

THE NERVOUS SYSTEM

08 MAY 2013

Lesson Description

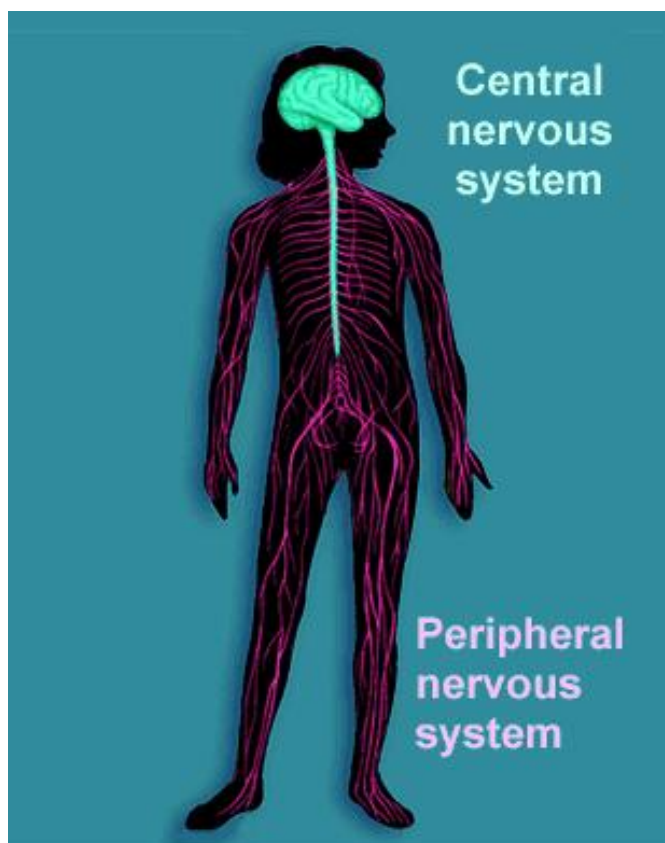
In this lesson we:

- Look at the location and functions of the peripheral nervous system
- Discuss the location and functions of the autonomic nervous system (sympathetic and parasympathetic)
- Discuss the effects of certain drugs on the central nervous system: Dagga, Heroin, Ecstasy & Tik.
- Explore the causes, symptoms & treatment of the diseases/disorders of the nervous system

