histology, Muhimbili University College of Health Sciences,  
P.O. BOX 65406 Dar es salaam, Tanzania

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## SUMMARY

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Goblet cells have been shown to secrete via apocrine process, but there are no detailed morphological features that show the types of apocrine release processes. The goblet cells of the colon of the male albino rats were stimulated with carbamylcholine (CCh) and examined by transmission and scanning electron microscopy for the purpose of studying the morphology of apocrine secretory processes. In the unstimulated control rats goblet cells secreted via exocytosis and apocrine mechanisms; but apocrine secretion was more commonly observed than exocytosis. The lumina contained intact vesicles and cytoplasmic fragments and cells with apical protrusions were also observed. Stimulation with CCh in HEPES-buffered Ringer's solution resulted into enhanced secretion and apocrine features became prominent. Apocrine secretion occurred via formation of apical protrusions and non-protrusion forming processes. The protrusions were covered with the plasma membrane and contained the secretory vesicles. Two types of apical protrusions were identified; oval-round and elongated protrusions. The elongated protrusions were released from the cell via decapitation and the oval-round protrusions were released via pinching-off process. Observations also indicated that some goblet cells of the surface epithelium and intestinal glands did not show apical protrusion but appeared to secrete via apocrine. This was non-protrusion forming apocrine secretion in which the exocytotic and the associated vesicles together with the intervening cytoplasm were released into the lumen causing appearance of wide concavities on the apical surface. The present results have demonstrated that apocrine secretion in the goblet cells involves multiple release processes and that these cells are capable of secreting with or without the formation of the apical protrusion.

## INTRODUCTION

Goblet cells are unicellular exocrine glands that secrete mucus into various areas such as the lumina of the airway, digestive tract and onto the ocular surface. Mu-