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Environmental pollution, stress molecules and wildlife health

The concept of stress as a change in the environment that results in an internal physiological response in living organisms has been recognized and hypothesized to involve important adaptive changes throughout an organism that are necessary to restore homeostasis. Different stressful conditions produce a similar stress response, and the ability of organisms to adapt to stress is regulated by the integration of the nervous, immune and endocrine systems, ultimately played out at the level of cells and molecules. Oxidative stress occurs when highly reactive molecules formed by exposure to toxic agents, including the sun's ultraviolet rays, background ionizing radiation, chemicals in food and the environment, overwhelm the cell's natural defenses against their attack. Free radicals attack other molecules and form molecules that are foreign to cellular machinery, accumulate and eventually impair function by slowing down physiological processes. DNA damage in the form of mutations or genomic instability result from genotoxic stress. The different types of pollutants released to environment by the human activity have been classified in five categories: inorganic and organic pollutants, organo-metallic compounds, radioactive isotopes and gases. These toxic elements enter different ecosystems from varied ways-industrial wastes, human disposal, toxic chemicals, sewage, radio nuclides, organic pollutants, air and trafficked pollutants-and their effects remain for a long period of time.

Recent ecological studies have shown that oxidative status could have a significant impact on fitness components in wild animals, reflect the environmental conditions that animals experience, and can also predict their chances of reproduction and survival in the future in their natural habitat. The individual and population variations in oxidative status and the emphasis of the measurement of markers of oxidative status in conservation programmes, may help investigators with the interpretation of their results and encourage conservation physiologists to use them in order to address the various levels at which anthropogenic environmental change might affect wildlife health and enhance the success of conservation programmes and wildlife management.

Biography

S S Hundal, Professor of Zoology, completed his PhD from the Punjab Agricultural University, Ludhiana, India. He has a distinguished career in teaching, research and outreach activities. His main research interests are effect of environmental contaminants on animal physiology and on bioconversion of agricultural wastes. He has supervised 9 MSc and 2 PhD students. He has published more than 50 research papers; attended as resource person and invited speaker at more than 35 national and international conferences and seminars. He is Reviewer for four international journals and serving on the Editorial Board of two journals.

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