

NEUR 0010 Study Guide
Weeks 01, 02, 03 - Ronnie Li

Two different stains
- What types of molecules does each stain for?
- Do they stain every cell?

Two competing theories of neuroanatomy
- Who was responsible for each?
- Who was right? Was he completely right?

Golgi Type 1 and Type 2
- long or short axon?

Dendritic spines: which two disorders are associated with abnormalities?

Cytoskeleton
- name the three classes of support structures
- which class is the biggest?
Smallest?
- what are MAPs?

Explain the theory behind Alzheimer's Disease

Axoplasmic transport

- technical terms for the two directions
- proteins responsible for each direction
- name two viruses that use this type of transport

Glial cells

- name three classes and their general functions
- why are gliomas more common than neuromas?

Ion concentrations

- relative concentrations of four major ions in and out
- Na/K pump: how many Na in/out? How many K in/out?

Equilibrium potential
- E_{ion} for Na, K, Ca, Cl
- Nernst Equation: be familiar with logs

Terminology (define)
- ionic driving force
- ionic conductance
- ionic current
- depolarization
- hyperpolarization
- absolute refractory period
- relative refractory period

Action Potential
- draw a diagram, label the different phases
- what happens at each phase?

Voltage-gated Na channel
- ball and chain model
- three states: when during the action potential is it in each state?

Voltage-gated K channel
- two states
- why is it a “delayed rectifier?”

Drugs (yum)
- two channel toxins, what does each block?
- what do local anesthetics block? Example?

Gap junctions
- what is the protein that connects one cell to another?

Synapses
- three types of synapses
- define: synaptic density

Neurotransmitters (NTs)

- amino acids
- catecholamines
- monoamines
- peptides (two examples is enough)

Criteria to be a NT (4 of them)

Synthesis of NTs

- rate-limiting enzyme in catecholamine synthesis?
what inhibits it?
- amino acid precursor to all catecholamines
- amino acid precursor to serotonin

Dale's principle

Dense core vesicles

Describe Otto Loewi's experiment

Release of NT

- two types of SNAREs
- what ion is required?
- what is the sensor for that ion?
- difference in peptidergic neurons

Ligand-gated ion channels

- what are they? Are they fast/slow?
- what is the channel at the neuromuscular junction?
- three types of glutamate-gated ion channels

G-protein coupled receptors

- how many transmembrane domains?
- how many polypeptides?
- describe the general process of function

cAMP system

- draw the process
- what is the effector protein, substrate for the effector protein, second messenger?
- what do kinases do?

PIP2 system

- draw the process
- what is the effector protein, substrate for the effector protein, second messengers?

Describe spatial summation vs. temporal summation

What is the length constant?

<p>Termination of signal</p> <ul style="list-style-type: none">- three ways- what breaks down cAMP?- what removes phosphate groups?	
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