Magic Bullets

Jacob Stegenga*[1]

[1]University of Utah – United States

Abstract

The metaphor of a magic bullet is often invoked as an explanation for the effectiveness of medical interventions or justification for the expected effectiveness of novel medical interventions. Examples include insulin moderating glucose levels, antidepressants moderating serotonin levels, and proton-pump inhibitors blocking ATPase. The magic bullet paradigm represents three related ideas regarding diseases and medical interventions: the monocausal disease model (macro-level symptoms constitutive of a disease are caused by the presence or absence of a single micro-level entity); intervention specificity (a therapy intervenes on, and only on, the single micro-level entity constitutive of the disease being treated); and micro-level effectiveness (a therapy eliminates the micro-level entity constitutive of the disease being treated, or adds the entity for diseases that are constituted by the absence of that entity). The magic bullet paradigm gained currency in the mid-twentieth century with the introduction of antibiotics. However, scientists have begun to recognize the complexity of many pathophysiological mechanisms, and philosophers have noted what such complexity entails. I argue that once we appreciate the complexity of mechanisms, the expectation of effectiveness ought to be mitigated, and concomitantly, we ought to expect many 'side effects.' The simplistic notion that drugs can intervene on one or few micro-level targets and thereby bring about an effect which is both clinically significant and symptomatically specific is, for many of our contemporary medical interventions, false. Nevertheless, the magic bullet paradigm is a good normative standard for medical interventions, and the low effectiveness of many contemporary medical interventions can be understood in virtue of the fact that these interventions and their target diseases do not satisfy the three principles of the magic bullet paradigm.

*Speaker