The robustness and fragility describe the extent to which a system can tolerate external and internal perturbations. To fully comprehend the concepts of biological robustness and fragility, we must first comprehend the types of perturbations that contribute to these characteristics.

The biological networks are resistant to ordinary disturbances. This is likely because the entire biosphere has become accustomed to the periodic minor oscillations and has gained the ability to withstand or adapt to them. For instance, the entire food web is very resistant to seasonal changes in animal or plant populations. Small changes in species never result in an entire systemic breakdown. These recurring turbulences may initially cause a few minor problems, but the ecosystem will quickly resolve them. DNA is one of the most effective instruments used by ecosystems to reinforce their robustness. Random DNA mutations allow every community of Earth's organisms to adapt to shifting environments and maintain their capacity to thrive. Through constant selection of the biological population, leaving the most suited DNA components for the current environment for reproduction, the entire biological network is always capable of maintaining relative homeostasis and robustness within a specific range of environmental variations.

Robustness is a critical part of survival, as the life of an individual member in biological networks is entirely contingent on the survival of all related groups. Without a strong ecosystem to generate an energy homeostasis for a single species, it will not be able to withstand extreme conditions without steady energy input and output. Morohashi et al. found that species-specific biochemical networks significantly contribute to the resistance of biological ecosystems to variations and fluctuations (Morohashi et al., 2002). Without the successful maintenance of biological robustness, the entire ecosystem may be unable to generate robust dynamic feedback loops for sustaining the stability of the biological web, resulting in the loss of species diversity over time (Kwon & Cho, 2008).

On the other hand, the fragility of biological networks normally corresponds to unanticipated disturbances or intrusions between minor systems. It usually takes a long time for the ecosystem to recover from unforeseeable environmental harm, such as an asteroid strike or a nuclear explosion. Or, the invasion between minor systems may be irreversible and irrecoverable; for instance, the human metabolising system may be readily destroyed by the HIV virus and cannot recover. Thus, a sudden, sufficiently substantial disturbance may exceed the system's ability to self-regulate and result in the collapse of all biological networks. In the majority of circumstances, biological fragility induced by unforeseen occurrences cannot be prevented, as we cannot intervene or prevent an asteroid strike, a sudden nuclear leakage or a coming pandemic. What we could do, however, is consider all conceivable situations and devise a comprehensive and dependable remediation strategy for these prospective conditions, minimising the impact of a disaster that might trigger the collapse of biological networks. However, with the effective identification of known flaws in the earlier model and the identification of topics for additional inquiry in the more current, credible model, we may have the opportunity to prevent the potential biological fragility in the near future (Kwon & Cho, 2008).

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