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Managing the future: The Special Virus Leukemia Program and the acceleration of biomedical research

Robin Wolfe Scheffler*

American Academy of Arts and Sciences, 136 Irving Street, Cambridge, MA 02138, USA

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ABSTRACT

After the end of the Second World War, cancer virus research experienced a remarkable revival, culminating in the creation in 1964 of the United States National Cancer Institute's Special Virus Leukemia Program (SVLP), an ambitious program of directed biomedical research to accelerate the development of a leukemia vaccine. Studies of cancer viruses soon became the second most highly funded area of research at the Institute, and by far the most generously funded area of biological research. Remarkably, this vast infrastructure for cancer vaccine production came into being *before* a human leukemia virus was shown to exist. The origins of the SVLP were rooted in as much as shifts in American society as laboratory science. The revival of cancer virus studies was a function of the success advocates and administrators achieved in associating cancer viruses with campaigns against childhood diseases such as polio and leukemia. To address the urgency borne of this new association, the SVLP's architects sought to lessen the power of peer review in favor of centralized Cold War management methods, fashioning viruses as "administrative objects" in order to accelerate the tempo of biomedical research and discovery.

1. Introduction

In the winter of 1961, a worried mother contacted the Illinois branch of the American Cancer Society to report a "cancer epidemic" in Niles, a town just north of Chicago. In the previous year, eight children associated with the St. John Brebeuf parish school had died from leukemia and another five had fallen ill; a combined rate five times higher than the national average. An epidemiologist dispatched by the United States Public Health Service attributed the cluster of deaths to "an unidentified infectious agent." While urging calm, two years later the Niles Board of Trustees mandated the reporting of all leukemia cases within the town, a measure invoked only for infectious diseases (Black, 1963; Hearst, 1962a; McGrady & Morgan, 1964; "Niles Board Cites Disease 'Reportable,'" 1963, "Niles Hears Panel's Views on Leukemia," 1963, "Open Forum on Leukemia Will be Held," 1963, "Seek Leukemia Clew in Study of Niles Cases," 1961).

Writing for the *Journal of the American Medical Association*, a Chicago hematologist, Steven Schwartz, announced that he had identified new antibodies in blood drawn from relatives of the children and even from laboratory workers who had handled blood samples. Speaking in the restrained tones of scientific prose, Schwartz concluded that the Niles outbreak lent "further credence to the viral etiological theory" of human leukemia (Schwartz, Greenspan, & Brown, 1963). He was more direct with a reporter for the *Saturday Evening Post*, stating, "you can't see patients for twenty years without being convinced that certain things are so…leukemia looks to me like an infectious disease—a virus" (McGrady & Morgan, 1964, p. 21). Alarmingly, it appeared that the Niles "outbreak" was not an isolated incident but symptomatic of rising childhood leukemia rates: in the early 1960s similar leukemia outbreaks were reported in Buffalo, New York; Bergen County, New Jersey; Cheyenne, Wyoming; Louisville, Kentucky; Mt.

* Tel.: +1 617 576 5091.
E-mail address: rscheffler@amacad.org.

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Prospect, Illinois; Seattle, Washington; and Orange, Texas (Schwartz et al., 1963, p. 106; Wallace, 1961).

Yet the ominous threat that leukemia was caused by a virus also contained a kernel of optimism. Polio, another feared viral childhood disease, had just been vanquished by the Salk vaccine after an energetic research effort. Leukemia might fall to a similar campaign. Vaccination held center stage when *Life* Magazine introduced its readers to the National Cancer Institute's "all-out assault" against childhood leukemia. While describing radiological and chemotherapeutic advances in leukemia treatment *Life* saved its greatest excitement for the implications of the discovery that "viruslike [sic] particles have been identified in the blood of leukemic humans" (Bradbury, 1966, p. 87). In 1964, to capitalize on the potential discovery of a human leukemia virus, the administrators of the National Cancer Institute (NCI) had launched a ten million dollar "superplan," the Special Virus Leukemia Program (SVLP), to develop a vaccine. Modeling their efforts on the Defense Department's successful oversight of complex aerospace projects, the administrators of the SVLP proposed to break the process of leukemia virus discovery and vaccine production into discrete components for delegation to coordinated teams of personnel spread among hospitals, academic departments, government laboratories, and industry. Unlike most biomedical research plans, *Life* enthused, these administrators had a strategy "that would do more than give out research money and wait for results. It…would *plan* research and *make* results" (Rosenfeld, 1966, pp. 110–111).

Funding for cancer virus research grew rapidly, but not without opposition. Just before President Nixon declared a "War on Cancer" in 1971, virus studies were the highest funded area of research at the NCI save chemotherapy.[1] The SVLP's emphasis on directing and accelerating therapeutic breakthroughs stood at odds with the emphasis on slow, gradual progress adopted by most of the cancer research community. A rising chorus of critics charged that the SVLP's management strategies were founded on the unsubstantiated assumption that viruses were a major cause of human cancer. To these critics, the SVLP was a moonshot without a moon, an effort whose misguided attempts to manage science threatened scientific autonomy (Wade, 1971). Later in the 1970s, the SVLP's centralized, hierarchical, and contract-directed framework provided a template for more ambitious efforts to diminish the power of peer review and manage biomedical research (Chubin & Studer, 1978).

