Blessed by Lady Luck,
My Experience with Grants-in-Aid for Scientific Research

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Good and bad luck are a stubborn reality for the field of scientific research. In my case, I was exceptionally lucky, when it came to obtaining research grants. In fact, for over a quarter-century, I enjoyed uninterrupted access to large-scale competitive research funding, and most of that came out of Grants-in-Aid for Scientific Research (Kakenhi). Although the selection ratio for grant applications has fluctuated over the years, it has generally hovered around 25 percent. Despite that relatively harsh reality, I virtually never had the experience of seeing any of my own experimental ventures hit a roadblock due to some shortage of research funding. That explains the basis for the title of this essay, namely, my feeling that I have been blessed by Lady Luck. Let me give some specifics. In the Specially Promoted Research category, I have won Kakenhi for research on proteasomes (large multicatalytic proteinase complexes)—the focus of my life work—from FY2001 through FY2018, a period spanning four consecutive program cycles, or five cycles if I count grant funding prior to that. Now that I have disclosed this, one might assume I had certain special inside connections that gave me ready access to Kakenhi. However, as a researcher affiliated with a regional university, I was nowhere near being in a position to reap financial assistance through any connection with the powers-that-be. The truth is that acquiring Kakenhi was something I gave my undivided attention on a regular basis. In fact, the very next day following arrival of a notice informing me that a grant application of mine had been accepted, I made it my policy as a researcher to drop everything, move right into that research, and continue preparing as many quality research papers as I possibly could. Hence, as chance would have it, this approach enabled me to publish in leading journals some original papers that garnered international attention, perhaps leaving the impression I planned everything in advance every time I submitted a grant application. External factors also appear to have helped sustain my stroke of good fortune. My field of research was in proteolysis, a subject that had not initially earned much notice for its biological importance. However, in time, proteolysis research went on to demonstrate unprecedented advances, eventually assuming position as one of the core fields of the life sciences. In other words, this historical background also may have had a serious influence on my luck with grant applications. In any event, these assorted coincidences had a cumulative effect that enabled me to concentrate on my research in an atmosphere of intellectual independence supported

by Kakenhi. In this respect, I have been surprisingly fortunate.

I have stressed the importance of writing papers at almost every opportunity. That's because I believe writing papers is the only way that researchers can achieve self-actualization. However, in an extremely regrettable sign of the times, lately I have found it increasingly necessary to qualify my recommendations with the parenthetical exhortation that written papers be ethical. Fabrication, falsification, plagiarism, and other forms of dishonesty are bitter legacies that have endured from the earliest days following the birth of science. However, revelations surrounding recent cases of research misconduct particularly in the life sciences field have incited public scorn. Normally, the paper screening procedures applied by leading scientific journals are quite rigorous. (Indeed, having a paper published in *Nature*, *Science*, or another comparably prestigious journal is not a simple matter in the first place.) That said, the task of identifying the authenticity of a scientific paper is not as easy as it is with, say, antiques or paintings. Furthermore, investigating the facts in a case involving research misconduct demands inordinately huge investments of time and labor. Hence, even if a truthful account of deception is exposed, the justification for such effort does not have even any transient value beyond ensuring that the researchers involved have no future, or providing a lesson for future generations to ponder. It is necessary that everyone involved in the fields of science and technology be strongly aware of the absolute impossibility that a fraudulent paper will ever withstand the test of time. In my view, acts of research misconduct stem largely from certain exceptionally personal facets of a researcher's character. However, a lack of moral fiber is behind such behavior, and that shortage has become a growing epidemic throughout the scientific world. Bearing witness to this trend, I reflect on the current situation as something attributable to omissions in education—omissions that stem from a belief, shared by many leading senior researchers in the life sciences field, that people are intrinsically good. In my opinion, we once again face the necessity of reviewing the position of our field on ethics education.

Aside from matters of honor and ambition, efforts to acquire competitive research funding are also frequently cited as another factor behind the widespread epidemic of dishonest reporting. However, this sort of logic puts the cart before the horse, and represents a view that cannot be accepted as legitimate. Writing and publishing quality reports is naturally a source of pride for the scholar. Likewise, writing and publishing quality reports is also something that can naturally boost the prestige of a researcher, and the ability to secure research funding is one benefit that may accrue as a result. Even if excessive competition for research funding is an undeniable fact, it is still an outrage to treat it as an incentive to engage in fraudulent behavior. Of course, granted that the number and quality of papers one has published can be the key factors influencing access to Kakenhi, some researchers may be tempted by the desire to boost their research credentials even through misconduct. However, this is a line that a scientist must never cross. To maintain this ethical standard, it is important above all

that a fair and impartial system of screening be established for the approval of Kakenhi. Absent a fully credible system of screening, the effective denunciation of deceptive papers would seem impossible. Further, even if the tendency for evaluations to put more weight on research papers is an unavoidable reality, quality research papers are still a convincing measure of research performance. However, the main purpose of screening has always been to evaluate past performance as well as future expectations. While evaluations that place emphasis on the quality of research papers constitute a safe approach, from the perspective of training researchers that excel and bring about innovation, room for improvement arguably exists. Currently, most of the screening of applications for Kakenhi are entrusted to researchers that are busily engaged with their own work. Researcher edification is one of the effective goals of this framework. However, if flaws in the accuracy and fairness of the application screening process are one dimension of that framework, then one can only conclude that it involves problems that cannot be ignored. With the current demographic aging of our society, many retired but capable researchers have nothing but time on their hands. I have entertained an idea of my own that I would like to propose: namely, why not build a framework that assigns a certain measure of the screening workload to these retired members of the research community?

“Promoting science and technology is precisely the cornerstone that will support the continued advancement of resource-poor Japan.” This readily understandable argument has been one of the factors behind the sometimes disorganized support accorded to scientific research. To be sure, we have many examples where advances in science and technology have contributed to gains in wealth and national power. However, we must not forget that the promotion of science should be oriented not toward one-time, ephemeral accumulations of material wealth but, rather, toward the cultivation of human resources that can be expected to generate new wealth into the future. One of the illusions typically associated with investments in human resource development is that they are a waste of money because they do not generate any tangible reward. However, the point I want to make is that, in terms of providing fundamental support for the perpetual advancement of our society, Kakenhi absolutely should be utilized to fund research that at first glance may appear futile. Interestingly enough, if we review the history of science, we can cite innumerable examples where undertakings in basic research that were never intended to bring about social contributions nevertheless evolved into research that generated assets of enormous value. Metaphorically speaking, true prowess in the realm of science is measured by the extent to which investments are made in research of questionable value. The mission of Kakenhi arguably resides here. To treat Kakenhi as funding for bottom-up, curiosity-driven undertakings backed by independent ideas rather than as funding for top-down, mission-operated undertakings represents an outstanding philosophy. Seeking not only new technologies (or increases in wealth) but also the intrinsic value of science (the pursuit of intellectual curiosity) through the results of research will be of the utmost importance to the

cultivation of future generations of researchers equipped with an abundance of ambition and vision. In the interest of Japan's continued prosperity and progress, let me reiterate that excessive support for technological innovations in the name of the secular profit motive must not lead to senseless cuts in the budget for Kakenhi.