

Review for Final Exam IDC 4WO
Unit 1: Introduction to Emergency Services

Terms:

emergency	Universal Precautions	scene size-up
tiered response	pathogen	post- traumatic stress disorder
community-based policing	PPE	

Questions:

- Complete the following chart to summarize the dangers and duties of the three emergency services.

	police	fire	ambulance
Most common type of call	traffic incidents and domestic violence	medical calls	injury to extremities (arms and legs)
Most common cause of work-related death	assaults and violence	toxic smoke inhalation	automobile accidents on the way to or after a call
Do they need to know first aid?	yes	yes	yes
Can they legally administer medication?	no	no	yes
Can they refuse to respond to an emergency because of:			
a) slippery road conditions	no	no	no
b) violent people at the scene	no	yes (stage and wait)	yes (stage and wait)
c) their vehicle is not safe to drive	yes	yes	yes
If a person is violent, what should they do?	be calm, restrain them	wait for police	wait for police

- What happens if a 911 call comes in, but no one speaks?
 - **the 911 dispatcher will listen carefully to the background noise to see if it sounds suspicious. If it does, they will dispatch the police**
 - **if the call does not sound suspicious, the dispatcher will call back in case it is a “pocket dial”**
- What is meant by proactive, community-based policing?
 - **modern policing is both proactive and community-based**
 - **proactive means that police try to prevent crime by anticipating problems and setting up programs to prevent them, for example, drug education programs and anti-bullying programs**
 - **community-based policing means that the police work with the community and try to get to know the people and risks in an area, instead of just responding when there is a crime**
 - **police are now more visible in the community, doing school visits, bicycle patrol, public education and open-houses**
- What is the **purpose** of Universal precautions?
 - **to prevent the transmission (spread) of blood-borne illness and infection**

a) Give examples of five Universal precautions.

- **hand-washing and wearing gloves when handling patients or their body fluids**
- **wearing breathing masks and goggles over eyes**
- **never re-capping a used needle**
- **handling all sharps carefully; disposing of sharps in the correct container**

b) Is wearing a fire helmet a universal precaution? Explain.

- **no, a fire helmet will not protect you against the spread of disease, so it is not a universal precaution**
- **PPE which protect from job hazards that are not related to the spread of pathogens are NOT universal precautions**

• With which of the following age groups should universal precautions be used?

- infants and children under 2 years of age: **yes**
- children between the ages of 2 – 12 years: **yes**
- people between the ages of 12 – 30 years: **yes**
- people between the ages of 30 – 50 years: **yes**
- senior citizens: **yes**

Universal precautions should be used with all age groups!! Assume that all people carry blood-borne pathogens.

• Why are emergency services personnel at high risk for post-traumatic stress syndrome? Suggest three things that people can do to treat, or cope with, post-traumatic stress syndrome.

- **emergency service personnel are at high risk of post traumatic stress syndrome because they have to handle so many upsetting, tragic and horrible situations**
- **they can handle post-traumatic stress by talking to other people, getting counselling, taking time off work if necessary, exercising and staying involved in the community outside of work**

Unit 2: Medical Emergencies

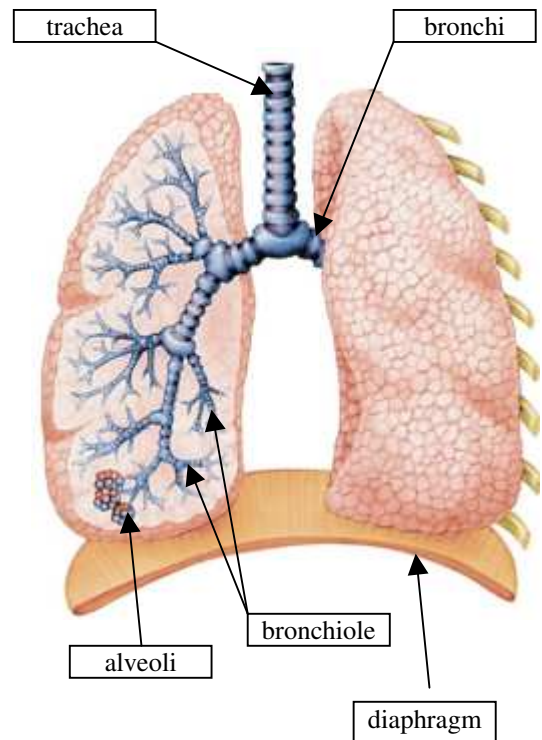
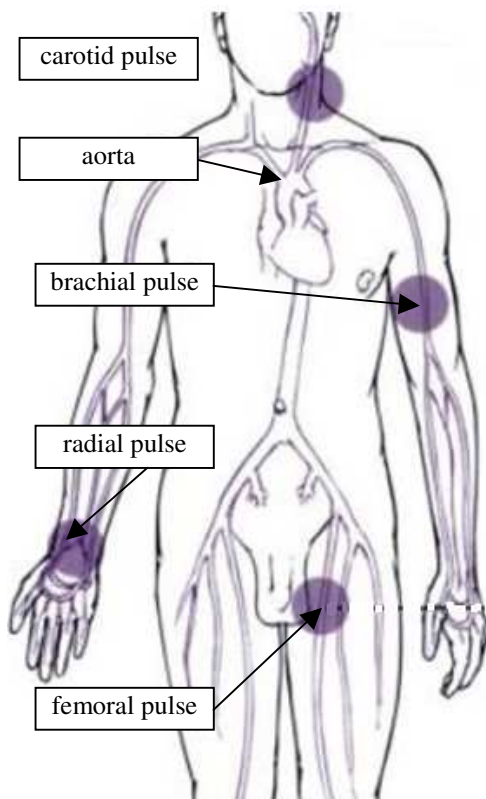
Multiple Choice from Review on line: 1 – 6, 8, 10, 11, 13 – 16, 22, 31, 34, 35, 37 – 59, 61, 62, 68, 69, 73, 79, 80, 82 - 90

