

Plausibility in Medical Causation

Medicine offers a parallel literature to that of philosophy on causation. In particular, there are many normative schemes for determining causation in disease. The concept of plausibility is central to many of them. For instance, they generally contain some explicit requirement that the causal factor is a plausible part of a causal mechanism in terms of the experimental evidence available.

However, I have reservations about the idea of plausibility. I'm unsure how we can decide how a mechanism is plausible or how we might decide between competing plausible theories. By this, I mean that plausible mechanisms often only seem plausible once they have been experimentally confirmed, and they have a nasty habit of seeming fanciful until then. We also do not have recourse to laws of nature in much of medicine, instead our general mechanisms derive from well-confirmed regularities. Without laws, what criteria might we use to discuss 'plausibility'? Can we distinguish highly plausible vs slightly plausible propositions and, if so, how? Can we rank statements in order of plausibility?

I therefore propose to give an example from the recent history of medicine in order to demonstrate some of these problems of plausibility. Cervical cancer is now thought to be caused by the human papillomavirus. But it has not always been so, and the cause was earlier thought to be a different virus, namely herpes simplex. After studies demonstrating rather good statistical association between it and cervical cancer, a mechanism was developed to link the two [for instance, Melnick et al, 1974]. Not only was this mechanism plausible (for example, herpes simplex was known to be capable of causing malignant transformation of some types of cells *in vitro*), but it was also, to an extent, experimentally confirmed (for instance, herpes simplex DNA occurred with cervical cancer much more often than would be expected from mere coexistence, infected women appeared to seroconvert in advance of malignant change occurring and herpes simplex virus was found in biopsies of cervical cancers). It was not until the early 1980s that advances in molecular techniques permitted the experimental demonstration of human papillomavirus *in situ*, allowing what we now think of as the causal agent to be demonstrated.

Melnick, J.L., Adam, E. and Rawls, W.E. 1974. "The Causative Role of Herpesvirus type 2 in Cervical Cancer," *Cancer*. **34**: 1375–85.
