

〈教育セミナー〉

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生物はなぜ死ぬのか
—老化のメカニズムを研究し、死の意味を考える—

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Why do Living Organisms Die?
—Study on the Mechanisms of Aging and Thinking of the Meaning of Death—

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Abstract

There are approximately 8 million species of organisms on Earth. While we do not have complete knowledge about all of them, one thing we can say for certain is that they will all eventually die. The reason we can make such a claim is because all organisms are the result of evolution. Evolution can be like a program that involves “change and selection” repeating over time, where “change” creates diversity and “selection” ensures that only those organisms that are well-suited to their environment can survive. In other words, it means that other organisms die. Thus, evolution has progressed through death, leading to the birth of all living creatures, including humans¹⁾.

What causes death? Death follows the process of aging, which is caused by the accumulation of DNA damage. For instance, ultraviolet radiation can damage DNA in skin cells, leading to aging. The genomic DNA contains fragile and unstable regions that may function as “aging switches” in cells. In fact, our study in yeast has revealed that when one of these regions, ribosomal RNA gene, becomes more stable, aging is suppressed, and the lifespan is extended. If the aging signal from the switch can be identified, it may be possible to control aging²⁾.

Key words: DNA damage, evolution, death, aging, lifespan.