Chapter 16  Performance-Enhancing Drugs

Case Study 1
A high school baseball athlete reports to his athletic trainer complaining of a rapid and strong heartbeat that the athletic trainer determines to be palpitations. The athlete’s medical history is unremarkable and he denies any drug use; however, the athletic trainer notes that his pupils appear dilated and he seems to be very restless. The athletic trainer also notes that the athlete has lost weight since the beginning of the season. Which drug classification might the athletic trainer suspect the athlete is using? Given his setting and recent trends in performance-enhancing drug use, which drug is he most likely using?

Answer: The athletic trainer should suspect stimulant use, most likely amphetamine use. Recent trends would suggest the source of the amphetamine is Adderall. Although the athlete is not being treated for attention deficit/hyperactivity disorder (ADHD) and does not have a prescription for Adderall, it is commonly prescribed and is much easier to obtain from friends and teammates who have a prescription or purchased on the street.

Case Study 2
A collegiate distance runner has asked her athletic trainer for advice regarding caffeine use. She states that she rarely ingests coffee, tea, or soda but is considering using energy drinks prior to her races and wants her athletic trainer’s opinion. What should his response be?

Answer: The athletic trainer should inform the athlete that, although there are individual responses, it is possible that the caffeine could enhance her performance, either through enhanced fat use and glycogen sparing or through a masking of fatigue. The athletic trainer should also make sure she understands that she could experience side effects, particularly because she does not habitually ingest caffeine, and that these side effects could be more severe with higher doses. Finally, the athletic trainer should advise her to the potential for drug testing and the restrictions regarding caffeine use.

Exam Questions
1. Which of the following statements is correct regarding caffeine use in athletes?
   a. Caffeine is banned by the International Olympic Committee (IOC), and the test is considered positive if the urine concentration exceeds 15 μg/mL.
   b. Caffeine is banned by the National Collegiate Athletic Association (NCAA), and the test is considered positive if the urine concentration exceeds 15 μg/mL.
   c. Caffeine is banned by the IOC, and the test is considered positive if any caffeine is detected in the urine.
   d. The World Anti-Doping Agency (WADA) includes caffeine on its list of banned substances.

2. β-blockers are banned by the NCAA for athletes participating in:
   a. Golf.
   b. Rifle competitions.
   c. Tennis.
   d. Basketball.
3. Adverse effects of anabolic-androgenic steroids in female athletes include:
   a. Acromegaly, deepening of the voice, and glaucoma.
   b. **Hirsutism, acne, and decreased breast mass.**
   c. Bronchoconstriction, hirsutism, and dehydration.
   d. Weight gain, cushingoid appearance, and avascular necrosis.

4. Studies indicate that the ergogenic effects of caffeine are most likely the result of:
   a. **Central nervous system stimulation.**
   b. Increased strength of muscle contraction.
   c. Glycogen sparing.
   d. The diuretic effect.

5. Increased blood viscosity and the resultant increase in risk of myocardial infarction and stroke are associated with the use of:
   a. Human growth hormone.
   b. Thiazide diuretics.
   c. β₂-receptor agonists.
   d. **Erythropoietin.**

6. Which of the following statements is correct regarding the ergogenic effects of β₂-receptor agonists?
   a. Inhaled β₂-receptor agonists appear to be more effective than oral agents.
   b. β₂-receptor agonists reduce heart rate and decrease tremor, so they are banned in precision sports.
   c. **The doses of β₂-receptor agonists needed to produce ergogenic effects are higher than the doses used to treat asthma.**
   d. Therapeutic use exemptions can be obtained for use of clenbuterol in athletes with asthma.

7. Which of the following classes of ergogenic agents are classified as stimulants?
   a. Diuretics.
   b. β₂-receptor agonists.
   c. Anabolic-androgenic steroids.
   d. **Amphetamines.**

8. Which of the following is an adverse effect of thiazide diuretics?
   a. **Photosensitivity.**
   b. Hypertension.
   c. Insomnia.
   d. Acne.

9. Use of the nasal decongestant pseudoephedrine is:
   a. Completely banned by the NCAA.
   b. Banned by the NCAA at large doses.
   c. **Banned by the WADA at large doses.**
   d. Completely banned by the WADA.
10. Aggressive behavior, mood changes, and other psychiatric events are possible adverse effects of:
   b. β2-receptor agonists.
   c. Anabolic-androgenic steroids.
   d. Human growth hormone.