

Mammary Trans-Epithelial Transport Modelled in a Primary Bovine Cell Culture System

A polarised primary cell monolayer culture offering a convenient alternative to animal models for study of the mammary transport of xenobiotics or other materials in dairy animals

SERVICE DESCRIPTION

The service offers a system comprising a primary isolate of bovine mammary epithelial cells cultured on a permeable membrane, under conditions which mimic the architecture of their tissue of origin, and enable study of the trans-epithelial transport of molecules across the mammary epithelium during lactation.

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| Cell source | Origin: | Pregnant bovine mammary parenchyma |
| | Animal status: | Third trimester of pregnancy, recorded as BSE-free. Post-mortem analysis negative for bovine viral diarrhoea |
| | Isolation: | Enzymic digestion (collagenase, hyaluronidase) |
| | Fractionation: | Enriched for luminal epithelial cells by differential density gradient centrifugation |
| | Cell typing: | CK18 positive, CK19 negative, vimentin negative |
| System characteristics | Cell source: | Cryopreserved stock stored under liquid nitrogen |
| | Substratum: | Permeable supported membrane |
| | Medium: | Substratum adhesion in serum-containing medium. Transport measurement in serum-free medium containing lactogenic hormones |
| Cell performance | Architecture: | Cell monolayer Formation of tight intercellular junctions with generation of trans-epithelial resistance > 200 Ω Establishment of basal and apical compartments |
| | Differentiation: | Expression of major soluble and milk fat globule membrane-associated milk proteins Vectorial (apical) protein secretion |
| | Transport: | Trans-epithelial xenobiotic transport reflects known transport characteristics of molecules in vivo |
| System applications | <i>Suitable for study of:</i> | <ul style="list-style-type: none"> Trans-epithelial transport of molecules into milk Milk accumulation of drugs, xenobiotics Local mammary immunity Polarised secretion of milk constituents Epithelial tight junction formation and integrity |
| | Service delivery | <p><i>AvantiCell Science offers a comprehensive client service including:</i></p> <ul style="list-style-type: none"> Customised assay design as required Single or multiple (x5) candidate molecules tested in parallel Time course measurement up to 24 hours Detection according to client requirements and test molecule e.g. fluorescence, radiotracer Ancillary culture characterisation e.g. milk protein secretion Full written report in electronic form and hard copy |
| Other options | Species: | Trans-epithelial transport across human mammary epithelium - please inquire |

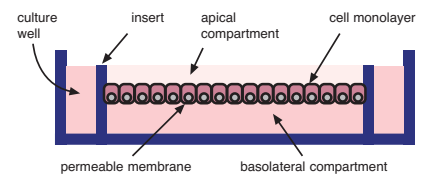


figure 1
Schematic representation of bovine mammary epithelial transport system. Culture conditions promote formation of a primary cell monolayer with tight intercellular junctions, creating pseudo-basal and apical compartments.

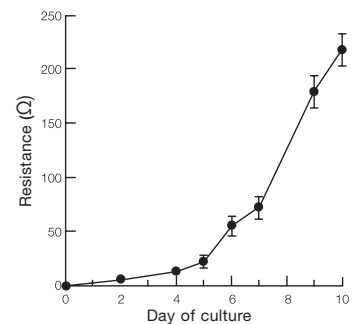


figure 2
Generation of trans-epithelial resistance during bovine mammary monolayer culture. Resistance induction is indicative of the formation of tight intercellular junctions in the epithelial cell monolayer.

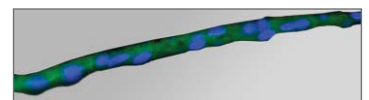


figure 3
Immunocytochemical staining of bovine mammary epithelial monolayer. Blue: cell nuclei. Green: casein immunostaining.

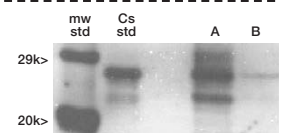


figure 4
Vectorial secretion of casein in a bovine mammary epithelial monolayer culture system. Cs, casein standard. A, apical conditioned medium. B, basal conditioned medium.

Leaders in Cell Culture