

Longing for "UNEXPECTEDLY"

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This happened more than ten years ago. I was working on the pathways through which abnormal conditions in the cell are sensed, and the signals necessary for the cell to trigger a defense response are transmitted. However, a series of theories that might directly lead to the answers to the issues I was trying to elucidate appeared then, and it forced me into a situation where I might have to give up my research. However, based on such published theories, no matter how many mutants I made which are supposed to keep the signal transduction pathway always ON, the signal transduction pathway was never turned on. It means that the academic theories published at that time were not correct. This was the first time I experienced "unexpectedly" in my research, and it gave me great hope to continue my research. Eventually, I could publish the correct theory a few years later.

From my own experience, one of the unique characteristics of basic science compared to applied research, at least in the bioscience field where I am working, is that the adverb "unexpectedly" has high value. It would be nice and a researcher's delight to begin the sentence of conclusion in a publication with the word "unexpectedly" when interesting findings emerge through one's research, isn't it? Of course, the adverb "unexpectedly" is used in publications outside of basic science. However, the sentences that follow "unexpectedly" are often negative. And we see higher value in things going "expectedly" than "unexpectedly" in applied research. In basic science, on the other hand, the higher the degree of "unexpectedly" and the more fundamental the "unexpectedly" discovery is in terms of intellectual curiosity, we recognize the high value. And as the goal we are aiming for is something "UNEXPECTEDLY" in nature, I feel it is difficult to explain the value of our research upfront. When writing an application for competitive research funds, I often have difficulty describing my research goal's mid—to long-term perspective. In addition, if we capture our field from a larger view and recognize that basic science develops through the accumulation of "UNEXPECTED" discoveries, I believe it is impossible to foresee the future of this field.

Therefore, I feel it makes little sense to discuss specific examples of how current basic science can benefit humanity or society. This may be similar to the fact that humankind in the past would not have been able to foresee the present world. For example, the current society, which is mainly free from the fear of infectious diseases such as the plague, and where infant mortality rates have dropped significantly, at least in developed countries, would not have been possible without the

discovery and subsequent study of microorganisms. And it would have been impossible for past humans who did not know of microorganisms to have foreseen this present world. On the other hand, it is also true that such significant advances cannot be made overnight. There have been many important discoveries and inventions from the dawn of microbiology to the conquest of infectious diseases. And our predecessors have provided enormous efforts to support these discoveries and inventions.

A paradigm shift that changes human perception and even the nature of society would not be possible without basic science, and it is unforeseeable in the long term and results from the accumulation of many studies. I would like to keep doing my daily research, aiming to discover something “unexpectedly,” even if it is tiny, while hoping that the research will lead to a new paradigm shift someday.