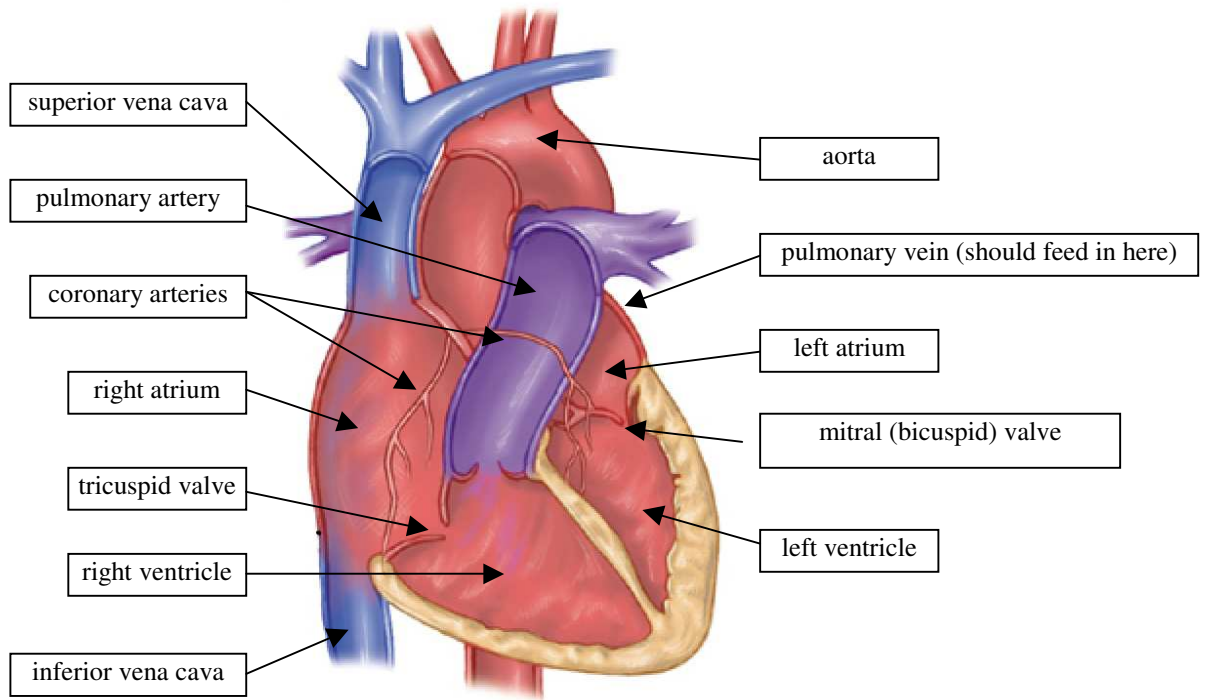
Terms:

- | | | |
|---------------------------|--------------------------|----------------------------------------|
| tidal volume | systolic blood pressure | stent |
| vital capacity | diastolic blood pressure | chronic disease |
| asphyxiation (aspiration) | asthma | anaphylaxis |
| gas exchange | emphysema | epi-pen |
| electrocardiogram (ECG) | COPD | coronary bypass |
| arrhythmia | hypertension | heart attack (myocardial infarction) |
| ventricular fibrillation | shock (hypoperfusion) | defibrillator |
| tachycardia | atherosclerosis | hypoxia and ischemia |
| bradycardia | plaque | stroke (cerebrovascular accident, CVA) |
| systole | angina | FAST |
| diastole | coronary artery disease | tPA |

Structures: Label the following structures on the diagrams below. You may be able to label a structure on more than one diagram. Know the **function** of each part.

- | | | |
|-----------------|-------------------------|-------------------------------------|
| trachea | left atrium | SA node |
| bronchi | left ventricle | pulmonary artery |
| bronchiole | aorta | pulmonary vein |
| alveoli | tricuspid valve | carotid artery and its pulse point |
| diaphragm | bicuspid (mitral) valve | brachial artery and its pulse point |
| right atrium | coronary artery | radial artery and its pulse point |
| right ventricle | vena cava | femoral artery and its pulse point |





Questions:

1. Complete the following chart for common medical emergencies:

Disease or Condition	What is Wrong? (what caused the problem?)	Signs and Symptoms	First Aid, Drugs or Procedures used for Treatment
asphyxiation in a conscious patient	choking, the airway is blocked from the inside	person may grab their throat, will be unable to speak, they may turn blue (cyanotic), wheezing or weak, ineffective coughing	<ul style="list-style-type: none"> • if the person can speak, monitor them but do not do anything • if the person can't speak, do abdominal thrusts (Heimlich)
asthma	airways are narrowed because the bronchioles are inflamed and swollen, they are producing too much mucous and the smooth muscle around them is constricted	wheezing, shortness of breath, difficulty breathing, they may turn blue (cyanotic), may go unconscious	<ul style="list-style-type: none"> • put the person in a sitting position, try to keep them calm • EMS can help them take puffers • EMS and fire should administer oxygen • monitor and take to hospital, if needed
anaphylaxis	person's immune system over-reacts to a harmless substance in food or the environment	hives (red patches on skin), swollen eyes, lips, tongue and throat, difficulty breathing due to swollen airways, wheezing and may go unconscious	<ul style="list-style-type: none"> • put the person in a sitting position, try to keep them calm • EMS and teachers can give epi-pen (epinephrine) • EMS and fire should administer oxygen • monitor and give another epi-pen if needed • transport to hospital

