Lecture 18 - Drugs of Abuse

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Goals & Objectives

The Pharmacy Technician will have a basic understanding of the following:

1. Term Drug of Abuse and Addiction
2. Drug Effects
3. Medical Theory
4. Opiate Dependence/Treatment
5. Other specific Drugs of Abuse
6. Terms used in this CE offering

Many theories exist today as to why addiction occurs, from genetic biological predisposition to environmental determinants such as stress factors or peer pressure. Although there is great importance in an individual understanding how they may have become addicted, this topic will not be discussed in this lecture as emphasis on opiate addiction and other types of addictions will be covered.

As a Pharmacy Technician, it is important to understand that the problem of drug abuse is not only limited to specific customers and patients. Drug addiction is also found at a higher rate in the health care setting. Whether this is due to availability or ignorance, two out of ten employees in the health care setting will become addicted to an illegal substance sometime in their lives.

Terminology

To greatly enhance one's ability to understand addiction and the ramification of addiction, there are several terms that need to be defined:

**Addiction:** A person’s loss of control over use of a chemical substance and a strong compulsion to obtain and use the substance.

**Tolerance:** Reduced effect from the use of a substance resulting in higher doses and repeated uses in order to obtain the same effect.

**Substance misuse** refers to the improper use of drugs and other chemical substances that have been prescribed or acquired legitimately. In most cases one becomes addicted to this drug or chemical substance out of ignorance rather than consciously.
Substance abuse refers to the socially unacceptable use of drugs or other chemical substance for non-therapeutic purposes. In this case the individual makes a choice to use drugs at inappropriate times or places. Generally this individual is harmful to themselves or others.

Habituation refers a pattern of use in which a person feels better when using a substance than when not using it. In this case, the individual can abruptly stop, but will experience physical or psychological effects. An example would be the coffee drinker or cigarette smoker.

Substance Dependence refers to the individual who is powerless to control him or herself. In this case the individual has difficulty functioning unless under the influence of a drug or chemical substance. This is the individual who understands the consequences of using, but fails to modify their use of a drug or chemical substance.

Psychological Dependence is a compulsive need to experience the effects produced by a drug or chemical substance. This can be a moderate desire or an overwhelming compulsion that supersedes all other sources of satisfaction that would include family, friends and work. Psychological dependence does not mean an individual is also physically dependent.

Physical Dependence occurs when one or more physiological functions of the body become dependent on the presence of a particular drug or chemical substance. This generally occurs after prolonged use and abrupt discontinuation of a drug or chemical substance. Severity of withdrawal symptoms is dependent on drug/chemical substance used and length of time used.
**Drug Effects**

Many different drugs affect the nervous system and thus can alter one’s mood or emotional state. These drugs generally work two ways. 1) They impact the *limbic system* and they 2) increase or decrease the action of specific neurotransmitters such as *serotonin* and *dopamine*.

In the human body there are hundreds of neurotransmitters that are like messengers in the respect they send information to millions of neurons in the brain that stimulate or inhibit cell activity. The homeostasis of these messengers, if left intact, allow thought processes and more importantly, emotions to function normally. Sometimes, neurotransmitters, whether by natural cause or with the introduction of a chemical substance, such as opiates, will cause an imbalance of neurotransmitters and thus causing neuronal excitation. This leads to changes in mood as well as one’s emotional state.

In the case of most drugs of abuse, the increase or decrease of neurotransmitters cause the state of “euphoria” or an overwhelming feeling of wellness. This effect, is the reason most individuals continue onward with their need for their drug of choice.

