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Physiology is the study of function and the mechanism of function of the various components of plants and animals. Physiological questions are asked of tissues at every level of structural complexity, ranging from questions of human behavior (how does a conscious human control the position of his joints?), to questions of the physics of ionic movement (how does an ion cross a membrane 3 nm thick?).

Physiological questions have a unity because the evolutionary process which built biological structures is the same, whether the structures are enzymes or ankles. Physiological questions have a unity because the methods of describing and analyzing function are not diverse, even if the structures performing those functions are. For example, the mathematics describing the flow of current across membranes is intimately related to the mathematics describing the control system for movement: a linear differential equation is a linear differential equation, no matter what the meaning of its coefficients. The unity of physiology arises then from the questions it asks of biological systems and the unity of the mechanism that created those systems.

The diversity of physiology arises from the range of systems about which those questions are asked. The excitement of physiology arises from the tension between its unity and diversity. When new systems arise, old questions are asked of them, at first. When new questions or methods arise in the new system, they are then applied to old problems. And applied to old problems, the new questions are often as revealing as when applied to the new systems, where they arose.

Whether the (apparent) unity of physiology is a reflection of reality (that is of the unity of biology), or a reflection of the paucity of our knowledge, or even a reflection of the inherent limitations of our ability to understand (i.e., of our nervous system), is not known. Probably all three.