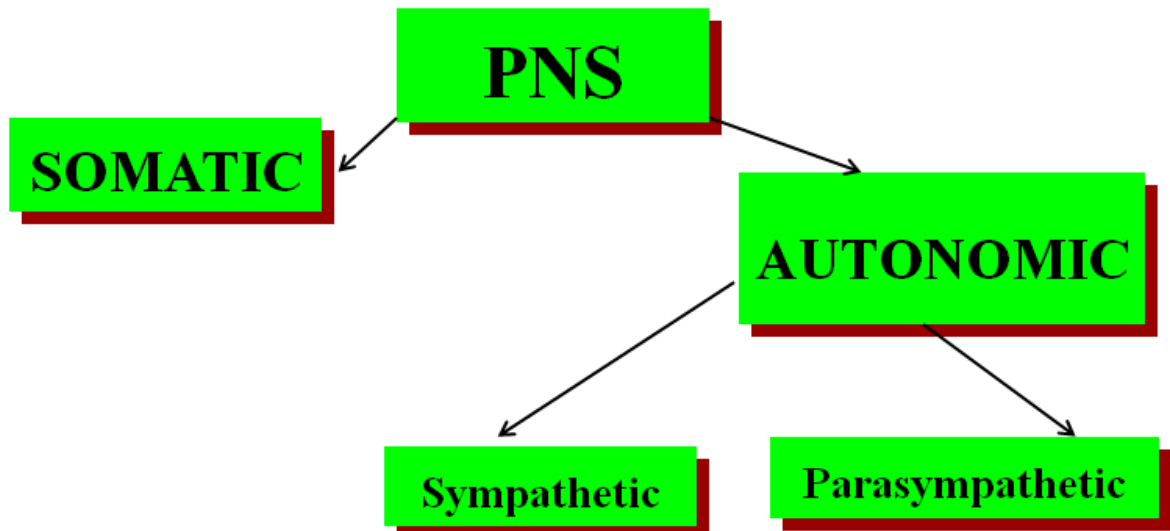
Key Concepts

Peripheral Nervous System

Co-ordination



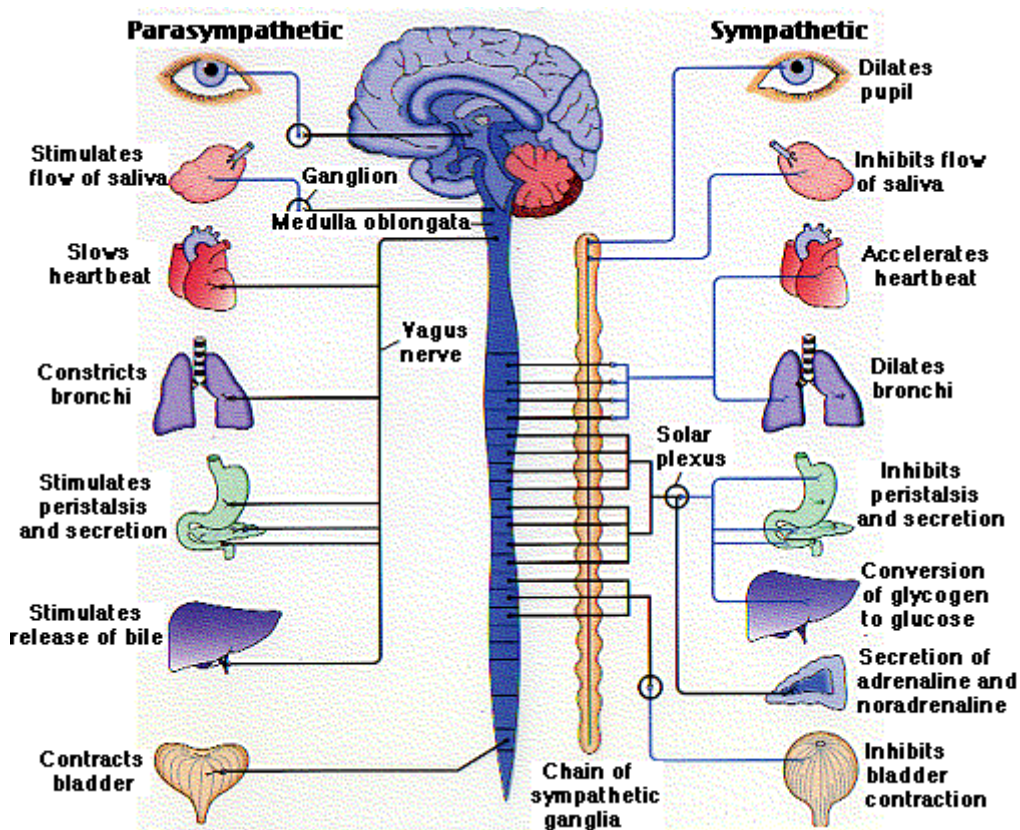
- Made up of all the nerves that carry messages to and from the central nervous system, thus connecting the rest of the body to the CNS. (Similar to telephone wires that connect all of the houses etc. in the town).
- 12 pairs of cranial nerves and 31 pairs of spinal nerves.
- Central Nervous System and Peripheral Nervous System work together to make rapid changes in the body in response to stimuli.



Autonomic Nervous System

Sympathetic and Parasympathetic Nervous System

- **Automatic** and **involuntary** control
- Control all internal organs (glands, smooth muscle, cardiac muscle)
- The 2 systems act antagonistically to maintain a steady internal environment



Drugs and the Central Nervous System

How drugs work

- Drugs make their effects known by acting to enhance or interfere with the activity of neurotransmitters and receptors within the synapses of the brain.
- **Agonistic** drugs enhance the message carried by the neurotransmitters. Inhibitory neurotransmitters become more inhibitory and excitatory neurotransmitters become more excitatory.
- **Antagonistic** drugs interfere with the transmission of neurotransmitter messages; the natural action of neurotransmitters is interfered with so that their effects are lessened or eliminated.
- Most of the drugs that get abused are agonists of various neurotransmitters - they work to enhance the natural effect of neurotransmitters.

