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Determination of *Hoxa-5* Function in Chicken Axial Tissue through RNA Interference

Hox transcription factors trigger the expression of genes responsible for the patterning of the anterior-posterior axis in most animal embryos. They pattern many tissues, including the somites, blocks of cells that give rise to most of the axial skeleton, muscles, and other tissues in chordates. Hox genes form an “expression code” along the anterior-posterior axis, influencing the morphology of the somites. In the absence of a Hox gene, homeotic transformations, where the identity of a vertebral segment transforms into that of another, will occur. *Hoxa-5*, known to function in the cervical-thoracic transition, has different expression domains in the mouse and the chick. In the mouse, *Hoxa-5* is expressed in the somites of the last five cervical vertebrae to the first two thoracic vertebrae. When *Hoxa-5* is knocked out in the mouse, anterior and posterior transformations occur within the expression domain. In the chick, *Hoxa-5* is expressed in the somites of the last seven cervical vertebrae. The purpose of this experiment is to determine the function of *Hoxa-5* in the chick using RNA interference to knock down the *Hoxa-5* transcript within its expression domain. We hypothesize that *Hoxa-5* functions in rib-repression in the cervical vertebrae of the chick. Any skeletal or molecular changes resulting from such a knock down will be assessed through *in-situ* hybridization of serial sections with known molecular markers, and an examination of the phenotype of the infected vertebrae against that of the wild-type, within the expression domain of *Hoxa-5*.