Unfortunately, the body will try to compensate and shut down or increase production of neurotransmitters causing “*system failure.*” When this occurs, tolerance becomes an issue as more drug is needed to reach the unattainable first euphoric effect. In the process, psychological as well as physical dependence becomes an issue.
Several theories exist today concerning addiction:

1. **Medical Theory**
   
a. essentially informs us that addiction is a disease
   - we are powerless over

   b. that there is no intent to become dependent on drugs
   - in high school we do not see addiction as a career choice

   c. addiction is related to brain chemistry dysfunction
   - too little or too much neurotransmitters, etc.

   d. disease such as addiction can be inherited

   e. more importantly, once an addict always an addict

2. **Rational Recovery**
   
a. addiction is not a disease

   b. addiction is a learned behavior

   c. no universal characteristic exist
   - not all addicts are the same
     1. no individual patterns
     2. derivation of problem varies
     3. problem itself varies
     4. outcome varies

   d. addiction can be cured
Road to Addiction

Whether due to potential predisposition to a chemical substance, peer pressure or some other reason, the beginning of an addiction is generally an unexceptional event. The offering of a chemical substance or drug can be from a physician writing a prescription for a disabling injury such as a pain medication or an anti-anxiety agent, to the offering of an illicit drug by a friend or supposed friend.

The initial high or *euphoria* is the reason an individual will find joy in the taking of this medication or chemical substance. The positive effect occurs in which an individual feels that all is well and in essence, they can do anything. The feeling of wellness embodies the individual into believing the chemical substance as a mood elevator or magic pill.

The continuation in the taking of this chemical substance or drug becomes an obsession in the need to achieve the initial euphoric effect. In most cases, this never occurs and the euphoria becomes less-and-less until there is no euphoria at all. When this occurs, both psychological and physical dependence becomes an issue, as well as, tolerance.

With ever increasing doses, the individual takes this drug just to function on a normal basis. In time, the drug hinders the user to even function normally. Without necessary help or intervention, the individual loses all interest in life with the need of this chemical substance at any cost. For some, death occurs due to the individual’s inability to handle the ever-increasing dosage required.

Drugs of Abuse – Opiates

Pharmacology: Opiates bind to receptors sites meant for Endorphins

Opiate agonists involve a group of naturally occurring, semi-synthetic and synthetic drugs that stimulate opiate receptor sites.

*Opiates* are derived from the dried ‘milk’ of the opium poppy

In addition to the effects of the drug itself, street drugs may have additives that do not readily dissolve and when injected, result in clogging the blood vessels that lead to the lungs, liver, kidneys, or brain. This can cause infection of vital organs and death.

Without any type of federal regulation, opium in some form was the constituent of many cough/cold mixtures in the late 1800’s and early 1900’s. In some cases you would find more than one narcotic in the same recipe:

Sample Cough Syrup

\[
\begin{align*}
\text{Rx} & \quad \text{Syrup of tar} \quad \ldots \ldots \ldots \ldots \ldots \ldots \ldots \text{fl. oz. 64} \\
& \quad \text{Syrup of wild cherry} \quad \ldots \ldots \ldots \ldots \ldots \text{fl. oz. 45} \\
& \quad \text{Tincture Opium Camphorate} \quad \ldots \ldots \ldots \text{fl. oz. 8} \\
& \quad \text{Fluid extract of lobella} \quad \ldots \ldots \ldots \text{fl. dr. 6} \\
& \quad \text{Heroin} \quad \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \text{gr 1/2} \\
& \quad \text{Fluid extract of Ipecac} \quad \ldots \ldots \ldots \text{fl. dr. 4} \\
\end{align*}
\]

- The Standard Formulary 1904
*Papaver Somniferum* which contains morphine and codeine, both of which are effective painkillers and are used for other medical uses such as cough (antitussive) and diarrhea.

Opioid powders can be swallowed or dissolved in water and injected, particularly into a vein that maximizes the effect. Heroin is sometimes sniffed, or the fumes from the heated powder is inhaled (this method is sometimes called *'chasing the dragon'*).

Opiate dependency is recognized as a central nervous system disorder, caused by continuous opiate intake. After prolonged opiate use, the nerve cells in the brain, which would otherwise produce endogenous opiates (natural painkillers, or endorphins), cease to function normally. The body stops producing endorphins because it is receiving opiates instead. The degeneration of these nerve cells results in the user's physical dependency to an external supply of opiates. Abrupt or sudden abstinence from opiates induces yet another traumatic disorder - withdrawal syndrome.

