Examining the Effect of Fibroblast Growth Factors on Development of Mammary Gland in 3D Cultures

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Fibroblast growth factors (FGFs) influence growth, migration and survival of cells as well as cell division in mammary gland development. FGF signaling deregulation can thus cause formation and progression of tumors and it is essential to understand the effects of individual FGFs and their combinations. I tested the influence of FGF1, FGF2, FGF7, FGF9, FGF10 and hepatocyte growth factor (HGF) on the pubertal mammary gland epithelium in mice. A mouse model was used in this work. Mammary gland epithelial organoids were cultivated in 3D cultures in media with a specific FGF concentration. They were observed every three days for altogether nine days using live cell imaging. Photos obtained from the microscope were analyzed for development of branching structures and size of the organoids. I confirmed that FGF2 induces branching of the epithelium. On the other hand, FGF1 and FGF7 were found to affect the branching negatively. As for the other factors, no direct effects were observed that would influence branching morphogenesis. All of the examined FGFs caused proliferation of the epithelium cells. This study showed that FGFs play a role in regulating growth and development of branches in the pubertal mouse mammary gland. FGF2 affects branching morphogenesis positively, FGF1 and FGF7 negatively. To understand the roles of FGFs more closely, interactions between FGFs, mammary gland epithelium and stromal cells will be examined in further experiments.

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