

Neurophysiology

[NU01](#) [al] The Nernst equation represents the potential at which:

- A. Electrical neutrality exists
- B. Concentration of ions on each side of membrane equal
- C. Potential at which there is no net movement of ions
- D. (?Balance of chemical & electrical forces?)
- E. Both sides are equiosmolar

[NU02](#) [g] Shivering that is ?mediated by the hypothalamus:

- A. . . ? . . muscle spindle to increase tone
- B. . . ? . . via red nucleus
- C. . . ? . . rhythmic stimulation of anterior horn cells
- D. Activation of shivering centre in brainstem

(see NU04)

- primary motor centre for shivering is located in the posterior hypothalamus, near the wall of the 3rd ventricle.
- normally inhibited by heat centre of hypothalamus
- excited by cold signals from skin/spinal cord.
- when excited, signals are sent bilaterally down brain stem, then lateral columns of spinal cord, and on to anterior horn motor neurons.
- signals are nonrhythmic. they cause increase in muscle tone, which is thought to trigger feedback oscillation of the muscle spindle stretch reflex mechanism, causing shivering.

[NU03](#) [hopq] Transection of a motor nerve leads to:

- A. ?Muscle fibre hypertrophy
- B. ?Increased/decreased RMP
- C. ?Increased/decreased receptors
- D. Increased spontaneous muscle activity ie fasciculations

Damage to lower motor neurons is indicated by abnormal EMG potentials, fasciculations, paralysis, weakening of muscles, and neurogenic atrophy of skeletal muscle

[NU05](#) [j] The setpoint in temperature regulation controls the body's response to changes in temperature. The location of sensory receptors which regulates the setpoint is:

A. Anterior hypothalamus

B. Posterior hypothalamus The set point may be determined by the ratio of sodium and calcium ions in the posterior hypothalamus

C. Spinal cord

D. Skin

E. Great veins

Alternative version:

The efferent limb of thermoregulation comes from

A. ?

B. ?

C. Anterior hypothalamus

D. Posterior hypothalamus

E. ?

[NU06](#) [k] Chemoreceptor trigger zone:

A. Both D2 and 5-HT3 receptors

B. ?(something about motion sickness)

C. Stimuli from blood and CSF

D. ?

E. ?

[NU07](#) [mn] ("Question about Pain" ?details)

A. Substance P acts on pain receptors

B. Any peripheral stimuli can activate pain receptors "nociceptive-specific" and "wide-dynamic range"

C. Dull C fibres and sharp pain A delta travel via the same fibres

D. ?

E. A delta & C fibres act on the same receptor. pain gate is A beta ie pressure & C fibres converge

A-delta fibres release glutamate > glutamate receptors

C fibres release Substance P which act on neurokinin 1 & substance P receptors So they can't both act on the same receptor.

NU08 [m] Cerebrospinal fluid (CSF):

A. Production is 150 ml / day 550mls/d with 3-4 turnover/day

B. Volume is 50 ml 150

C. Produced by choroidal blood vessels and ependymal cells 50% each

D. ?

E. ?

NU09 [opq] Which ONE of the following is characteristic of type A nerve fibres:

- A α fibres: proprioception/somatic motor function
- A β fibres: touch/pressure
- A γ fibres: motor to muscle spindles
- A δ fibres: pain/cold/touch

A = 12-120m/s, 2-5 μ m

B = myelinated - SNS

C = unmyelinated = 0.5-2.3m/s

A. Nociception yes but also other info

B. Slower conduction than C fibres

C. Myelinated

D. Substance P C fibres

E. Sensory only

F. Do not carry pain sensation

NU10 The sharp initial pain associated with injury is transmitted by:

A. Unmyelinated C fibres.

B. Unmyelinated A δ fibres. myelinated

C. Nerve fibres with a conduction velocity of approximately 15 m/s.

D. Nerve fibres which project to the anterior horn and the spinothalamic tract. dorsal

E. Nerve fibres with a diameter of less than 2 μ m

NU11 [Feb07] Which of the following is an excitatory neurotransmitter

- A. Glycine
- B. Glutamate
- C. Gamma amino butyric acid
- D. Serotonin
- E. Dopamine

[NU12](#) [Feb12] Nernst equation: $RMP = 6.1 + \log \frac{[outside]}{[inside]}$?? ... Some three letter acronym means what.

- A. units are mcV **mV**
- B. measured at 20 degrees C **25deg**
- C. if a negative ion, will be positive **all -ve**
- D. calculates the potential inside the cell
- E. can be calculated for an ion of any valency

[NU13](#) [Feb12] Duration of a typical Action potential of a large nerve fibre

- A. **0.4msec** **AP spike duration fibre type A**
- B. 0.04msecs
- C. 4msecs
- D. 40mses
- E. 400msec