**Heroin**

Heroin is a concentrated form extract of opium. When sold at street level it is likely to have been diluted or cut with a variety of similar powders. The main diluent is lactose. However, the practice of using other substances such as caffeine, flour and talcum powder is a constant danger to users. Street names associated with heroin include "smack," "H," "skag," and "junk." Other names may refer to types of heroin produced in a specific geographical area, such as "Mexican black tar."

The short-term effects of heroin abuse appear soon after a single dose and disappear in a few hours. After an injection of heroin, the user reports feeling a surge of euphoria ("rush") accompanied by a warm flushing of the skin, a dry mouth, and heavy extremities. Following this initial euphoria, the user goes "on the nod," an alternately wakeful and drowsy state. Mental functioning becomes clouded due to the depression of the central nervous system.

Long-term effects of heroin include collapsed veins, infection of the heart lining and valves, abscesses, cellulitis, and liver disease. Pulmonary complications, including various types of pneumonia, may result from the poor health condition of the abuser, as well as from heroin's depressing effects on respiration.

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**Fentanyl**

Fentanyl is a synthetic opiate agonist available as an injection, intrabuccal and for transdermal application. The action of Fentanyl is more prompt and less prolonged than other opiate agonists. Fentanyl is used pre-operatively during surgery and also postoperatively for its analgesic effect. Although pharmacologically similar to meperidine and morphine, Fentanyl exhibits little hypnotic activity and histamine release rarely occurs.
**Oral Opiates**

The ingestion of oral opiates such as oxycodone or hydrocodone is of great concern in the health care system as this is the number one type of addiction associated with health care workers. Although taken orally, tolerance does develop and higher doses are needed. Most opiate drugs of this type come in combination with another drug such as acetylsalicylic acid (Aspirin) or acetaminophen. The ingestion of large quantities of acetaminophen does cause liver damage, as well as, damaging effects of the opiate drug itself.

Although not an opiate, *Nicotine* is one of the most toxic drugs available. It is readily absorbed through skin and mucous membranes. Much of the nicotine in cigars and cigarettes is vaporized during burning, but enough still remains to cause significant toxicity in the lungs and in organs affected by nicotine in the blood. Nicotine is also highly addictive (as addictive as heroin and alcohol, measured by the number of smokers who become dependent and by the difficulty in stopping the use of the drug).
Opioid Road to Addiction

Initial Dose →

a. may be unpleasant with sweating, itching, nausea and vomiting
b. will feel analgesic affect
c. will feel euphoria or a feeling of wellness

Repeated Doses →

a. user feels fewer unpleasant side effects
b. each dose gives a drowsy relaxation
   - relief from worry
   - relief from all problems

Tolerance develops →

a. need more drug to get same effect
b. become psychologically and physically addicted
   - begin to want more

c. euphoria disappears and is replaced with the need to just function

Withdrawal →

a. abrupt withdrawal
   - profuse sweating
   - anxiety, depression, restlessness
   - insomnia and irritability
   - nausea / vomiting
   - abdominal cramps, chills, convulsions

b. symptoms peak 36 to 48 hours

c. symptoms subside next 5 to 10 days
   - actually takes months to years before an individual feels “normal”
Opiate Dependence Treatment

Several methods exist today in the treatment of Opiate dependence. One method would be detoxification (detox), which is the total discontinuation of the drug or chemical of abuse. Generally in detoxification different drugs are used to alleviate symptoms of withdrawal. These drugs may include: hydrocodone, propoxyphene, chlordiazepoxide, Phenobarbital and clonidine. A successful detoxification and removal of all drugs associated with the dependence and in detox treatment generally takes two weeks to complete.

The second method of opiate dependence is methadone maintenance. Methadone, a synthetic opiate derivative, serves as a crutch in allowing the individual a drug that will prevent withdrawals. Methadone is used because it reduces craving, does not cause a euphoric effect as other opiates and is long acting to allow once-a-dosing monitored dosing.