As a result of these controversies, most scientific commentators have discussed the history of the SVLP in light of the retrospective knowledge that it failed to identify a significant human cancer virus and that cancer virus research in the 1970s established the importance of genes (oncogenes) rather than viruses in the genesis of cancer (Klein, 1999; Weinberg, 1998, pp. 66–84). While links between viruses and some cancers, notably Human Papilloma Virus and cervical cancer, were revealed later in the century, the prevalence of these virally caused cancers never fulfilled the promises of the SVLP's advocates (Aronowitz, 2010; Kiberstis & Marshall, 2011). Against these frustrations, cancer virus research played an important role in the discovery of oncogenes, and in the elucidation the molecular mechanisms of processes of cellular regulation and development. The successor to the SVLP, the Virus Cancer Program, also provided important resources for elucidating the nature of HIV/AIDS (DeVita, 2002; Gallo, 1991, pp. 138–145; Gaudillière, 1993, p. 164; Morange, 1997).

The aim of this article is not to evaluate the legacy of cancer virus studies at the NCI but to explain the remarkable fact that such a large program of research could start before its central object, a human leukemia virus, was known to exist. The explanation of this fact requires understanding how human leukemia viruses became visible as coherent, productive, and tractable entities to both scientists and bureaucrats. This process of visualization extended to politics and culture as well as the laboratory (Creager & Gaudillière, 2001, pp. 204–205; Daston, 2000; Wailoo, 2001, pp. 23–25). The SVLP's principal innovation was in presenting leukemia viruses as *administrative objects* as well as laboratory objects. The management of the SVLP faced two ambiguous worlds: the biological world of virus studies and the social world of biomedical research. This new way of thinking about leukemia viruses allowed both viruses and virus research to become more legible for state intervention (Scott, 1998). While the process of seeking human leukemia viruses was never severed from questions of their existence, the emergence of viruses and virus research as entities for bureaucratic control as well as laboratory inquiry accorded this question a secondary position to concerns of organization and rapid action—concerns inspired by the association of leukemia viruses with childhood disease and reflected in the Cold War genealogy of the SVLP's management methods.

Even if the SVLP did not conclusively reveal the existence of a human leukemia virus, the administrative machinery organized around the *process* of searching for it gained the power to shape the kinds of knowledge produced by experimental cancer research. The existence of the SVLP also gives further reason to suspect that the historical relationship between science and management was often much less antagonistic than the rhetoric of scientists suggests (Shapin, 2008). The history of the SVLP bridges efforts to manage biomedical research in the twentieth century, beginning with the efforts of the Rockefeller Foundation in the 1920s and 1930s and continuing today in the biotechnology industry (Fortun, 1998; Kohler, 1976, 1991). Decades before more notable "big biology" efforts such as the Human Genome Project, the SVLP sought to develop management structures for the acceleration of biomedical research.[2] In the biological materials that it banked and circulated or the animal and *in vitro* models of disease it supported, the activities of the SVLP provide a window into how the development of the managerial and experimental practices helped constitute biomedicine in the late twentieth century.[3]

The unique features of the SVLP's approach to the management of biomedical research, moreover, took shape in the broader context of profound transformations in the role of government in American society. While biomedical research was the beneficiary of exponential increases in public support and scored numerous

[1] National Cancer Institute 1972 Fact Book (Washington: DHEW, 1971), 17.

[2] Others have suggested that the SLVP was an early instance of "big biomedicine" (Gaudillière, 1998, p. 158). The development of "big science" been extensively discussed in the history of physics and is reviewed in Capshew & Rader (1992) and Galison & Hevly (1992).

[3] The definition of "biomedicine" and the scope of its history have been the topics of considerable debate among both practicing scientists and historical researchers (Löwy, 2011). Experimental biologists, especially molecular biologists, have often been aggressive promoters of the wide-ranging applicability of 'basic' or 'fundamental' research to human disease, although the insistence of the primary place of laboratory biology in medicine extends back to the mid nineteenth century (Bernard, 1957; Crick, 1969; Dill, 1999; Flexner, 1910). Historical commentaries stress that its primary feature is the extension of laboratory, especially molecular biological techniques, into medicine, a trend which accelerated after the Second World War as a part of the broader "(bio)medicalization" of society (Clarke, Shim, Mamo, Fosket, & Fishman, 2003; Conrad, 2007; Gaudillière, 2002, pp. 360–372). While not discounting the importance of this trend, I follow the insight of other recent scholars who have identified the importance practices which created new connections between laboratory and clinical spaces, including the development of *in vitro* disease models, as more characteristic of biomedicine. Indeed, very often activities, knowledge, and practices in the clinic or other sites outside the laboratory shaped the production of experimental knowledge in the life sciences (Cambrosio & Keating, 2001; Keating & Cambrosio, 2004; Landecker, 2007, pp. 14–16; Löwy, 1996; Strasser, 2011). It is precisely for this reason that further historical research on the broader historical settings of biomedical research is so engaging.