

Genes in the postgenomic era

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Abstract

We outline three very different concepts of the gene - 'instrumental', 'nominal', and 'postgenomic'. The instrumental gene has a critical role in the construction and interpretation of experiments in which the relationship between genotype and phenotype is explored via hybridization between organisms or directly between nucleic acid molecules. It also plays an important theoretical role in the foundations of disciplines such as quantitative genetics and population genetics. The nominal gene is a critical practical tool, allowing stable communication between bioscientists in a wide range of fields grounded in well-defined sequences of nucleotides, but this concept does not embody major theoretical insights into genome structure or function. The post-genomic gene embodies the continuing project of understanding how genome structure supports genome function, but with a deflationary picture of the gene as a structural unit. This final concept of the gene poses a significant challenge to conventional assumptions about the relationship between genome structure and function, and between genotype and phenotype.

Keywords: Conceptual change; epigenetics, gene definition; gene concepts; history of genetics; instrumental gene; nominal gene; postgenomics;

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