Biological robustness is a kind of system property to keep a stability of biological system. Robustness enables a system to function normally although there are a series of disturbance in or out of the system[1]. Here is one exmaple of robustness: A body-system is a stable system and pathogen is a big theat which can disturb the balance of this system. The robustness of a body-system emerges when body can use the immune system to fight against pathogen threats to protect the inner balance. Specifically, when hepatitis B virus(HBV) enters in human body, virus will be able to enter and replicate in the liver cells, causing the destruction of the cells. Then it may cause the hepatitis, disrupting the inner balance of body-system. In order to protect the body-system, B cells in human immune system can generate antibodies responding to HBV to do viral clearance, and T cells can generate cell factors to enforce function of B cells, so that the liver can be recovered[2].

Biological fragility is the opposite feature compared to biological robustness. It embodies the weakness of the system that can be easily broken or destroyed. Here is one example of fragility: Some ecosystem services are very vulnerable and fragile. They are affected by environmental change and they may be devastated or disrupted. For example, pollination, which is relevant to food security and biodiversity, is a very important service for ecosystem. But the mechanisms of nocturnal pollination can be easily negatively affected by environmental change, including air and soil pollution, artificial light at night, and climate change[3]. And if nocturnal pollination can not function well, many important crops and flowers will disappear.

In order to survive in the environment, every system, no matter whether it belongs to body-system, services of ecosystem or else, has to develop or evolve their own machanisms to resist outer threats. To explain it further, all systems need to keep their own balance and stability, so if some accidents happen to interfere the inner balance of systems, they must need adjust themselves automatically, so that systems can function normally. From this perspective, robustness is integral and fundamental for systems.

The consequences of fragility are always disastrous. The fragility enables the system to be perturbed easily and can not function well continually. Even worse, this kind of systems may collapse when they encounter the outer interference. In order to avoid these consequences, we need to improve the robustness and sustainability of each system and lower the fragility of it, which means that systems will have more efficient or powerful mechanisms to deal with the outer interference. Specifically, in order to enable the ecosystem to be robust, we can promote the biodiversity of ecosystem. If there is a volcanic eruption which causes some plants dying, the ecosystem can still function well since there are other plants can provide food for animals to keep the balance of the food link.

Additionally, recent studies show that robustness and fragility of biological systems are correlated with each other[4]. Some systems evolved to be robust against general perturbations can extremely be fragile against certain types of rare perturbations[5]. Otherwise, an interesting phenomenon is that some researchers believe that some robust features are not necessarily an evolutionary advantage and may have arisen under neutral evolution or through pleiotropy[6], which allow our understanding of the robustness to be deeper and more dialectical.

In brief, in most of the cases, we need to lower the fragility and improve the robustness of systems.

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