REGULATION OF EARLY DEVELOPMENT IN CRICKET EMBRYOS

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The regulation of developmental process in embryos of cricket, Gryllus bimaculatus, was investigated in the special reference to the temporal correlation between protein synthesis and the differentiation. In order to relate the metabolic change in cricket embryos with the morphological characteristics during development, microscopical observations were performed during early development until germ band formation.

Effects of many different metabolic inhibitors on embryonic development were examined by immersing embryos at various stages in Ringer solution containing an inhibitor. The embryonic deve-

lopment was inhibited by the treatment if it was given within 10 h after oviposition, but no effect was noticed in embryos treated at later stages. These results may be due to a decrease in permeability of egg membranes in the later stages.

The ^{3}H-amino acid incorporation into proteins in vivo was low immediately after oviposition but considerably higher at 25 h. Since there might be some problems for the assay of protein synthesis in vivo, the activity was determined on the homogenates of embryos at defined stages of development. There was a transient increase in incorporation of amino acids into the protein fraction of homogenates at 25 h, and afterwards, the activity was maintained at the lower level until 120 h. The transiently increasing activity of incorporation was insensitive to cycloheximide or puromycin, but was strongly inhibited by chloramphenicol or streptomycin, which are inhibitors for procaryotic-type protein synthesis. Furthermore, the activity was located mainly in the mitochondrial fraction but not in cytoplasmic ribosome fraction. Although the actual role of the proteins synthesized in 25-h embryos is yet unknown, this protein synthesis may cause or reflect differentiation of embryos with effective energy supply after 30 h of development.