THE ROLE OF JAK-STAT3 SIGNALING PATHWAY DURING FETAL LUNG DEVELOPMENT

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Background and aim: The process of lung development involves several effectors that exert its action via JAK/STAT signaling pathway. The elucidation of the signaling pathways involved in lung development may lead to strategies to rescue pulmonary hypoplasia associated with a broad spectrum of human diseases. Thus, our aim was clarify the role of STAT3 during fetal lung development.

Material and methods: STAT3 expression pattern was assessed by immunohistochemistry. Rat lung explants were harvested at 13.5 days post-conception and cultured during 4 days with piceatannol, an inhibitor of STAT3 phosphorylation (0, 0.01, 0.1, 1, 10, 20, 30 ng/mL). STAT3, MAPK (ERK1/2, JNK and p38) and PI3-AKT phosphorylation in explants was assessed by western-blot. Morphometric analysis was performed in all lung explants.

Results: STAT3 was expressed by pulmonary endothelium during lung development. Higher doses of piceatannol inhibited JAK/STAT3 pathway and decreased lung growth. However, lower doses of piceatannol induced increase of STAT3 phosphorylation (accordingly previously described in literature) and also increased lung growth. Moreover, western blot demonstrated none difference on ERK1/2, JNK, p38 and PI3-AKT pathways.

Conclusions: These findings suggest that JAK/STAT3 signaling pathway is a positive regulator of fetal lung development. Moreover, the STAT3 endothelial expression proposes an airway-vasculature interaction on branching regulation.