Medical Marijuana: Pharmacologic and Regulatory Considerations

EDUCATIONAL OBJECTIVES

Upon completion of this activity, participants will be better able to:

1. List the potential therapeutic applications of marijuana;
2. Describe the effects of marijuana on the central nervous system and other organ systems;
3. Recognize the advantages and disadvantages of different natural and synthetic cannabinoids and routes of administration;
4. Describe the differences and similarities among states that permit marijuana to be used for medical purposes; and
5. Analyze the controversy between state and federal law as it applies to marijuana and the historical context of regulation.

Post-Test/Rationale:

1. Which of the following is a non-psychoactive cannabinoid with potential medical applications?
   
   A. delta-9-tetrahydrocannabinol (THC)  
   B. delta-8-THC  
   C. Cannabidiol ***  
   D. All known cannabinoids are psychoactive

**Correct Answer: C**

*Rationale:* The 2 most abundant and well known phytocannabinoids are delta-9-THC and cannabidiol (CBD). Delta-9-THC and the closely related but less potent delta-8-THC are believed to be the principal psychotomimetic compounds found in Cannabis. CBD is a non-psychoactive compound.

2. Which of the following substances is an endogenous ligand for the cannabinoid receptor?
   
   A. Enkephalin  
   B. Anandamide ***  
   C. Prostaglandin  
   D. There is no known endogenous ligand

**Correct Answer: B**

*Rationale:* Several endogenous substances are believed to bind to cannabinoid receptors, but the 2 best-characterized endocannabinoids are anandamide and 2-arachidonoylglycerol.

3. Which statement about the medical use of marijuana is INCORRECT?
   
   A. Marijuana has been proposed for use as a pain reliever
B. There are many large, controlled clinical trials that consistently demonstrate the efficacy of marijuana ***
C. Synthetic drugs targeting cannabinoid signaling are under development
D. Smoked marijuana has a faster onset of action than oral administration

Correct Answer: B
Rationale: While there are numerous individual reports of the therapeutic uses of marijuana that are promising, meta-analyses of most of the published research studies have shown variable, inconsistent, and conflicting results and modest to weak effects on a number of disease states; conclusions are also limited by short-term investigations, small sample sizes, and subjective effects. A recent review by a medical researcher concluded that the therapeutic areas with the best potential for exploitation of Cannabis-related medicinal agents were pain, epilepsy, feeding disorders, multiple sclerosis, and glaucoma. Synthetic compounds affecting discrete pharmacodynamic targets within the endocannabinoid system are currently under development. The onset of psychoactive and other pharmacologic effects of marijuana is rapid after smoking but much slower and variable after oral intake.

4. Which of the following is NOT a side effect of medical marijuana?
   A. Drowsiness
   B. Difficulty concentrating
   C. Dry mouth
   D. Bradycardia ***

Correct Answer: D
Rationale: Acute effects of marijuana are consistent with its central nervous system depressant activity and include dizziness, fatigue, somnolence, euphoria, disorientation, drowsiness, problems with balance, and dry mouth. Deficits in memory, judgment, attention, coordination, and perception (such as time and color) have also been reported along with anxiety, dysphoria, and psychosis. In addition to CNS effects, cardiovascular (tachycardia, palpitations, paroxysmal atrial fibrillation) and respiratory (cough, increased carboxyhemoglobin, bronchitis [when smoked]) effects have been described.

5. A synthetic form of delta-9-tetrahydrocannabinol is approved by the U.S. Food and Drug Administration for the treatment of:
   A. Nausea and vomiting associated with cancer chemotherapy ***
   B. Pain
   C. Glaucoma
   D. There are no FDA-approved cannabinoid drugs at the present time

Correct Answer: A
Rationale: Dronabinol is a synthetic form of delta-9-tetrahydrocannabinol that was approved by the U.S. Food and Drug Administration in 1985. It is approved for the relief of nausea and vomiting associated with cancer chemotherapy and to assist with the loss of appetite in patients with HIV.
6. Which of the following is INCORRECT concerning the Marijuana Tax Act, which first made marijuana use illegal?

A. Congress responded to pressure exerted by the American Medical Association to prohibit marijuana

B. Congress responded to public fears about marijuana’s role in promoting crime and immoral behavior, especially by minorities

C. At the time of the law’s enactment, marijuana was listed in the *U.S. Pharmacopeia*

D. It was enacted in 1937

**Correct Answer:** A

**Rationale:** Fears and associated political pressures about the use of marijuana resulted in the passage of the Marijuana Tax Act in 1937. Concerns and fears about marijuana use were related to its use by immigrant Mexican laborers and African-American musicians, and the fears became more widespread at the time of the Great Depression, likely fueled by economic concerns. The Act was passed with little debate or public attention, despite the opposition by the American Medical Association. From 1850 to 1941, cannabis was listed in the *U.S. Pharmacopeia* and *National Formulary*.

7. How many states approved the use of medical marijuana?

A. 4

B. 16

C. 25

D. 47

**Correct Answer:** C

**Rationale:** Although still illegal under the Federal Controlled Substances Act, some states, beginning with California in 1996, enacted laws that permit the sale, use, possession and, in some cases, cultivation, of marijuana for medical purpose at the time this article was written in 2016. In June 2016, Ohio became the 25th state (plus the District of Columbia) to enact a medical marijuana law.

8. Which of the following is correct with respect to state medical marijuana programs?

A. Limits on the amount a patient may obtain vary according to the intended use

B. All states follow the same guidelines for approved indications

C. In at least one state, only a pharmacist may dispense medical marijuana

D. States permit retail purchases of marijuana, but no state permits patients to cultivate their own plants

**Correct Answer:** C

**Rationale:** There is a lack of uniformity among the different states with medical marijuana programs regarding factors such as medical conditions qualifying for medical marijuana; the amount of marijuana that can be purchased or possessed; the requirement for registration; whether the patient can grow their own marijuana; residency requirements; and the role of caregivers. Some states permit the sale, use, possession, and, in some cases, cultivation, of
marijuana for medical purposes. Connecticut requires a permit to operate a marijuana dispensary and all registered dispensaries must be owned and operated by a licensed pharmacist who is required to document all orders in the state’s prescription management program database.

9. Marijuana and its components are currently regulated by the Drug Enforcement Administration in what schedule?

A. Schedule I ***
B. Schedule II
C. Schedule I in most states, but Schedule II in states with medical marijuana programs
D. They are not in a Schedule

Correct Answer: A
Rationale: Despite the existence of state medical marijuana programs, under the Federal Controlled Substances Act, marijuana is classified as a Schedule I drug.

10. The position of the Drug Enforcement Administration on medical marijuana can be best described as:

A. Supportive, but awaiting Congressional action
B. Supportive, but waiting for the rest of the states to indicate their support
C. Unsupportive, suggesting that it has no medical value and that the programs are a means to achieve legalization ***
D. Neutral

Correct Answer: C
Rationale: The Drug Enforcement Administration (DEA) supports the classification of marijuana as a Schedule I controlled substance. In a lengthy report published in 2013, the DEA’s stated position on marijuana is that: “(m)arijuana is properly categorized under Schedule I of the Controlled Substances Act...The clear weight of the currently available evidence supports this classification, including evidence that smoked marijuana has a high potential for abuse, has no accepted medicinal value in treatment in the United States, and evidence that there is a general lack of accepted safety for its use even under medical supervision.” Moreover, the DEA maintains that “(t)he proposition that smoked marijuana is ‘medicine’ is, in sum, false-trickery used by those promoting wholesale legalization.”