Other methods after detoxification in the treatment of opiate dependence would be the use of a narcotic antagonist such as Naltrexone. Naltrexone is used to help an addict remain drug free by causing immediate withdrawal effects should an individual relapse or again begin taking an opiate.

Another method used after detoxification is abstinence drug-free programs such as Narcotic Anonymous (NA) and Rational Recovery (RR). In NA, an individual attends meetings to help them cope with addiction problems. These meetings are open to peers that share the same concerns and issues. NA believes that addiction is a disease state and that once an addict, always an addict applies. A strict 12-step program is followed as well as peer support.

Rational Recovery (RR) believes that addiction is not a disease but rather a learned behavior that can be unlearned. It is up to the individual to overcome his or her own addiction as addiction can be cured. Both programs offer different theories in the treatment of an addiction. Obviously, the best program would be the one that keeps an individual from relapsing.
Central Nervous System Depressant Abuse

The most widely abused drugs come in two classes one of which is sedative-hypnotics and the other alcohol.

Sedative/hypnotic Agents

Sedatives are being prescribed more frequently for individuals who suffer from insomnia or have trouble sleeping. This is especially true in the geriatric population. The problem with sedatives is that long-term use generally leads to addiction.

An example of an anti-anxiety and sedative class of drugs is the benzodiazepines and barbiturates. Too frequently these drugs are used to control anxiety or insomnia with inadequate monitoring of dosing thus dosing and frequency increases. In some case dependency becomes an issue where normal functioning is no longer possible for the individual taking these medications.

To add concern, the combination of alcohol and sedative/hypnotics or opiates oftentimes results in acute poisoning at moderate doses. Treatment involves detoxification as with opiate detoxification, but withdrawal can take up to months rather than weeks.

Alcohol Abuse

Ethanol or alcohol is the oldest psychoactive drug known. In the Unites States, two out of three individuals drink alcoholic beverages with up to twenty million drink enough to impair their ability to function. Fourteen million individuals are considered alcohol dependent.

Defining alcoholism is difficult mainly because society has different standards as far as how much consumption is too much. General criteria would be if alcohol interferes with an individual's personal life, health and the need for alcohol overrides the need for other social activities.

Problems associated with alcohol would include, but not limited to, acute alcohol intoxication, alcohol dependence, acute alcohol withdrawal syndrome, medical complications and fetal alcohol syndrome.
Fetal Alcohol Syndrome (FAS) is a set of birth defects caused by maternal consumption of alcohol during pregnancy. At birth, children with FAS can be recognized by growth deficiency and a characteristic set of minor facial traits that tend to become more normal as the child matures. Less evident at birth—but far more devastating to FAS children and their families—are the lifelong effects of alcohol-induced damage to the developing brain.

FAS is considered the most common nonhereditary cause of mental retardation. In addition to deficits in general intellectual functioning, individuals with FAS often demonstrate difficulties with learning, memory, attention, and problem solving as well as problems with mental health and social interactions. Thus these individuals and their families face persistent hardships in virtually every aspect of life.

Antagonist such as disulfiram is used in the treatment of alcohol dependency. The mechanism of Action (MOA) is to inhibit the enzyme aldehyde dehydrogenase, thus causing an increase of acetaldehyde in the body. This leads to flushing, headache, dizziness, nausea and vomiting.

For many individuals, the awareness that alcohol is a drug will help them better understand the potential health risks associated in its overuse. Alcohol effects depends on several variables which include the Blood Alcohol Concentration (BAC), patient level of tolerance and the ability of the body to metabolize and eliminate the consumed alcohol.

Alcohol withdrawal with physical dependence begins with nausea, mild tremors, sweating, disorientation, hallucinations and nightmares. Further withdrawal without treatment can lead to generalized tonic-clonic seizures during the first 12 to 48 hours. The most common manifestation delirium tremens or dt’s occurs in five percent of patients in withdrawal. In this case confusion, disorientation, fever, tachycardia, sweating, hypertension and tremors exist. DT’s can occur 2 to 5 days after last dose of alcohol and last one to six days without treatment.

