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Progress in the study of connective tissues and some interactions with muscle during growth.

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Summary

Since the work of Neuberger and others on the turnover of collagen in the early 1950s it has become increasingly clear that the insoluble fibrous elements of connective tissue, collagen and elastin, are synthesized by cells as soluble proteins; the morphological stability and metabolic inertia of connective tissue structures are owed to the in situ formation of covalent crosslinkages.

During the linear growth phase of a young animal the amount of soluble collagen precursor which can be extracted from a tissue such as the skin can be related mathematically to the collagen growth rate and the time (T) required for the establishment of a sufficient number of intermolecular crosslinks per molecule to form an insoluble polymer. For elastin T can be estimated independently by the use of isotopically labelled lysine.

The growth of muscle and the connective tissue system (including bone) are known to interact but the control mechanisms are largely independent. The importance of out-of-phase differences in the development of muscle and bone to the visible conformation of the animal will be discussed in relation to our present sparse knowledge of factors controlling development of the hard and soft skeletons.