<p>emphysema (a COPD)</p>	<ul style="list-style-type: none"> • person has damaged the alveoli in the lungs by smoking or breathing toxic fumes • the membranes between alveoli are damaged, so the alveoli join together and form larger alveoli which have less surface area for gas exchange 	<ul style="list-style-type: none"> • wheezing, shortness of breath, difficulty breathing, they may turn blue (cyanotic), may go unconscious 	<ul style="list-style-type: none"> • put the person in a sitting position, try to keep them calm • EMS can help them take puffers • EMS and fire should administer oxygen • monitor and take to hospital, if needed
<p>shock (hypoperfusion)</p>	<ul style="list-style-type: none"> • there is inadequate blood flow to the body tissues due to decreased blood volume or inadequate heart function • tissues, especially the brain, do not get enough oxygen 	<p>person will have cold, clammy skin, rapid shallow breaths, low blood pressure, cyanosis (blue skin), and may go unconscious</p>	<ul style="list-style-type: none"> • if person is bleeding, administer fluids • lie the person down, elevate legs and arms to blood goes to head • EMS and fire should administer oxygen • keep them warm • monitor and take to hospital
<p>ventricular tachycardia</p>	<ul style="list-style-type: none"> • the ventricles in the heart are not beating in a strong, organized fashion • they are beating too fast, so they are not filling properly and pumping blood around the body effectively • usually due to damage to the heart because of a heart attack 	<ul style="list-style-type: none"> • person will have symptoms of heart attack: short of breath, chest pain that may radiate to the neck, shoulders and arms, nausea, and may go unconscious 	<ul style="list-style-type: none"> • lie the person down • if person is VSA (vital signs absent) begin CPR • hook up defibrillator, V-tach is shockable • defibrillate • administer oxygen if available • monitor and transport
<p>angina</p>	<ul style="list-style-type: none"> • the coronary arteries are clogged with plaque so there isn't enough oxygen getting to the heart muscle (coronary artery disease) • heart muscle becomes ischemic (lacking oxygen) 	<ul style="list-style-type: none"> • person may have no symptoms until the arteries are almost completely blocked • angina is chest pain when the person exerts themselves • severe angina may develop into a heart attack 	<ul style="list-style-type: none"> • lie the person down • give the patient nitroglycerine (EMS carries this, spray it under the tongue) • administer oxygen if available • monitor and transport • may do angioplasty and install a stent to open up arteries
<p>ischemic stroke (cerebrovascular accident)</p>	<ul style="list-style-type: none"> • in general, something blocks a cerebral artery in the brain • ischemic stroke happens when the cerebral arteries are clogged with plaque or a plaque ruptures and travels to the brain arteries, blocking them 	<ul style="list-style-type: none"> • person will have symptoms of stroke: sudden headache, weakness or paralysis on one side of body, one side of face “droops”, slurred speech, confusion, may go unconscious 	<ul style="list-style-type: none"> • ischemic stroke can be treated with tPA to break down any clots • do FAST (face, arms, speech test) to see if person is having a stroke • if they are, administer oxygen and get them to the hospital- there is a 3 hr golden window to begin treatment

2. Who can legally administer the following?

Medication	Fire	Police	Ambulance	Teachers
epi-pens	no	no	yes	yes
puffers	no	no	yes	no

3. What is the epiglottis? What is its function?

- **the epiglottis is a flap of cartilage that is found in the trachea**
- **it folds over and covers the trachea during swallowing so food and liquids don't go down into the lungs when eating**

4. What is a chronic disease? Give three examples of chronic diseases.

- **a chronic disease is a disease that develops over a long period of time, it isn't necessarily fatal**
- **examples include coronary artery disease (atherosclerosis), cancer, diabetes, emphysema, asthma, and any other disease that people have for a long time**

5. What is the single most important thing that emergency personnel can do to prevent the transmission of pathogens?

- **pathogens are biological agents that cause disease**
- **emergency personnel should always wash their hands thoroughly after each call**

6. What are the five Rs that must be checked before administering or assisting with medication?

- **right medication**
- **right patient**
- **right dose (how much to give them)**
- **right route (method of administration eg. oral or spray under tongue)**
- **right time (they haven't taken too much in too short a period of time)**

7. What are the average normal, resting values for the following:

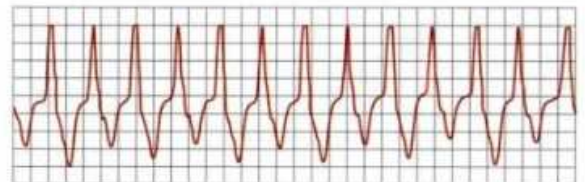
- a) Number of breaths per minute: **12 – 15 breaths per minute**
- b) Tidal volume: **400 - 500 mL (or 0.4 to 0.5 L)**
- c) Vital capacity (maximum air exchanged in one breath): **5 – 6 L**
- d) Systolic blood pressure: **120 mmHg**
- e) Diastolic blood pressure: **80 mmHg**
- f) Resting heart rate: **72 beats per minute**
- g) Blood sugar: **4 – 8 mmol/L**

