Ecological and environmental physiology of mammals

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Abstrak

This book describes the physiology of mammals in an ecological and environmental context. It first describes the basic bauplan and history of living mammals from an evolutionary viewpoint. General physiological principles are then presented, including the importance of body size and regulatory control systems. This is followed by a detailed description of the physiological characteristics of mammals with respect to energetics, thermoregulation, respiration, circulation, feeding and digestion, water and solute balance, neurobiology, and reproduction. Environmental adaptations are then described for mammals in extreme environments (cold, hot, underground, high altitude, and aquatic), using specialized locomotor styles (cursorial, brachiation, migration, gliding, and powered flight), and exploiting difficult-to-digest diets (keratin, bone, waxes, chitin, and plant material). Current concepts, approaches, techniques, and applications in mammalian research are then discussed, starting with the use of the comparative method to interpret evolutionary adaptations in a phylogenetic context. This is followed by basic concepts for measurement of mass, temperature, and humidity. The use of remote sensing and stable and radioactive isotopes for the study of free-living mammals. The rapid development of molecular biology techniques in mammalian physiology. And the implications of ecological and environmental physiology to mammalian distributions now and in the future. Conclusions and future directions focus on effects of climate change on mammals, the implications of phenotypic plasticity and epigenetics, the expanding role of physiology and ecology in conservation, and the future role of mammals in medical and veterinary research, and in agriculture. An extensive reference list is provided.