Abstract:

Michelle Gittelman, “The Revolution Revisited: Clinical and genetics research paradigms and the productivity paradox in drug discovery”

Ayfer Ali and Michelle Gittelman, “Research paradigms and useful inventions in medicine: Patents and licensing by teams of clinical and basic scientists in Academic Medical Centers”

Breakthroughs in genetics and molecular biology in the 1970s and 1980s were heralded as a major technological revolution in medicine that would yield a wave of new drug discoveries. However, some forty years later the expected benefits have not materialized. In Gittelman (2016) I question the narrative of biotechnology as a Schumpeterian revolution by comparing it to the academic research paradigm that preceded it, clinical research in hospitals. I analyze these as distinct research paradigms that involve different epistemologies, practices, and institutional loci. I develop the claim that the complexity of biological systems means that clinical research was well adapted to medical innovation, and that the genetics/molecular biology paradigm imposed a predictive logic to search that was less effective at finding new drugs. The post-World War II institutional history provides a contextual narrative to illustrate that, in contrast to the framing of biotechnology as a Schumpeterian revolution, the adoption of biotechnology as a core drug discovery platform was propelled by institutional changes that were largely disconnected from processes of scientific or technological selection.

In a companion empirical paper (Ali and Gittelman, 2016) we explore the implications of basic and clinical research as distinct research logics for the performance of innovative teams in Academic Medical Centers. We propose that laboratory science and clinical research represent fundamentally different research paradigms that defy a simple arithmetic of combining the skills of individuals on teams. We propose that clinical and basic researchers inhabit distinct cultures of work that yield different, and sometimes conflicting, approaches to medical problem-solving, and that clinical research remains an important engine of medical innovation because researchers have unique opportunities for insights that emerge from the joint activities of research and close observations of living patients. There are few empirical studies of the relative contributions of clinical and basic research in medical innovation; this paper addresses that gap. Our analysis focuses on patents and licenses from two prominent Academic Medical Centers (AMCs) over a 30 year period across a broad range of medical fields. Our results supports the claim that useful (licensed) inventions are more likely to be invented by clinical rather than basic scientists, controlling for a range of technological and individual characteristics. The results on team leaders also supports our interpretation that clinical and basic research represent distinct paradigms of research, rather than scientific specializations that can be readily combined. Our results help inform policy about the relationship between scientific research, teams, and innovation in bio-medicine.