8. Describe the steps that take place during one complete breath (breathing in and out).

- **the diaphragm contracts so the muscle shortens and pulls down**
- **the volume of the chest cavity increases**
- **the pressure in the chest cavity is decreased so air moves into the lungs**
- **the diaphragm relaxes so the muscles lengthen and move up**
- **the volume of the chest cavity decreases**
- **the pressure in the chest cavity is increases to air moves out of the lungs**

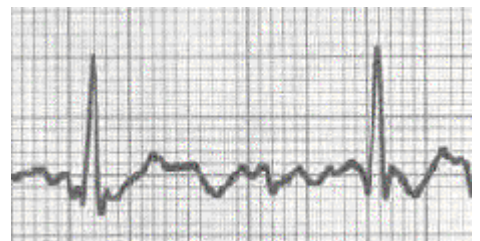
9. Describe the flow of blood through the heart and body for one cardiac cycle, including the four chambers of the heart and major blood vessels.
- **the superior and inferior vena cava bring deoxygenated blood from the body to the heart**
 - **deoxygenated blood enters the heart at the right atrium**
 - **from the right atrium, blood goes through the tricuspid valve to the right ventricle**
 - **from the right ventricle, the pulmonary artery takes deoxygenated blood to the lungs**
 - **in the lungs, blood passes through capillaries close to the alveoli and gas exchange occurs, carbon dioxide leaves the blood and oxygen goes into the blood**
 - **the oxygenated blood is carried from the lungs back to the heart by the pulmonary vein**
 - **the pulmonary vein puts blood into the left atrium in the heart**
 - **from the left atrium, oxygenated blood goes through the mitral (bicuspid) valve to the left ventricle**
 - **the left ventricle pumps blood out through the aorta to the head and body**
10. Explain three things that happen during an asthma attack that makes breathing difficult.
- **the muscle around the bronchioles contracts, squeezing the bronchiole shut**
 - **cells in the bronchiole make too much mucous, which plugs up the bronchioles**
 - **the lining of the airways (bronchioles) become inflamed and swollen, so the bronchioles get smaller inside**
11. You come across a person in a public washroom who is choking. The person is coughing forcefully. Describe exactly what you should do.
- **as long as the person is coughing effectively, do not touch them**
 - **encourage them to cough**
 - **watch them carefully in case the situation gets worse or the person loses consciousness**

12. What type of arrhythmia is shown in the ECG?
- **this shows ventricular tachycardia (V-tach)**
 - **you know this because the heart rate is very rapid and you can see the QRS complex when the ventricles contract**



- a) Can this arrhythmia be treated with defibrillation? **yes**
- b) Which arrhythmias can be treated with a defibrillator? **V-tach and V-fib (not any atrial problems)**
- c) What does a defibrillator do?
- **it gives the heart a massive shock to make it stop beating**
 - **when the heart resumes beating, it should be beating in a normal, organized pattern**

13. What type of arrhythmia is shown in the ECG?
- **atrial fibrillation (too many P waves)**
- Can this arrhythmia be treated with defibrillation?
- **no, this arrhythmia can't be shocked (only ventricular arrhythmias are shockable)**



14. What happens when a person goes into shock?

- **circulating blood volume is decreased because of loss of blood, internal bleeding or heart problems**
- **decreased blood flow to the tissues (hypoperfusion), so they don't get enough oxygen**
- **blood flow to the skin and extremities are reduced so the skin feels cold and clammy**
- **to try to increase oxygen to the tissues, breathing rate and heart rate increase**
- **blood and fluids pool in the extremities (arms and legs)**
- **circulating blood volume is further decreased, so heart pumps less effectively**
- **decreased blood flow means that more cells become anaerobic**
- **the vicious cycle continues, causing damage first to the brain, then heart, kidneys**
- **the person dies**

a) Why is this dangerous?

- **shock is dangerous because it is a vicious cycle that results in further decreased blood flow throughout the body and brain, causing death**

b) List three situations that may cause shock.

- **when the heart is not beating properly or effectively because of a heart attack or arrhythmia**
- **when the blood volume is severely reduced due to bleeding or severe dehydration**
- **when the circulation is impaired due to anaphylaxis or severe infection**

Unit 3: Behavioural Emergencies

Multiple Choice from Review on line: 1 – 8, 12, 14, 16 – 28, 31 – 41, 47, 48, 54 – 56, 58 – 60, 63, 64, 67, 68 – 74, 76 – 78, 82 – 85, 89, 90

