

2

An Introduction to Body Systems and Psychological Influences on Health

Chapter Summary

The field of health psychology stems from the integration of biological, behavioural, psychological, and social processes in the evolution of complex multicellular organisms. Searching for food, defending from predators, and developing collaborative networks to aid in these and other tasks required the development of complex nervous systems and organs to support the intake and distribution of nutrients. This chapter discusses the key systems involved in the intake and distribution of nutrients and protecting the body from unhelpful substances. To some degree, these systems are capable of self-regulation, though activity is also influenced by the brain in accordance with information about the internal and external environment. Major life challenges can elicit a strong pattern of physiological response called the stress response.

Given its importance in the survival of primitive animals, the stress response developed early in evolution. Snakes, frogs, and fish have well-developed stress responses. Stress-immune system interactions have even been observed in insects. Thus, it appears that humans are “stuck” with these reactions. Unfortunately, modern life challenges do not usually require the kinds of vigorous physical responses that were once necessary, setting the stage for stress-related illness. On the other hand, human beings also have the potential for creative problem-solving and stress management so we are not necessarily prisoners of the “stress of life.”

Essay Topics

1. How does the human central nervous system control physiology and behaviour? (pp. 27–29)
2. How does emotion relate to a stress response? (pp. 33–34)

3. What is psychoneuroimmunology? What is one popular way of studying the impact of stress on immune function? (pp. 39–40)
4. What complications can arise from using illness as a metaphor for “the wages of sin”? What about the portrayal of illness as an invader we need to battle? (p. 42)

Weblinks

<https://www.youtube.com/watch?v=3UAo6V6EgoU>

This video provides an overview of the immune system and what we know about how it protects our bodies from infections.

<http://www.getbodysmart.com/>

GetBodySmart is an animated and interactive eBook about human anatomy and physiology. It is a great learning tool.

<http://placid.skidmore.edu/human/index.php>

Web-HUMAN is a teaching simulation that provides users with access to HUMAN, Tom Coleman’s physiology simulation program. Instructions and a tutorial are included.

<https://www.youtube.com/watch?v=s93ywgFa6CM>

What Is Stress? This animated video describes the nature of stress, the stress response, and the effects of stress and relaxation on our bodies.

Glossary

Adrenal glands Two small glands located near the kidneys that release a number of hormones involved in the stress response.

Autonomic nervous system The portion of the peripheral nervous system involved in control of organs, heart and lungs, that influence muscle activity and behaviour in different organs..

Cortisol A key adrenal hormone that increases blood glucose and has numerous effects on metabolism and immune function.

Endocrine system Glands that release hormones into the bloodstream to influence different aspects of physiology.

Immune system A system involving organs and circulating blood cells devoted primarily to protecting the body from foreign substances and infection.

Inflammation A coordinated response to injury or infection involving blood vessel dilation and migration of fluid and immune cells to seal the area and speed healing.

Parasympathetic nervous system The portion of the autonomic nervous system that usually reduces cardiac and smooth muscle activity.

Peripheral nervous system Neurons that lie outside the central nervous system (brain and spinal cord) that allow the brain to influence physiology.

Somatic nervous system The portion of the peripheral nervous system involved in control of voluntary, striated muscle activity.

Sympathetic nervous system The portion of the autonomic nervous system that often stimulates cardiac and smooth muscle activity.