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Antigen-sampling M cells in the hamster Peyer's patch and conjunctiva

M (membranous) cells initiate mucosal immune events by binding and translocating soluble and particulate antigens across the surface epithelium and delivering the captured antigens to underlying antigen-presenting cells. The M cell is usually found within the follicle associated epithelium (FAE) above organized collections of lymphoid tissue which are found within close proximity of the epithelial layer. Antigens which bind to the cell are transcytosed across a thin apical bridge of cytoplasm to an underlying pocket filled with lymphocytes and macrophages which then internalized the antigen and begin the mucosal immune response. M cells are found in intestinal Peyer's patches, bronchi, tonsils, and the nasal cavities. Evidence has shown that the Guinea pig and rabbit have functional M cells in the conjunctiva and ongoing research is underway to confirm the conjunctival M cells presence in other mammals, including this study looking at the hamster. Because M cells have not been well characterized in either the hamster conjunctiva or Peyer's patch, we are examining the FAE in both regions for cells that have the distinctive M cell morphological and physiological phenotype. Using light and transmission electron microscopy, we identified cells in both regions that have classic M cell features: a thin apical membranous bridge of cytoplasm, extensive tubulovesicular compartments in the cytoplasm and intraepithelial lymphoid pockets. Using SEM, we have found cells in the FAE of the Peyer's patch that have apical microfolds that distinguish them from surrounding enterocytes; SEM analysis of the conjunctiva is underway. Carbohydrate specific lectins have been shown to selectively bind M cells in other mucosal locations and we are currently using fluorescence microscopy to screen a panel of 12 lectins. Our goal is to demonstrate that a lectin tracer can be preferentially transcytosed by M cells in both the Peyer's patch and conjunctival FAE in the hamster.