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\text{Ethanol} \rightarrow \text{Acetaldehyde} \rightarrow \text{Acetate}
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\text{OH Dehydrogenase} \quad \text{Aldehyde Dehydrogenase}
\]

\[
\text{Oxidation and Elimination}
\]
Some other specific Drugs of Abuse

Methamphetamine

Pharmacology: release high levels of neurotransmitter dopamine

*Methamphetamine* is an addictive stimulant drug that strongly activates certain systems in the brain. Methamphetamine is closely related chemically to amphetamine, but the central nervous system effects of methamphetamine are greater. Both drugs have some medical uses, primarily in the treatment of obesity, but their therapeutic use is limited.

Street methamphetamine is referred to by many names, such as "speed," "meth," and "chalk." Methamphetamine hydrochloride, clear chunky crystals resembling ice, which can be inhaled by smoking, is referred to as "ice," "crystal," and "glass."

Methamphetamine releases high levels of the neurotransmitter dopamine, which stimulates brain cells, enhancing mood and body movement. It also appears to have a neurotoxic effect, damaging brain cells that contain dopamine and serotonin, another neurotransmitter. Over time, methamphetamine appears to cause reduced levels of dopamine, which can result in symptoms like those of Parkinson's disease, a severe movement disorder.

Methamphetamine is taken orally or intranasally (snorting the powder), by intravenous injection, and by smoking. Immediately after smoking or intravenous injection, the methamphetamine user experiences an intense sensation, called a "rush" or "flash," that lasts only a few minutes and is described as extremely pleasurable. Oral or intranasal use produces euphoria - a high, but not a rush. Users may become addicted quickly, and use it with increasing frequency and in increasing doses.

The central nervous system (CNS) actions that result from taking even small amounts of methamphetamine include increased wakefulness, increased physical activity, decreased appetite, increased respiration, hyperthermia, and euphoria. Other CNS effects include irritability, insomnia, confusion, tremors, convulsions, anxiety, paranoia, and aggressiveness. Hyperthermia and convulsions can result in death.

Methamphetamine causes increased heart rate and blood pressure and can cause irreversible damage to blood vessels in the brain, producing strokes. Other effects of methamphetamine include respiratory problems, irregular heartbeat, and extreme anorexia. Its use can result in cardiovascular collapse and death.
Cocaine

Pharmacology: prevents the synaptic uptake of the neurotransmitter dopamine

*Cocaine* is a powerfully addictive drug of abuse. Individuals who have tried cocaine have described the experience as a powerful high that gave them a feeling of supremacy. However, once someone starts taking cocaine, one cannot predict or control the extent to which he or she will continue to use the drug. The major ways of taking cocaine are sniffing or snorting, injecting, and smoking (including free-base and crack cocaine).

Health risks exist regardless of whether cocaine is inhaled (snorted), injected, or smoked. However, it appears that compulsive cocaine use may develop even more rapidly if the substance is smoked rather than snorted. Smoking allows extremely high doses of cocaine to reach the brain very quickly and results in an intense and immediate high. The injecting drug user is also at risk for acquiring or transmitting HIV infection/AIDS if needles or other injection equipment are shared.

Physical effects of cocaine use include constricted peripheral blood vessels, dilated pupils, and increased body temperature, heart rate, and blood pressure. Some cocaine users report feelings of restlessness, irritability, and anxiety, both while using and between periods of use. An appreciable tolerance to the high may be developed, and many addicts report that they seek but fail to achieve as much pleasure as they did from their first exposure.

High doses of cocaine and/or prolonged use can trigger paranoia. Smoking crack cocaine can produce particularly aggressive paranoid behavior in users. When addicted individuals stop using cocaine, they may become depressed. This depression causes users to continue to use the drug to alleviate their depression.

Prolonged cocaine snorting can result in ulceration of the mucous membrane of the nose and can damage the nasal septum enough to cause it to collapse. Cocaine-related deaths are often a result of cardiac arrest or seizures followed by respiratory arrest.

