

CHAPTER 1

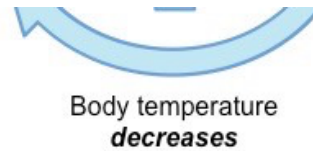
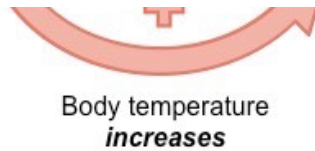
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MAJOR THEMES OF ANATOMY AND PHYSIOLOGY

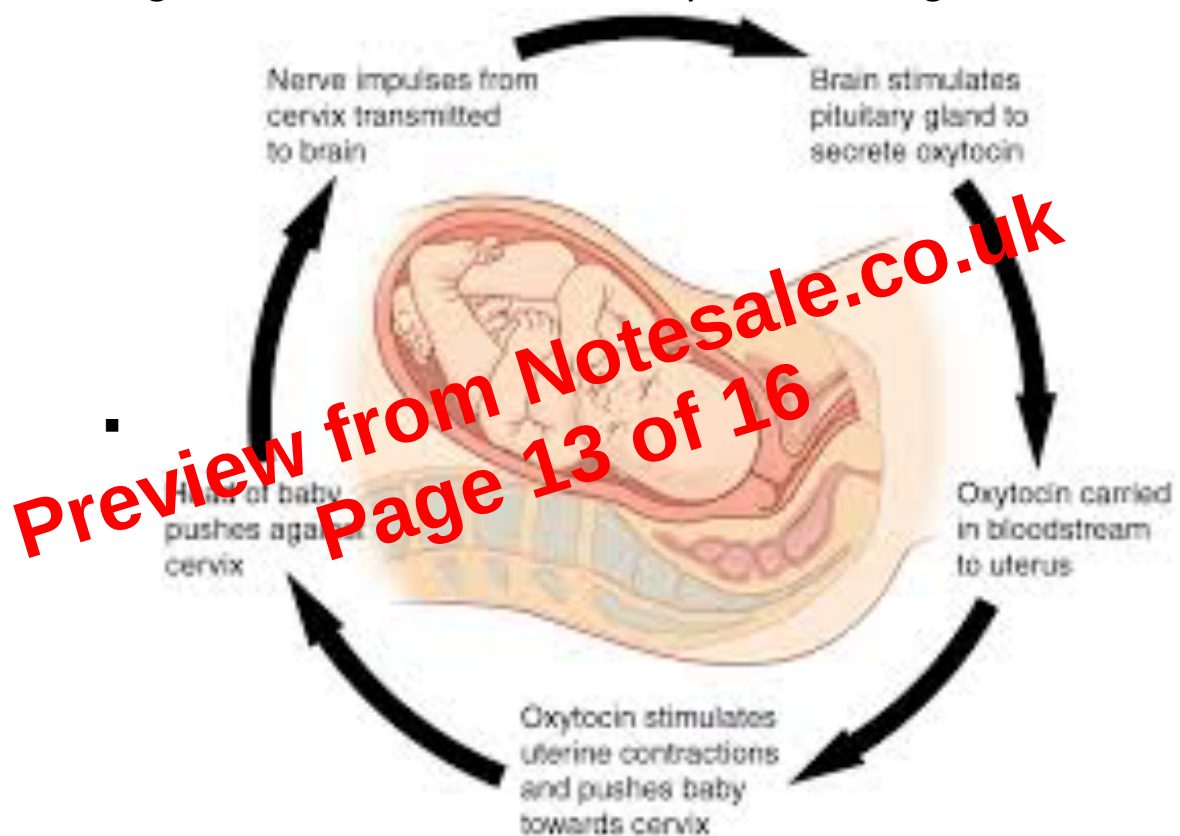
1.1 The scope of Anatomy and Physiology

- **Anatomy** is the study of structure, and **physiology** is the study of function.
 - These approaches are complementary and never entirely separable
 - Together, they form the bedrock of the health sciences
- Physiology lends meaning to anatomy --> Anatomy makes physiology possible
- **There are several ways to examine the structure of the human body**
 - Simplest: **Inspection**: simply looking at the body's appearance, as in performing a physical exam from surface appearance.
 - **Palpation**: Feeling a structure with the hands
 - **Auscultation**: Listening to the natural sounds made by the body, such as heart sounds
 - **Percussion**: the examiner taps on the body, feels for abnormal resistance, as in checking for fluid in the lungs
 - **Dissection**: Carefully cutting and separating tissues to reveal their relationships
 - Cadaver: dead human body
 - **Comparative anatomy**: The study of multiple species in order to examine similarities and trends.
 - **Exploratory Surgery**: Opening the body and taking a look inside to see what is going on
 - **Medical imaging**: Methods of viewing the inside of the body without surgery
 - **Radiology**: Branch of medicine concerned with imagery
 - **Gross anatomy**: Structures that can be seen with the naked eye
 - **Histopathology**: the microscopic examination of tissues for signs of disease.
 - **Cytology**: The study of the structure and function of individual cells.
 - **Ultrastructure**: refers to fine detail, down to the molecular level, revealed by electron microscopy
 - **Comparative physiology**: The study of how different species have solved problems of survival and reproduction.



- **Positive feedback and Rapid Change**

- **Positive feedback** is a self-amplifying cycle in which a physiological change leads to further change, rather than producing the corrective effects of negative feedback.
- Normal way of producing a rapid change
- Frequently, positive feedback is a harmful or even life-threatening process. It can change the internal state of the body to something far from its homeostatic state.



- **Gradients and flow**

- Matter and energy tend to flow down gradients
- **A physiological gradient:** a difference in chemical concentration, electrical potential, or pressure between one point and another.
 - **Down the gradient:** If matter or energy moves from the point where the concentration is higher to the point where it is lower (does not require energy)
 - **Up the gradient:** Lower --> higher concentration (does require energy)