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Letters

Metaphoric misconceptions

By pointing out the role of metaphor in immunology ("Metaphor in immunology," SN: 10/18/86, p.254), Fred Karush raises an issue important to all scientific investigation. If a metaphor proves useful, it is because the pattern of interaction of the parts of the mental image is congruent with the pattern of activity of the process it depicts. For example, in the simple metaphor, "the ship plows the sea," the same basic mathematical models can be used to describe the interaction of both plow and hull with their respective environments. If a process is only partially understood, a good metaphor can be used through interpolation to predict experiments more likely to fill in the rest of the picture, but a poor one can lead to studies yielding data not relevant

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Cover: Many Arctic and Antarctic fish—like the *Trematomus borchgrevinkii* shown here resting on an underwater ice platelet—make and store a protein antifreeze in their blood to keep from freezing in subzero water. Scientists are trying to find out how these proteins prevent the formation of ice crystals.
(Photo: A.L. DeVries)



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to understanding the process.

A major problem in our research for understanding is cultural bias, and the history of science is replete with examples of how a widely shared mental image can limit exploration. The images of how things work that we commonly apply in everyday life can have a powerful influence on the metaphors we choose to use in our research.

One of the strongest themes in current Western thinking is adversary interaction, and one need do no more than read a newspaper or watch television to find the evidence. But a close look at any biological system that is reasonably well understood reveals a different type of activity. The entities involved interact with a strong theme of cooperation.

As an example of metaphors with bias toward the adversary process, consider the usual approaches to studying cancer cells and

viruses. We try to find ways to kill them or render them ineffective. Suppose the eventual cure for cancer were to help the genetically misguided cancer cells to function normally by infecting their host with a custom-built virus which adds genetic information needed by the cancer cells but redundant and nonfunctional in the normal cells of the host. How would our current metaphors get us there?

We would do well to avoid imagery from human experience and infuse our thinking with metaphors from all the other life that arrived long before we did and is unbiased by human intervention.

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