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# Dissecting the explanatory power of epigenetics

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## Abstract

The field of epigenetics is booming. This recent development has been accompanied by a philosophical debate on whether epigenetics could spur a paradigm shift in modern biology. Such a potential shift includes the expansion of our understanding of inheritance by processes of ‘Lamarckian’ information transfer as well as the consideration of developmental responsiveness as an evolutionary significant factor. This paper argues that although epigenetics (re)introduces interesting historical issues into modern biology, investigations of its explanatory practices has yet been completely neglected by philosophers of science interested in explanation. In order to close this gap, the paper develops a framework of contrastive explanation to evaluate the explanatory power of epigenetic explanation in contrast to prevailing mechanistic molecular explanations and orthodox evolutionary explanations. These two issues will be addressed: Do molecular epigeneticists’ explanations with less mechanistic detail (i.e. higher-level explanations omitting genetic explanatory information) have more explanatory power than standard mechanistic molecular explanations? Do proximate/efficient cause explanations (answering how a character evolved) have more explanatory power in evolutionary biology than standard ultimate/final cause explanations (answering what a character evolved for)? I will argue that answering these questions is crucial for establishing an explanatory framework of a new ‘Extended Synthesis’ which gives precise guidance by means of which criteria (*why*) and in which explanatory context (*when*) epigenetic explanations are legitimately chosen over prevailing molecular and evolutionary explanations.

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