Dagga

- Affects those part of the brain that control emotions, memory and judgement
- Difficult keeping track of time, impaired or reduced short-term memory
- Reduced ability to perform tasks requiring concentration and coordination, such as driving a car
- Paranoia, hallucinations



Other effects:

- Enhanced cancer risk
- Decrease in testosterone levels for men; also lower sperm counts and difficulty having children
- Increase in testosterone levels for women; also increased risk of infertility
- Diminished or extinguished sexual pleasure

Heroin



- When heroin hits your bloodstream, it goes directly to the brain, where it has a sedative effect.
- In terms of feelings and sensations, heroin acts like a powerful narcotic (painkiller) and slows down your thoughts and reactions.
- Creates difficulty in differentiating between reality and fantasy
- Problems with concentration
- Memory loss, paranoia, anxiety and confusion
- It can also impair important bodily functions like breathing.

Cocaine



- Brain seizures
- Violent, erratic, or paranoid behaviour
- Hallucinations and "coke bugs" - a sensation of imaginary insects crawling over the skin
- Confusion, anxiety and depression, loss of interest in food or sex
- "Cocaine psychosis" - losing touch with reality, loss of interest in friends, family, sports, hobbies, and other activities

Methamphetamine (Crystal Meth), Amphetamines (Speed or Tik)



- Insomnia
- Hyperthermia, convulsions, and cardiovascular problems, which can lead to death
- Irritability, confusion, tremors
- Anxiety, paranoia, or violent behaviour
- Can cause irreversible damage to blood vessels in the brain, producing strokes
- Breaking out into sweat or cold chills.
- Memory loss,
- Mood swings and wild rages.
- Circulatory and respiration collapse, coma and death.

Ecstasy

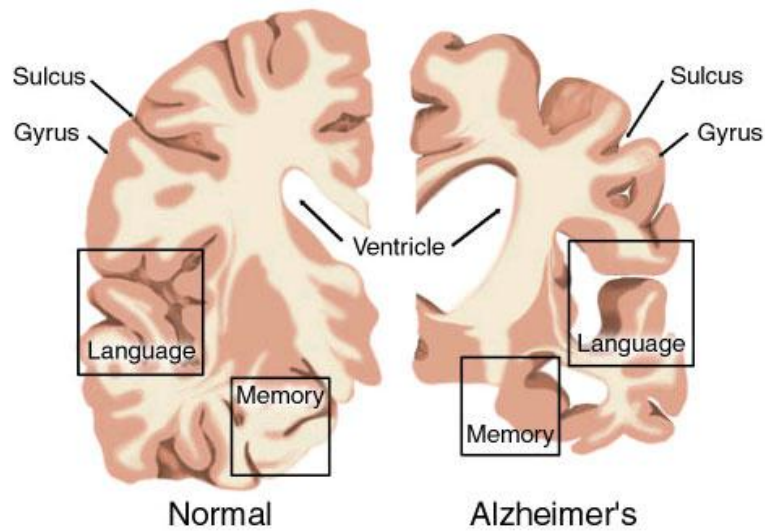


- Anxiety and paranoia and confusion
- Depression
- Irritability
- Trouble focusing and concentrating
- Dizziness, light-headedness, or vertigo
- Trouble sleeping