When people mix cocaine and alcohol, they are compounding the danger each drug poses and unknowingly causing a complex chemical interaction within their bodies. Researchers have found that the human liver combines cocaine and alcohol to manufacture a third substance, cocaethylene, which intensifies cocaine’s euphoric effects and possibly increases the risk of sudden death.
**Ecstasy**

Pharmacology: increase release of dopamine and serotonin

*MDMA*, called "Adam," "ecstasy," or "XTC" on the street, is a synthetic, psychoactive (mind-altering) drug with hallucinogenic and amphetamine-like properties. Its chemical structure is similar to two other synthetic drugs, MDA and methamphetamine, which are known to cause brain damage.

Many problems users encounter with MDMA are similar to those found with the use of amphetamines and cocaine. They are:

- Psychological difficulties, including confusion, depression, sleep problems, drug craving, severe anxiety, and paranoia during and sometimes weeks after taking MDMA (in some cases, psychotic episodes have been reported).
- Physical symptoms such as muscle tension, involuntary teeth clenching, nausea, blurred vision, rapid eye movement, faintness, and chills or sweating.
- Increases in heart rate and blood pressure, a special risk for people with circulatory or heart disease.

Recent research findings also link MDMA use to long-term damage to those parts of the brain critical to thought and memory. It is believed that the drug causes damage to the neurons that use the chemical serotonin to communicate with other neurons.

MDMA is also related in structure and effects to methamphetamine, which has been shown to cause degeneration of neurons containing the neurotransmitter dopamine. Damage to dopamine containing neurons is the underlying cause of the motor disturbances seen in Parkinson's disease. Symptoms of this disease begin with lack of coordination and tremors, and can eventually result in a form of paralysis.
Ketamine

*Ketamine* hydrochloride, or "Special K," is a powerful hallucinogen widely used as an animal tranquilizer by veterinarians. Users sometimes call the high caused by Special K, "K hole," and describe profound hallucinations that include visual distortions and a lost sense of time, mental sense, and identity. The high can last from a half-hour to 2 hours. The Drug Enforcement Administration reports that overt effects can last an hour but the drug can still affect the body for up to 24 hours.

Special K is a powder. The drug is usually snorted, but is sometimes sprinkled on tobacco or marijuana and smoked. Special K is frequently used in combination with other drugs, such as ecstasy, heroin or cocaine.

Liquid Ketamine was developed in the early 1960s as an anesthetic for surgeries, and was used on the battlefields of Vietnam as an anesthetic. Powdered Ketamine emerged as a recreational drug in the 1970s, and was known as "Vitamin K" in the 1980s. It resurfaced in the 1990s rave scene as "Special K."

Use of Special K can result in profound physical and mental problems including delirium, amnesia, impaired motor function and potentially fatal respiratory problems.

Club Drugs

Club drugs are being used by young adults at all-night dance parties such as "raves" or "trances," dance clubs, and bars. MDMA (Ecstasy), GHB, *Rohypnol*, ketamine, methamphetamine, and LSD are some of the club or party drugs gaining popularity.

No club drug is safe. Chronic abuse of MDMA, for example, appears to produce long-term damage to serotonin-containing neurons in the brain. Given the important role that the neurotransmitter serotonin plays in regulating emotion, memory, sleep, pain, and higher order cognitive processes, it is likely that MDMA use can cause a variety of behavioral and cognitive consequences as well as impair memory.

Because some club drugs are colorless, tasteless, and odorless, individuals who want to intoxicate or sedate others can add them unobtrusively to beverages. In recent years, there has been an increase in reports of club drugs used to commit sexual assaults.
Rohypnol

Pharmacology: Sedative, hypnotic, causes retrograde amnesia

*Rohypnol* has been a concern for the last few years because of its abuse as a "date rape" drug. People may unknowingly be given the drug which, when mixed with alcohol, can incapacitate and prevent a victim from resisting sexual assault. Also, Rohypnol may be lethal when mixed with alcohol and/or other depressants.

Rohypnol produces sedative-hypnotic effects including muscle relaxation and *retrograde amnesia*. In Miami, one of the first sites of Rohypnol abuse, poison control centers report an increase in withdrawal seizures among people addicted to Rohypnol.

