A07-4 Basement Membrane Dynamics during Epithelial Branching of Mouse Salivary Gland

Yuichi Kadoya1*, Sugiko Futaki2, Kiyotoshi Sekiguchi2, Taketoshi Kimura1

1Kitasato University, School of Allied Health Sciences, 2Osaka University, Institute for Protein Research

The developing submandibular gland (SMG) is a well-known system for studying the mechanisms underlying branching morphogenesis. On embryonic day 12 (E12), the mouse SMG consists of an epithelial terminal cluster that connects to the distal end of an epithelial stalk. The branching starts with the formation of a cleft at the basal surface of the terminal cluster. Subsequent cleft elongation separates the cluster into hemispheres. Repeated epithelial branching results in an extensive arborizing duct system that terminates with many terminal end buds. The basement membrane (BM) is a thin, extracellular structure that surrounds various epithelial, endothelial, and nervous tissues, as well as muscle and fat cells. As a result of the extensive SMG branching, the contours of the epithelial BM become more complex, implying that the BM components are synthesized to accommodate this rapid expansion. The major intrinsic BM components include laminins, collagen IV, nidogens and perlecain. The individual components and their macromolecular complex have been shown to play significant roles on the development of various organs including SMG. However, it remains largely unclear how the signals from BM generate mechanical forces for tissue-form changes during branching morphogenesis.

In order to elucidate structural dynamics of BM during epithelial branching morphogenesis, we cultured the SMG of E13 mouse embryos with medium containing EGFP-nidogen-1, and observed BM dynamics by confocal time-lapse microscopy. The EGFP fluorescence appeared on the epithelial BM after 30 min. Interestingly, the stronger and earlier fluorescence was seen along the cleft. These findings suggest that an active turnover of nidogen-1 at the developing SMG epithelial BM, in particular at along the cleft.