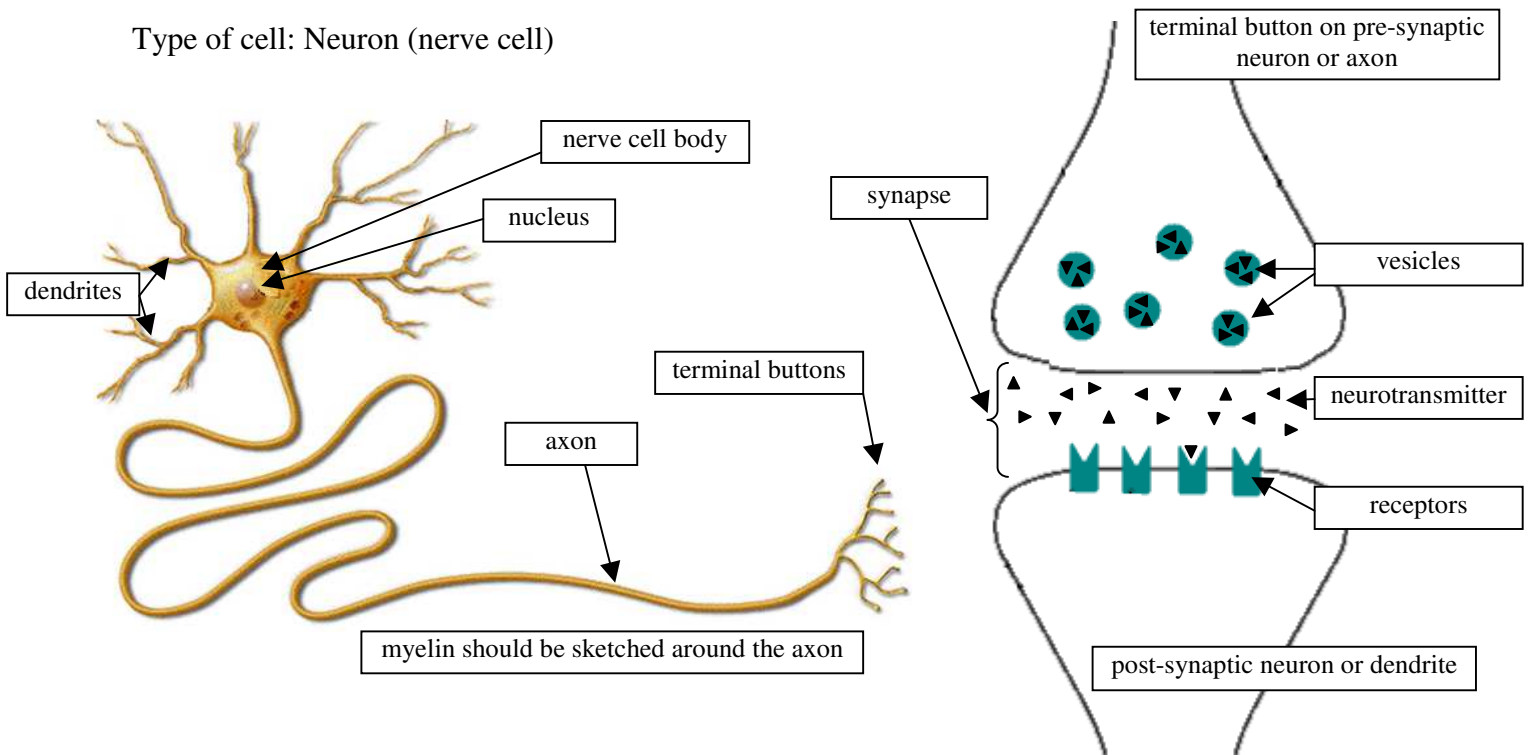
Terms:

- | | | |
|----------------------------|--------------------------|-------------------------------|
| central nervous system | insulin | methadone |
| sympathetic nervous system | seizure | hypoxia |
| neuron | epilepsy | mental illness |
| myelin | absence seizures | serotonin |
| neurotransmitters | tonic-clonic seizures | dopamine |
| synapse | status epilepticus | schizophrenia |
| pre-synaptic neuron | psychoactive substances | depression |
| post synaptic neuron | reward (pleasure) centre | mania (manic) |
| Type I diabetes | addiction | bipolar disorder |
| Type II diabetes | tolerance | obsessive compulsive disorder |
| hyperglycemia | dependence | hallucination and delusions |
| hypoglycemia | withdrawal | endorphins |

Structures: Label the following structures on the diagrams below. You may be able to label a structure on more than one diagram. Know the **function** of each part.

- | | | |
|-----------------|----------------------|------------------|
| neuron | cell body | vesicle |
| axon | nucleus | neurotransmitter |
| dendrite | pre-synaptic neuron | synapse |
| terminal button | post-synaptic neuron | receptor |

Type of cell: Neuron (nerve cell)



Questions:

1. Complete the following chart for common behavioural emergencies:

Disease or Condition	What is Wrong?	Symptoms	First Aid, Drugs or Procedures used for Treatment
hyperglycemia	blood sugar is too high because of eating too much carbohydrates or not taking enough insulin	gradual onset of confusion; very thirsty; fruity odour on breath; skin is warm and flushed	<ul style="list-style-type: none"> • test blood glucose • give insulin • give oxygen • take to hospital
hypoglycemia	blood sugar is too low because of not eating enough, too much exercise or illness (vomiting and diarrhea)	rapid onset of confusion; person may appear drunk, with slurred speech and clumsiness; skin is cool and clammy	<ul style="list-style-type: none"> • test blood glucose • give glucose between cheek and gums • monitor closely • if no improvement, take to hospital
ischemic stroke	<ul style="list-style-type: none"> • in general, something blocks a cerebral artery in the brain • ischemic stroke happens when the cerebral arteries are clogged with plaque or a plaque ruptures and travels to the brain arteries, blocking them 	<ul style="list-style-type: none"> • person will have symptoms of stroke: sudden headache, weakness or paralysis on one side of body, one side of face “droops”, slurred speech, confusion, may go unconscious 	<ul style="list-style-type: none"> • ischemic stroke can be treated with tPA to break down any clots • do FAST (face, arms, speech test) to see if person is having a stroke • if they are, administer oxygen and get them to the hospital- there is a 3 hr golden window to begin treatment
hypoxia	blood levels of oxygen are too low because of low oxygen environment (fire), choking, carbon monoxide poisoning, heart problems or lung problems	person may or may not be breathing; around lips and nailbeds are blue (cyanotic) person will be confused or unconscious	<ul style="list-style-type: none"> • lie them down, and elevate feet to increase blood flow to head • administer oxygen • treat under-lying cause, if possible • transport
epilepsy	<p>part of the brain produces a “storm” of electrical signals, due to problems at birth or brain damage</p> <p>not all seizures are caused by epilepsy!!</p>	person may be unconscious, may be wandering picking at their clothes, may be staring vacantly or may be convulsing on the ground	<ul style="list-style-type: none"> • do not restrain • stay with and monitor the person • loosen tight clothing • remove any hot, sharp or dangerous objects • cover lower body • move crowds away • reassure when seizure is over

