Abstract

Sprouty proteins are known as negative regulators of the pathways downstream of receptor tyrosine kinases (RTKs), including fibroblast growth factor (FGF) pathways. FGFs are involved in patalal and tooth formation, osteoblasts proliferation, differentiation and bone formation. Especially FGFR3, one of the fibroblast receptors, affects chondrocytes in the growth plate and its gain-of-function mutation is responsible for chondrodysplastic syndromes. *Sprouty2* (*Spry*) gene plays an important role in embryonic development, as in the development of limb, kidney, pulmonary branching and morfogenesis of teeth. *Spry2* knock-out results in supernumerary tooth formation in diastema of mandible, abnormalities of skull shape or cleft palate. *Sonic hedgehod gene (Shh)* also plays an important role in the craniofacial development and in the development of limb bud. The aim of this master thesis was to describe the expression of *Spry2* in the craniofacial area and in the developing limbs with focus on the early stages of embryogenesis. We focused also on the relationships between *Spry2* and *Sonic hedgehog* (*Shh*) gene expressions in the craniofacial area and in the limb buds. In situ hybridization was used to show the expression patterns of *Spry2* and *Shh* genes. Immunohistochemistry was used for visualization of *Spry2* and *Shh* proteins to determine the activity of relevant genes. Cre-loxP technology was used to trace the fate of *Shh* expressing cell population in the jaws of *Spry2* knouck-out mice.

Keywords: tooth development, limb bud, Sprouty, Sonic hedgehog, FGF