Insulin-like growth factor-I (IGF-1) MRNA levels and chicken muscle growth

Michel Jacques M.J. Duclos

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M. J. DUCLOS

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Station de Recherches Avicoles, INRA, 37380, Nouzilly, France

Insulin-like Growth Factor-1 is a key regulator of muscle development and metabolism in birds and other vertebrate species. In a first part, the present paper sums up the specificities of the IGF system in birds and especially those related to muscle development. In a second part, it reviews available data obtained with avian genetic or nutritional models. Data obtained by comparing genetic models with large variations of overall body growth show a positive relation between endocrine IGF-1 and growth rate. Data obtained using both genetic and nutritional models show a positive relation between muscle IGF-1 mRNA levels, which determine paracrine IGF-1 levels, and post hatch muscle growth.

Key words: *insulin-like growth factors, IGF, muscle, chicken, growth, genetic, metabolism*

THE IGF SYSTEM AND MUSCLE DEVELOPMENT IN BIRDS

In avian species, muscle development starts with the emergence of the first somites 24 h after the beginning of incubation. Myogenic precursor cells arise from the somites to give myoblasts, which after multiplication, migration to their final location and fusion into multinucleate myotubes, eventually differentiate into muscle fibers. The final number of fibers is reached at the end of embryogenesis in most muscles under normal conditions. Post hatch muscle growth is achieved by an increase in fiber size, which is associated with an increase in the number of nuclei per fiber (so called myonuclei, 1). Myonuclei have lost the ability to divide so that this increase is due to the mitotic activity of a residual population of myogenic precursor cells present between the muscle fiber and its surrounding basement membrane, the so-called muscle satellite