Functional Analogical Models in Biomedical Research

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Abstract

Session: Functions and Complex Systems (Gillian Barker, Zac Munroe, Martin Vezer) Recent literature in human immunology charges that research based on animal models of the human immune system has underperformed compared to initial expectations. I argue that the reason for this shortfall in clinical success is a failure to be clear about the nature of the analogy between humans and animal models upon which the research is based. In particular, as a result of an uncritical reliance on the dual background assumptions of determinism and causal reducibility, the focus has wrongly been placed on the attribution of causal similarity between humans and (other) animals. This is manifest in what has become the standard view of animal models in scientific research, according to which the analogy between model and modeled system is one of certain shared or similar causal structures, such models being termed "causal analogical models" (CAMs). I present reasons for thinking that this is a flawed picture, and argue instead that the relevant analogy between biological systems is *functional*. Viewing experimental animals as *functional* analogical models (FAMs), rather than CAMs, has two important benefits: first, it can account both for the successes and instances of poor performance of these models in biomedical research; second, it provides a metaphysical framework for understanding animal models and their use in research that a) does not make an implicit appeal to reduction, and b) accommodates the emergent and complex nature of the human immune system.

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