Molecular Genetics in the Study of Development and Evolution—The Insect Chorion

Jerome C. Regier and F. C. Kafatos

THE TOOLS OF MOLECULAR GENETICS have had a profound impact on many areas of modern developmental biology, including embryonic pattern formation, expression of developmentally controlled genes, hormone-induced developmental responses and sex determination (Cold Spring Harbor Symposium 1985, Davidson 1986). Genes can now be cloned, their sequences altered, the altered genes returned to the organism, and the new phenotype observed (Sambrook et al. 1989). Thus, the genome has become the most manipulable part of the organism.

Molecular genetics has been particularly powerful in combination with classical transmission genetics. Classical genetics is best at revealing the genes of interest and their interactions, but usually cannot identify the specific nature of the mutation, or how directly and specifically involved the mutation is in the observed phenotype. The reverse genetics approach described above can frequently answer these questions. Even for organisms for which sophisticated genetic analysis or the ability to transform with exogenous DNA is precluded, molecular genetics is still invaluable for a detailed