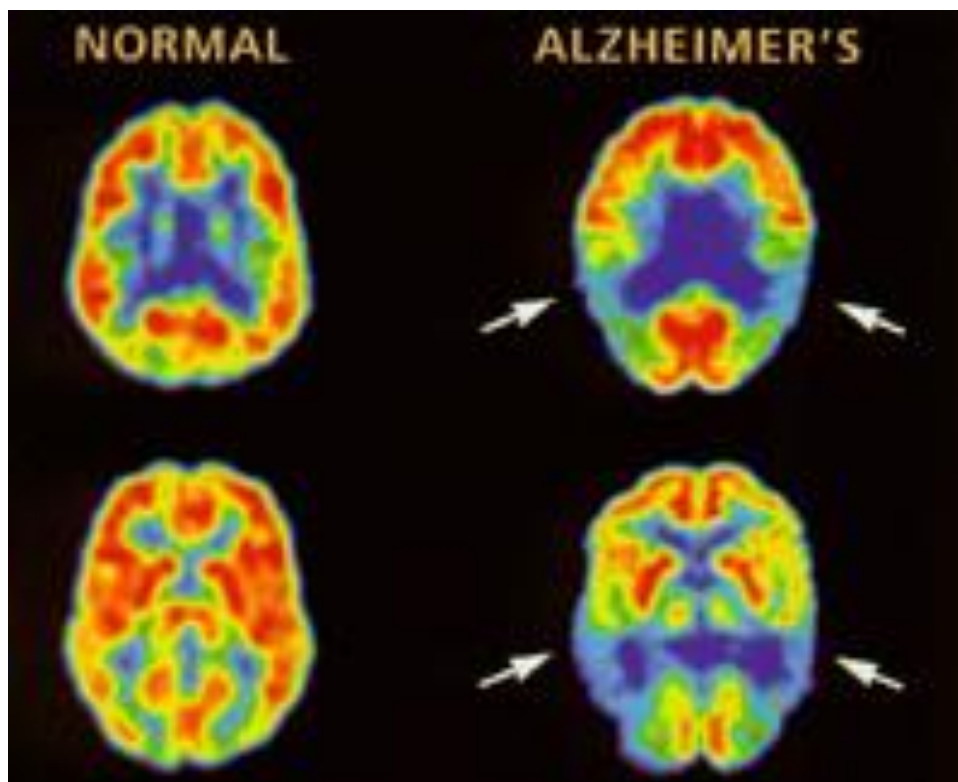
Disorders of the Central Nervous System

Alzheimer's Disease

- Nervous tissue in brain wastes away.
- Usually occurs in older people, but can affect people in 40's and 50's.



Pet Scans



- Memory loss and confusion.
- No successful treatment found yet. All drugs used in trial stages.

Parkinson's Disease

Causes:	Symptoms:	Treatment:
- Genetics - Environmental chemicals (e.g. PCBs) - Thyroid disorders - Repeated head injury	- Resting tremor on one side of the body - Generalized slowness of movement (bradykinesia) - Stiffness of limbs (rigidity) - Gait or balance problems (postural dysfunction).	- Medication - Deep brain stimulation with electrodes

Aneurism

- An **aneurism** occurs when part of a blood vessel (artery) or cardiac chamber swells - either the blood vessel is damaged or there is a weakness in the wall of the blood vessel.
- As blood pressure builds up it balloons out at its weakest point.
- The swelling can be quite small or very large - when large it tends to extend along the blood vessel.
- As the aneurism grows there is a greater risk of rupture - this can lead to severe haemorrhage, and other complications, including sudden death.

What causes an aneurism?

- Brain (cerebral) aneurism causes:
- Weakness in the artery wall (usually present since birth)
- Hypertension (high blood pressure)
- Arteriosclerosis (plaques of cholesterol, platelets, fibrin, and other substance form on the arterial wall)



(An example of an aneurism in the brain)

Questions

Question 1

- a.) Name the part of the nervous system that connects the organs of the body to the CNS.
- b.) Name the two parts of the autonomic nervous System
- c.) List the functions of the sympathetic nervous system.

Question 2

- a.) Tabulate the side effects of Dagga, Heroin, tik and ecstasy on the nervous system.
- b.) Study the article below and answer the questions that follow:

(NaturalNews) January 10, 2013 by: Michael Ravensthorpe

There are many reasons to avoid soda and other soft drinks: High refined sugar levels, extreme acidity, unnatural and often toxic ingredients, and much more. According to a new study by U.S. researchers for the *National Institute of Health*, however, we can add another reason to the list - the regular consumption of soda, especially those that contained artificial sweeteners, can lead to depression.

The study, which was released in January 2013 and will be delivered in full at the *American Academy of Neurology's* annual conference in March, studied the drinking habits of 265,000 men and women between 50-71 years old. The researchers monitored their consumption of soft drinks, teas, and coffees between the years of 1995 and 1996 and then, one decade later, asked them if their doctors had diagnosed them with depression from 2000 onwards.

The results showed that individuals who drank four or more sodas daily were 30 percent likelier to suffer from depression than individuals who didn't drink soda, while individuals that drank diet soda were even likelier to suffer from depression than individuals who drank regular soda. Moreover, the research showed that regular coffee drinkers were 10 percent unlikelier to be diagnosed with depression than individuals who didn't drink coffee.

"Our research suggests that cutting out or down on sweetened diet drinks or replacing them with unsweetened coffee may naturally help lower your depression risk" said Dr Honlei Chen, the leader of the study, but added that "more research is needed to confirm these findings."

- i.) Provide TWO reasons to avoid sodas provided in the article (apart from depression).
- ii.) In which year were the participants questioned about diagnosis with depression?
- iii.) Provide a hypothesis for this research.
- iv.) What conclusion can be made from the research regarding coffee drinkers?
- v.) How can the reliability of this research be improved?
- vi.) Suggest ways of managing depression.