35 Control Mechanisms of the Circulatory System

Introduction: systemic pressure and flow

1. What are some of the factors that determine arterial blood pressure?
2. What are normal values for arterial blood pressure?
3. Which species have much higher blood pressures and why might this occur?

Nervous control

1. Describe the autonomic innervation of the cardiovascular system, the transmitters, cotransmitters, and receptors involved.
2. Is sympathetic innervation greatest in arterioles or conduit vessels?
3. Explain various mechanisms for active vasodilation.

Neurohumoral regulating mechanisms

1. What determines classification of endogenous compounds as endocrines, paracrines, or autocrines?
2. Describe the renin–angiotensin–aldosterone system and its role in control of the circulation.
3. Under normal conditions, what is the major role of vasopressin (antidiuretic hormone, ADH) in the body and what regulates its release?
4. Describe the major eicosanoid pathways.

Reflex control mechanisms

1. Describe the central nervous system pathways for the arterial baroreflex, cardiopulmonary reflexes, and the arterial chemoreflex.
2. Why are the carotid sinus and aortic nerves called buffer nerves?
3. What are the baroreflex responses to an increase and decrease in arterial pressure?
4. Where are the chemoreceptors located and what are the cardiovascular responses to chemoreceptor activation?
5. Which cardiovascular control systems are involved in compensatory responses to progressive hemorrhage and what are the neural and humoral responses?

Long-term regulation of blood pressure

1. Are arterial baroreflexes more important for short-term or long-term regulation of blood pressure?
2. What is the overall goal of integrated cardiovascular regulatory mechanisms?