Disease or Condition	What is Wrong?	Symptoms	First Aid, Drugs or Procedures used for Treatment
depression	brain does not produce enough serotonin	<ul style="list-style-type: none"> • person may show decreased interest in food, sex and socializing • sleep disturbances • thoughts of suicide, death • lack of energy, motivation 	<ul style="list-style-type: none"> • treat with anti-depressants such as Prozac (a SSRI, selective serotonin reuptake inhibitor) to increase the amount of serotonin in the synapse • behaviour modification therapy to help control symptoms
mania	brain is in “hyper-drive”, part of bipolar disorder when person is “super-charged”	<ul style="list-style-type: none"> • rapid speech • person needs very little sleep • reckless promiscuous behaviour • feel invincible 	treat with lithium to even out moods
schizophrenia	person’s brain produces too much dopamine; may be caused by drug abuse or withdrawal	<ul style="list-style-type: none"> • person has trouble knowing what is real • have delusions and hallucinations • hear voices in their head 	treat with medications such as Haloperidol to control symptoms; may use shock treatments
obsessive compulsive disorder	an anxiety disorder related to imbalances of neurotransmitters in the brain	<ul style="list-style-type: none"> • person feels compelled to repeat rituals and actions or they feel incredibly stressed • compulsive hand-washing, organizing, checking that the door is locked etc 	treat with anti-anxiety medications and behaviour modification therapy
drug addiction to cocaine or heroin	person has addictive personality, drugs cause intense cravings in these people	person craves drugs and will do anything, including stealing and prostitution to get money for drugs	person quits when there are severe negative consequences or they can no longer get the drug. Methadone for heroin addiction

2. Name three drugs that cause addiction by stimulating the reward (pleasure) centre in the brain.
 - **cocaine, MDMA, ecstasy, methamphetamine all have structures similar to dopamine and stimulate the pleasure (reward centre of the brain)**
 - a) What is the function of the reward centre?
 - **the reward centre in the brain makes us feel good when we do something that is necessary for the survival of the individual or species**
 - **this is important because it means that people (and other animals) will repeat behaviours that make them feel good, like having sex, eating, breast-feeding their children**
 - b) List three biological functions or actions that stimulate the reward centre.
 - **sex, eating, drinking and breast feeding all stimulate the reward centre of the brain**

- c) Why do drugs that stimulate the reward centre cause such powerful addiction?
- **stimulating the reward system causes feelings of pleasure and makes the person want to repeat the behaviour**
 - **drugs that stimulate the reward centre (cocaine, MDMA, ecstasy and meth) cause powerful feelings of pleasure, so the person's brain is telling them to repeat the behaviour**
3. What is the purpose of the sympathetic nervous system?
- **the sympathetic nervous system kicks in under stress, for the "fight or flight response" to increase the chances of survival**
- a) what hormone/neurotransmitter stimulates the sympathetic nervous system? **epinephrine**
- b) how does the sympathetic nervous system affect:
- heart-rate: **goes up to increase blood flow to brain and muscles**
 - blood pressure: **goes up to increase blood flow to brain and muscles**
 - pupils: **dilate to let in more light**
 - blood flow to muscles and brain: **increases to provide clearer thinking and better endurance**
 - bronchioles: **dilate to increase air flow to lungs, so more oxygen gets delivered**
4. List three different medical problems that may cause a person to behave in an unusual or unacceptable manner.
- **diabetes (either hypoglycemia or hyperglycemia)**
 - **stroke**
 - **seizures due to epilepsy, high fever, infection, high blood pressure etc**
5. List three different ways that the amount of neurotransmitter in the synapse can be increased.
- **by increasing the amount of neurotransmitter released from the presynaptic neuron**
 - **by decreasing how much neurotransmitter is reabsorbed by the presynaptic neuron**
 - **by decreasing the amount of enzyme in the synapse that breaks down the neurotransmitter**
6. Why do people with mental illnesses often resist taking their medications?
- **medications that treat mental illness often make the person feel emotionally flat and dull so they don't like to take them**
 - **schizophrenic people often miss hearing the voices in their heads while they are on medication**
 - **when the person is on their medications, they feel better so they think they can stop taking their meds**
7. List five different medical conditions that may cause a seizure.
- **high fever (febrile seizures, usually in children)**
 - **meningitis (inflammation of the membranes around the brain)**
 - **concussion (trauma to the head)**
 - **stroke (bleeding or ischemia in the brain)**
 - **extreme hypertension (high blood pressure)**
 - **brain tumour or cancer**
 - **hypoxia (low blood oxygen)**
 - **hypoglycemia (low blood sugar)**
 - **alcohol or drug intoxication**
 - **epilepsy (excessive electrical activity in the brain)**

8. A person is having a tonic-clonic seizure. List three things that you should do, and three things you should NOT do.

Should do:	Should NOT do:
<ul style="list-style-type: none"> • tell people to move away- assign people to crowd control if needed • ask how long the person has been seizing. If it has been for more than 5 minutes, call 911 • loosen any tight clothing and eye glasses • monitor to make sure they are still breathing • remove anything sharp, hot or dangerous that they may hit • put something soft like a jacket under their head • cover their lower body with a jacket (to protect their dignity if they lose bladder or bowel control) • wait while the seizure passes, do not restrain • when done, roll into recovery position. Monitor and reassure them 	<ul style="list-style-type: none"> • do not restrain the person • do not leave them alone • do not force anything in their mouth • do not act disgusted if the person loses bladder or bowel control

9. A police officer has been called to a mentally ill street person who is hysterical and yelling at something they cannot see. In dealing with the patient, what should the officer do? What should she not do?

