

Biology Presentation

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Concept Of Stress

Stress

Stress refers to physical, chemical, and biological constraints on the productivity of species and on the development of ecosystems. When the exposure to environmental stressors increases or decreases in intensity, ecological responses result. Stressors can be natural environmental factors, or they may result from the activities of humans. Some environmental stressors exert a relatively local influence, while others are regional or global in their scope. Stressors are challenges to the integrity of ecosystems and to the quality of the environment.

Types of Environmental Stressors

- Climate Stressors
- Chemical Stressors
- Anthropogenic Stressors
- Energetic Stress
- Physical Environment Stressors
- Biological Stressors
- Ergonomic Stressors

Stressors can be grouped into the following categories:

- Physical stress refers to brief but intense exposures to kinetic energy. This is a type of ecological disturbance because of its acute, episodic nature. Examples include volcanic eruptions, windstorms, and explosions.
- Wildfire is also a disturbance, during which much of the biomass of an ecosystem is combusted, and the dominant species may be killed.
- Thermal stress occurs when releases of heat influence ecosystems, as happens in the vicinity of natural hot-water vents on the ocean floor, and near industrial discharges of heated water.

Biological Stress

- The body also experiences biological stressors in the form of pathogens, like viruses, bacteria, and parasites, as well as allergens. If you have allergies, you know this well, but allergens are substances in the environment that cause an allergic reaction in the body, ranging from sneezing and watery eyes to a rash to severe allergic reactions that affect breathing. Many people have food allergies and sensitivities – sometimes you may not even know about them – that affect the proper functioning of the digestive system, which in turn affects everything from your skin to your mental health. Check our article on the link between mental health and your gut to learn more about this topic.

Physical Environment Stress

- Physical environmental stressors can include light, color, and energetic vibrations. Too much sunlight or not enough can both serve as stressors. People living in northern latitudes without much sunlight exposure during winter may experience seasonal affective disorder, a condition characterized by sadness and "blues" during these months. Artificial lights, especially blue light and fluorescent lights which are used in many work environments can stress our minds and bodies. Even energy-efficient LED light bulbs, which are often described as the better alternative for the environment, can create stress on the body.

Energetic Stress

- Invisible but very real, energetic stressors can cause disturbances to the body and mind. People walk around with their cell phones at their ear, right by the brain and studies have found that the radio-frequency waves emitted by cell phone radiation caused brain tumors in rats.

Anthropogenic Stress

- Today, most people live in environments that are a far cry from the more natural setting in which humanity arose. While cities have their perks, the constant noise, traffic, movement, and crowding take their toll on the body and mind. Noise pollution can cause serious stress to the body and mind. People who live near car, aircraft, and railway noise experience higher blood sugar and diabetes, increased blood pressure, greater arterial stiffness (a contributor to heart disease), and higher levels of stress hormones. These subtle health changes can happen even when you're exposed to noises during your sleep!

Chemical Stress

- We encounter thousands of chemicals daily: pesticide residue on our food, antibiotics, and hormones fed to food animals, and chemicals in our beauty and household products and even in our carpets and furniture. While they may not cause blatant mental stress – unless you live next door to a chemical factory – these substances physically stress the body. Although the body has natural detoxification processes in the liver and kidneys, these organs can scarcely keep up with so the thousands of chemicals we are exposed to, which means they accumulate in the body, potentially causing long-term health concerns. Just a few hundred years ago, people lived surrounded by nature and ate naturally grown foods. Today, we live in a more industrialized and chemical-saturated world.

Climate Stress

- Environmental stressors can also include weather and climate. Climate stressors are typically longer-term than major disturbance stressors involving weather. Climate stressors can last for a season or can be an overall shift, as in global climate change. A summer heat wave that causes extreme high temperatures in a city whose citizens do not typically use air conditioning units, like Seattle, is a climate stressor, for example.

Darwinian Concept Of Stress

- Why do we get the stress-related diseases we do? Why do some people have flare ups of autoimmune disease, whereas others suffer from melancholic depression during a stressful period in their life? In the present review possible explanations will be given by using different levels of analysis.

Darwinian Concept Of Stress

- First, we explain in evolutionary terms why different organisms adopt different behavioral strategies to cope with stress. It has become clear that natural selection maintains a balance of different traits preserving genes for high aggression (*Hawks*) and low aggression (*Doves*) within a population. The existence of these personality types (Hawks–Doves) is widespread in the animal kingdom, not only between males and females but also within the same gender across species.

Darwinian Concept Of Stress

- Second, proximate (causal) explanations are given for the different stress responses and how they work. Hawks and Doves differ in underlying physiology and these differences are associated with their respective behavioral strategies; for example, bold Hawks preferentially adopt the fight–flight response when establishing a new territory or defending an existing territory, while cautious Doves show the freeze–hide response to adapt to threats in their environment. Thus, adaptive processes that actively maintain stability through change (allostasis) depend on the personality type and the associated stress responses.

Darwinian Concept Of Stress

- Third, we describe how the expression of the various stress responses can result in specific benefits to the organism.
- Fourth, we discuss how the benefits of allostasis and the costs of adaptation (allostatic load) lead to different trade-offs in health and disease, thereby reinforcing a Darwinian concept of stress. Collectively, this provides some explanation of why individuals may differ in their vulnerability to different stress-related diseases and how this relates to the range of personality types, especially aggressive Hawks and non-aggressive Doves in a population.

• **Ways to Reduce the Overall Impact of Environmental Stress**

Reduce Exposure to the Stressor

It might go without saying, but the most important and easiest way to reduce environmental stress involves minimizing your exposure. This is not always possible, but in many cases it is.

Cleanse Your Environment

One of the first steps you can take when choosing a more natural lifestyle is to eliminate products that contain toxic chemicals – such as traditional cleaning products, beauty and body care products – and replacing them with healthier, environmentally-friendly, or organic options.

Thank

You