Rohypnol is not approved for use in the United States and its importation is banned. Illicit use of Rohypnol began in Europe in the 1970s and started appearing in the United States in the early 1990s, where it became known as "rophies," "roofies," "roach," "rope," and the "date rape" drug.

*Doodle space*
Conclusion

Only a few drugs have been discussed in this CE offering, but in truth, any drug has an abuse potential. As a Pharmacy Technician, a brief understanding of addiction will allow you to be open and available for any customer, patient or friend in need. In most cases an individual who is addicted to a drug or chemical substance will be in denial and will not seek help themselves. It is to be hoped that you will be there for them when the time of need comes.

Today we find intervention and treatment programs that are allowing thousands of individuals to live more productive lives. In the Pharmacy arena, recovery programs are offered to allow a Pharmacist or Pharmacy Technician the opportunity to start over again in their chosen profession. In many cases, this is done confidentially; allowing the individual to get back on their feet and succeed without the social stigma attached. The alternative to non-treatment can be not only loss of job, but also loss of income, family and for some, loss of life.

About the Author

Joe Medina, CPhT, BS Pharmacy, former Program Director of a Pharmacy Technician Program at two community colleges and former clinical Pharmacist at Fort Logan Mental Health Institute, a state psychiatric hospital, in Colorado, is a lifetime national advocate for the Pharmacy Technician Profession. Mr. Medina has helped produce several textbooks and co-authored the “Pharmacy Technician Workbook & Certification Review” through Morton Publishing. With fifteen years as a Pharmacy Technician and fifteen years as a Pharmacist, Mr. Medina understands the needs of the Pharmacy Technician and the important role they play in interacting with Pharmacists, Medical paraprofessionals and the community in the Pharmacy setting.
Lecture 18 - Drugs of Abuse

Multiple Choice (choose the best correct answer)

1. Of the following, which term specifically applies to having a compulsive need to experience the effects produced by a drug or chemical substance?
   a. Substance misuse
   b. Substance abuse
   c. Physical dependence
   d. Psychological dependence

2. Which drugs of abuse bind to receptor sites meant for endorphins
   a. Opiates
   b. Methamphetamine
   c. Cocaine
   d. Nicotine

3. Several methods exist today in the treatment of Opiate dependency. These methods include:
   a. Detoxification
   b. Methadone maintenance
   c. Abstinence drug-free programs
   d. All of the above

4. Antagonist such as disulfiram (Antabuse®) is used in the treatment of alcohol dependency. The mechanism of action (MOA) is to inhibit what enzyme?
   a. OH dehydrogenase
   b. Aldehyde dehydrogenase
   c. Cytochrome P-450
   d. None of the above

5. Methamphetamine releases a high level of which neurotransmitter?
   a. Dopamine
   b. Serotonin
   c. Norepinephrine
   d. Acetylcholine
6. Concerning the medical theory of addiction, which statement is false?
   a. Informs us that addiction is considered a “disease”
   b. Addiction or drug dependency is related to brain chemistry dysfunction
   c. A disease such as addiction can be inherited
   d. Addiction can be cured

7. Of the following drugs of abuse, which one of the following is considered a powerful hallucinogen?
   a. MDMA
   b. GHB
   c. Special K
   d. Hydrocodone

8. Neurotransmitters such as dopamine
   a. Are electrical charges
   b. Are messengers that stimulates or inhibits cell activity
   c. Are nerve tissue surrounded by myelinated tissue
   d. all of the above

9. The ingestion of oral opiates such as oxycodone or hydrocodone is of great concern because these drugs generally come in combination with the following drug that has been associated with liver failure in high doses.
   a. Acetaminophen
   b. Acetylsalicylic Acid
   c. Naloxone
   d. None of the above

10. Problems associated with alcohol abuse would include, but not limited to:
    a. Acute alcohol intoxication
    b. Acute alcohol withdrawal syndrome
    c. Medical complications
    d. All of the above

Click below to fill in your answer sheet on-line

https://secure.jotformpro.com/form/50025918602954