Should do:	Should NOT do:
<ul style="list-style-type: none"> • expect sudden or violent behaviour • stay calm • talk quietly • make sure you have a way out • make sure you have a partner or someone that knows what you are dealing with • call for EMS in case medications are needed 	<ul style="list-style-type: none"> • do not approach the person alone • do not yell or get upset • do not get too close or block the person's escape

10. A paramedic is called to an intravenous drug user who is having a bad trip. The user is aggressive and threatening to commit suicide. List three precautions to take when working with this patient.

- **call for police to restrain person, make sure you are safe**
- **do not approach the person alone**
- **wear PPE such as gloves and a lab coat or jacket, follow all universal precautions**
- **expect the person to have needles or a weapon**
- **do not grab their ankles, they often have their money or weapons in their boots**
- **do not go in alone**
- **expect the person to attack or behave unpredictably**

11. You are a paramedic who is attending a woman who is diabetic. What signs and symptoms can you use to indicate whether she is hypoglycemic or hyperglycemic? What treatment will you administer?

Hyperglycemia	Hypoglycemia
check blood sugar, it is too high	check blood sugar, it is too low
onset is gradual	onset is sudden
fruity odour on breath	no unusual odour on breath
skin is hot and flushed	skin is cool, grey and clammy
person has excessive thirst and excessive urination	person seems intoxicated, clumsy may be violent slurred speech loses consciousness, seizures
give oxygen and transport (if advised, may give insulin)	oral glucose into cheek monitor, transport?

12. How are Type I and Type II diabetes the same? List three ways that they are different.

Both types of diabetes result in hyper and hypoglycemia, depending on their medications and how much carbohydrates they eat

Type I diabetes	Type II diabetes
starts in childhood	starts in adulthood
pancreas makes NO insulin	pancreas makes some insulin but not enough or the body does not react to it (insulin resistance)
must take insulin injections	can take pills to increase insulin secretion
can not be cured or reversed	can be reversed if person loses weight or exercises

13. List three drugs that are opiates. What is the name of the neurotransmitter in the brain that is a natural opiate?

- **opium, heroin, morphine, codeine, percocets, hydromorphone, oxycontin, methadone are all opiates**
- **the natural opiate in our brain is called endorphin**

14. What drug is used to treat heroin addiction? **methadone**

Unit 4: Fire Emergencies

Multiple Choice from Review on line: 1 - 9, 11 – 17, 20 – 26, 42 – 53, 55 – 66, 68 – 78, 81, 82, 85, 89 – 95, 97 – 98, 100

Terms:


oxidation	endothermic reaction	smoke
combustion	ignition	hydrogen cyanide
self-sustaining	pyrolysis	carbon monoxide
fire	temperature	conduction
oxidizing agent	surface area	convection
fire tetrahedron	concentration	radiation
fuel (reducing agent)	lower flammable limit (LFL)	compartment
Class A fire	upper flammable limit (UFL)	plume
Class B fire	explosive (flammable) range	entrain
Class C fire	too rich to burn	thermal layering
Class D fire	too lean to burn	rollover
Class K fire	PPE	flashover
pyrophoric metals	SCBA	ventilation
exothermic reaction	hazardous combustion products	backdraft

Questions:

1. Complete the following chart:

Situation	Type of Energy for Ignition	Class of Fire
a pile of sawdust and wood chips “spontaneously” ignites	chemical energy from slow oxidation	Class A
a match ignites when it is rubbed across the strike pad on the package	mechanical energy from friction	Class A
a woman touches the nozzle at the gas pumps and the gas vapours ignite	electrical energy from static discharge (static)	Class B
a car hits a hydro pole; live wires ignite spilled gasoline	electrical energy from power lines (current)	Class C
a man is grinding a galvanized pipe; the zinc metal coating gets hot and ignites	mechanical energy from friction of grinding	Class D
cylinders of acetylene gas are heated by the sun; they explode	solar energy from sun heating bottles (radiation)	Class B

2. What does the following symbol indicate? What is the hazard associated with this symbol?

	<p>This is the symbol for an oxidizing agent. Oxidizing agents provide oxygen for the fire, so the fire can not be extinguished by smothering. Oxidizing agents include oxygen, chlorine gas, bromine, fluorine, and any compounds ending with “ate” or “ite” such as potassium chlorate, potassium permanganate, sodium nitrate etc.</p>
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3. Complete the following chart for fire emergencies:

What's on Fire	Specific Hazards	What to Do or Not Do
Fire at a hazardous waste depot	all kinds of hazmat are together in the same place and probably not labelled or stored correctly. Many different types of poisonous substances may be present.	call Canutech stay upwind and uphill wear SCBA do not go too close, fight fire from a distance
Fire from a spill from a gasoline tank truck	fire stays low to the ground so it can travel and burn firefighters that get too close, gas needs to be contained (diked)	do not spray with water gently cover with foam watch for spontaneous ignition dike and contain fuel spill
Spill of chlorine gas from tank train	powerful oxidizer, will cause combustible materials to ignite gas is poisonous and dense, will hug the ground	call Canutech stay upwind and uphill wear SCBA do not go too close, fight fire from a distance evacuate area
Fire in a factory where they grind magnesium from steering columns	magnesium is a pyrophoric metal, it burns with a very hot, blinding flame if the magnesium is a dust from grinding, expect it to explode in the air	do not go in stay uphill and upwind do not spray with water
Fire in a hospital	expect an oxygen –enriched environment from air canisters so fire will burn rapidly; expect other hazmat such as ether, drugs, biohazards	get information about hazards before going in approach from uphill and upwind wear all PPE, especially SCBA anticipate any kind of emergencies!!
Fire in a chemical laboratory	expect an oxygen –enriched environment from gas canisters so fire will burn rapidly; expect other hazmat such as compressed gas cylinders, plastics, solvents, biohazards	get information about hazards before going in approach from uphill and upwind wear all PPE, especially SCBA anticipate any kind of emergencies!!
A tightly sealed home has smoke coming from under the door in little puffs	house is ready to backdraft	do not open doors or windows ventilate roof to let hot gases escape expect gases to ignite as they escape from building when you do open doors or windows, stand to the side in case a fireball comes out

4. Describe four ways that you can make a campfire burn more rapidly. Be specific.

- **split the wood to increase its surface area**
- **add an accelerant like lighter fluid (but don't really do this:)**
- **increase the temperature by lighting it in many places**
- **sprinkle on an oxidizing agent to increase the supply of oxygen**

5. Describe two factors that will make gasoline burn more quickly.

- **its surface area (how far it has spread over the pavement)**
- **its temperature (is the pavement hot and heating the gas?)**
- **the concentration of the vapours (if the concentration is greater than the UFL, the gas vapours won't burn)**

6. How will the following factors affect how a fire burns?
- increasing the surface area by spreading the fuel out: **will increase the rate the fire burns**
 - adding an oxidizing agent: **will increase the concentration of oxygen and the rate the fire burns**
 - making the fuel vapours very concentrated: **will make the fuel “too rich to burn”, so the fire will burn slowly and produce a lot of soot and black smoke**
 - cooling the fuel down: **will make the fire burn slowly and it may go out**
7. What does “too rich to burn” mean?
- the concentration of the fuel is too high (or the concentration of oxygen is too low) so the fire burns slowly and produces a lot of soot and black smoke**
 - for example: if a propane tank is leaking, the propane will not burn close to the tank where the propane vapours are very thick. Instead, it will burn a short way away from the leak where the concentration of fuel vapours are lower and there is more oxygen in the mix. When the proportions of fuel vapours and oxygen will burn, the mixture is within the flammable range**
8. What is meant by ventilation in fire fighting? Why is it important when fighting a compartment fire?
- ventilation means to open up a compartment fire to let hot, combustible gases escape**
 - the top of the compartment should be opened to gases can escape by convection**
 - by releasing the hot gases, it decreases the chances of flashover and backdraft**
9. What is backdraft? Describe the conditions that are necessary for backdraft to occur.
- backdraft is when all of the combustible vapours in a compartment are at their auto-ignition temperature but there is not enough oxygen in the compartment for them to burn**
 - when a source of air or oxygen is introduced, the gases ignite explosively and blow out of the compartment in a blast of flame**
10. How are pyrolysis and vapourization the same? How are they different?

Pyrolysis	Vapourization
<ul style="list-style-type: none"> the conversion of solid fuel into combustible gases 	<ul style="list-style-type: none"> conversion of liquid fuel to its gas state
<ul style="list-style-type: none"> it is a chemical change, new substances are produced 	<ul style="list-style-type: none"> it is a physical change, the same substances are present just their state has changed
<ul style="list-style-type: none"> requires energy 	<ul style="list-style-type: none"> requires energy
<ul style="list-style-type: none"> converts fuel to a gaseous form that can burn 	<ul style="list-style-type: none"> converts fuel to a gaseous form that can burn

11. What is a reducing agent? Give three examples of reducing agents.
- a reducing agent is what burns in a fire, or the fuel**
 - the fuel could be a pyrophoric metal such as magnesium, it could be gasoline, wood, plastic, flammable gases such as carbon monoxide or methane**

12. What are the five sources of energy that can ignite a fire? Give an example for each.
- heat from a chemical reaction, such as oily rags reacting slowly until they produce enough heat that they ignite
 - electricity, such as the spark produced by a person when they get in and out of their car at a gas station or current electricity in a house
 - nuclear energy, such as the sun (fusion) or a nuclear reactor
 - light energy, such as the energy from the sun that is focused using a magnifying glass
 - mechanical energy, such as friction used to light a match or compression used to light diesel fuel in a diesel engine

Summary Question:

Fire, police and ambulance are often required to handle difficult emergencies involving terrible injuries and tragedy. Many emergency personnel have difficulty coping after dealing with these emergencies.

- what is the name of the disorder experienced in these situations?
 - post-traumatic stress disorder**
- what are some signs or indications that a person may be having trouble coping?
 - avoiding people**
 - lack of motivation, “what does it matter” attitude**
 - excessive drinking or drug use**
 - anger, unpredictable moods**
 - depression**
 - change in eating and sleeping habits**
 - does not bother to wash or look after themselves**
- what are some of the things emergency services personnel can do to deal with difficult or upsetting events?
 - talk to other emergency services people**
 - talk to a counsellor**
 - get help coping**
 - maybe take some time off work**
 - maybe take a holiday or spending time in a pleasurable way**