

Subjects list for Nervous System Lectures – December 2016

1. Nervous system components and subdivisions
2. Neuron: structure and compartmentalization
3. Features of axoplasmic transport
4. Classification of neurons
5. Neuronal and non-neuronal cells: types and characteristics.
6. Cell membrane potential: Resting membrane potential
7. Diffusion and the cell membrane potential. Nernst potential
8. Voltage-gated Na ion channels
9. Voltage-gated Ca ion channels
10. Ion pumps: characteristics, functions and examples
11. Membrane responses to stimulus current: hyperpolarization current, depolarization current, threshold current
12. Nerve action potential: phases, ionic conductance during AP
13. Nerve action potential: membrane refractoriness
14. Na channels distribution and generation of AP. Axon depolarization.
15. Myelin; saltatory conduction
16. Electrical synapse: structure, function, occurrence in the nervous system
17. Chemical synapse: Presynaptic mechanisms - mechanism of transmitter release;
18. Chemical synapse: Postsynaptic mechanisms: ionotropic, metabotropic;
19. Control of transmitter activity in the synaptic cleft;
20. Fast and slow chemical synapses - define and explain the differences between them
21. Presynaptic inhibition.
22. Glutamate
23. GABA
24. Acetylcholine
25. Norepinephrine
26. Dopamine
27. Serotonin
28. Ligand-gated ion channels: glutamate receptors
29. Ligand-gated ion channels: nicotinic and muscarinic Ach receptors
30. Ligand-gated ion channels: GABA receptors
31. Explain the differences between ionotropic and metabotropic receptors
32. Excitatory postsynaptic potentials (EPSPs)
33. Inhibitory postsynaptic potentials (IPSPs)
34. Glial cell functions at synaptic level
35. Skeletal muscle structure: components and their functions
36. Organization of proteins in a sarcomere
37. Excitation-Contraction coupling
38. Mechanism of muscle contraction
39. Neuromuscular junction
40. Nicotinic ACh Receptor
41. Motor unit
42. Muscle fatigue
43. Classification of the sensory receptors

44. Adaptation of sensory receptors. Tonic vs. phasic receptors
45. Sensory unit and the receptive field
46. Pain receptors and their stimulation
47. Types of pain: fast and slow
48. Referred pain
49. Visceral pain
50. Pain transmission in the spinothalamic tracts
51. External layer of the eye- components and function
52. Accommodation
53. Pupillary reflex
54. The lens system of the eye; focal point
55. Emmetropia and refraction errors
56. Visual acuity
57. Photopic and scotopic vision
58. Fluid system of the eye
59. Cellular organisation of the retina
60. Photoreceptor cells
61. Phototransduction
62. Colour vision
63. Optical pathway
64. Cochlea and the Corti organ- structure and function
65. Vestibular receptors- structure and function
66. Air conduction of the sound to the hair cells and signal transduction
67. Sound pitch and intensity determination
68. Hair cells innervation and the main auditory pathway neurons (the four neurons and location of the auditory cortex)
69. Vestibular pathway- neurons, connections and cortical projection
70. Olfactory mucosa- structure and function
71. Olfactory pathway- main neurons and cortical projection
72. Olfactory signal transduction
73. Taste receptors- location, structure and function
74. Gustative pathway and cortical projection
75. General structure of visceral reflex
76. Sympathetic nervous system efferents
77. Parasympathetic nervous system efferents