

Incompatible assumptions common in biomedical research

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Strong, incompatible views are common in biomedicine but are largely invisible to biomedical experts themselves, creating artificial barriers to effective modeling of complex biological phenomena. Researchers at the University of Chicago explored the diversity in views among scientists researching the process of cancer metastasis and found ubiquitous disagreement around assumptions in any model of the progression of cancer cells from their original location to other parts of the body. The researchers suggest that making often invisible assumptions explicit could significantly improve the modeling of biomedical processes.

The study, published in the open-access journal [PLoS Computational Biology](#) on October 6th 2011, was based on interviews with 28 biologists and physicians considered experts in various cancer research fields. The authors found that a wide range of incompatible assumptions are held by scientists studying the same domain; in fact, no two scenarios for [cancer metastasis](#) were identical, and these differences were largely invisible to the experts themselves.

The authors believe this poses fundamental problems for modeling, peer-review, and scientific advance. They argue that assumptions are a critical part of any theory or mathematical model, and should be examined and collected systematically. Models that capture the full range of scientific opinion will create new opportunities for understanding how alternative assumptions and theories differ, and inform the researcher on how best to arbitrate between them. The authors then built an exemplar mathematical model of metastasis that makes conflicting assumptions

explicit and exposes them for testing and systematic evaluation.

More information: Divoli A, Mendonça EA, Evans JA, Rzhetsky A (2011) Conflicting Biomedical Assumptions for Mathematical Modeling: The Case of Cancer Metastasis. PLoS Comput Biol 7(10): e1002132. [doi:10.1371/journal.pcbi.1002132](https://doi.org/10.1371/journal.pcbi.1002132)

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