STRUCTURE AND FUNCTION OF BASAL GANGLIA

1) Draw the anatomical arrangement of the basal ganglia at two planes 1) through the anterior horns of the lateral ventricles but NOT through the 3rd ventricle, 2) through the body of the lateral ventricles, through the third ventricle and through the inferior horn of the lateral ventricles (10)

2) What nucleus is formed at the anterior part of the basal ganglia where the caudate and putamen meet? (1)

3) The lateral surface of the lateral ventricles is made up by which basal ganglia nucleus? (1)

4) Which structure passes in-between the caudate and putamen thus separating them anatomically? What does this structure contain? (2)

5) Which arteries supply the ICAP & basal ganglia? Which artery do they branch off and why are they susceptible to occlusion? (3)

6) Where is the substantia nigra located and what is its function (compacta)? (2)

7) What are the 4 dopaminergic pathways in the brain? Which one is has the most dopaminergic cells i.e. Uses dopamine the most? (2)

8) Draw the basal ganglia pathway. (8)

9) What is monitored by the caudate and putamen in terms of where the stimulus originates from? (1)

10) How does the balance between the direct and indirect pathway determine whether movement occurs or not? (4)

11) What causes Parkinson’s and what are some symptoms? (6)

12) What causes Huntington’s and what are some symptoms? (5)

13) What is the difference between ballismus and athetosis? (2)
NEURODEGENERATION IN BASAL GANGLIA

1) The presence of which structure is characteristic in Parkinson’s disease? Which protein does this contain? (2)
2) What are some signs and symptoms of Parkinson’s? (4)
3) Which compound is neurotoxic and produces degeneration of SNpc cells? From which compound is this derived from? (2)
4) Which enzyme is responsible for the oxidation of dopamine to DOPAC? (1)
5) Which enzyme further oxidizes dopac and what is the end product which is a neurotoxin? (2)
6) Describe the 4 dopaminergic pathways in the brain? (8)
7) Give 10 drugs for the management of Parkinson’s and describe the mechanism of action for each one. (20)
8) What are some of the adverse effects of long term L-DOPA usage? (3)
9) What is the preferred method of treatment in the early stages of Parkinson’s with fewer symptoms and why is this more conservative method favoured earlier on? (4)
10) What is rotigotine, how is it administered, what are its advantages and which receptors does it target? (4)
11) What is the half life of L-DOPA and how does this relate to symptoms such as ‘on-off’? (4)
12) What are some of the surgical approaches to treat Parkinson’s and how do they work? (4)
13) Huntington’s disease is due to a mutation in which chromosome and which gene does it code for? (3)
14) What is destroyed in Huntington’s by the faulty protein and where are these structures found? (2)
15) Which 2 types of drugs are generally for Huntington’s treatment and give an example of each. (4)
DRUG DEPENDENCE

1) What are the most harmful drugs in terms of mortality? (2)
2) Give examples of class A, B and C drugs in the UK at the moment. (3)
3) What are the 3 receptors that are targeted by cocaine? (3)
4) Which receptors do phencyclidine, hallucinogens and barbiturates have an effect on? (3)
5) Which dopaminergic pathway is associated with reward and is involved in drug-dependence? (2)
6) Give the areas of the brain that develop abnormal connections in drug dependency starting from those affected earlier on. (6)
7) What are the three stages of the addiction cycle and what is the source of reinforcement at each stage? (6)
8) Expression of which protein is increased in chronic drug useage? (1)
9) Which opioid receptor is most sensitive for dynorphin? (1)
10) What is the ultimate effect of high dynorphin levels on the VTA and dopaminergic fibres? (3)
11) Describe how long term opiate and cocaine use can lead to dysphoria associated with withdrawal and also tolerance to the drug? (5)
12) Give three types of substituted amphetamines. (3)
13) What is the chemical name (or abbreviation) of ecstasy. (2)
14) Which chemicals/ targets does MDMA act on? (4)
15) What are some of the behavioural actions of MDMA? (3)
16) What are acute side effects of MDMA toxicity? (4)
17) What effect does MDMA have on serotonin axons? (2)
18) What are the two cannabinoid receptors? (2)
19) What are some symptoms of cannabis intoxication? (4)
20) What is the general mechanism of action for cannabinoids? (4)
21) Name one CB1 agonist and one antagonist and give their uses? (2)
22) What are ways to manage opiate addiction and how to manage withdrawal symptoms? (4)
23) Give 4 ways you can manage alcohol addiction and withdrawal? (4)
ADDICTIVE BEHAVIOUR

1) What is the definition of addiction? (2)
2) What are the mechanisms of action of drugs? (3)
3) What is classical conditioning? (2)
4) What is operant conditioning and how is it different from classical conditioning? (2)
5) What is +ve and –ve reinforcement and how do they increase drug taking behaviour? (4)
6) What sorts of factors increase an individual’s vulnerability to drug dependence (positive and negative)? (4)
7) What sorts of factors increase an individual’s susceptibility to try drugs? (3)
8) What are some treatment options for coming off drugs? (6)