

Interactive Example Candidate Responses

Paper 4 (May/June 2016), Question 8

Cambridge International AS & A Level Biology 9700

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8 (a) Fig. 8.1 is a diagram of a sensory neurone and some receptor cells.

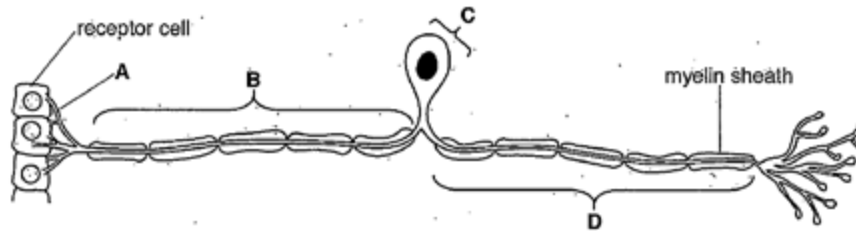


Fig. 8.1

Name the parts of the neurone labelled A, B, C and D.

- A dendrites
 B axon
 C cell body
 D dendron (axon) [4]

(b) Explain how the myelin sheath increases the speed of conduction of nerve impulses.

Myelin sheath insulates the axon. No action potentials occur in myelinated regions. action potentials only occur at nodes of Ranvier where myelin is absent. local circuits between node of ranvier makes the impulse jump from one node to another in what is called saltatory conduction. [2]

Your
Mark

8(a)

8(b)

8(c)

Q8	Mark scheme
(a)	<p>A – dendrite(s) ; B – dendron / (sensory) axon ; C – cell body (of neurone) / soma / centron ; D – axon (membrane) ; A terminal axon [4]</p>
(b)	<p>myelin insulates (axon) ; action potentials / depolarisation, only at nodes (of Ranvier) ; local circuits set up between nodes ; I local circuits at nodes action potentials / impulses, 'jump' from node to node or saltatory conduction [max 2]</p>
(c)	<p>only, stimulus / depolarisation / receptor potential / potential difference, that reaches threshold produces an action potential ; ora A -50mV for threshold A generator for receptor <i>idea that the action potential is the same size no matter how strong the stimulus ; ref. to all-or-nothing (law) ; I all-and-nothing</i> [max 2] [Total: 8]</p>

- (c) Fig. 8.2 shows the changes in the membrane potential of a sensory neurone when the receptor cells are stimulated.

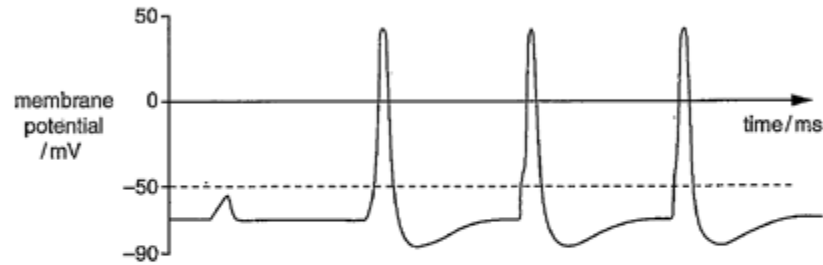


Fig. 8.2

Fig. 8.3 shows the strength of the stimuli applied to these receptor cells.

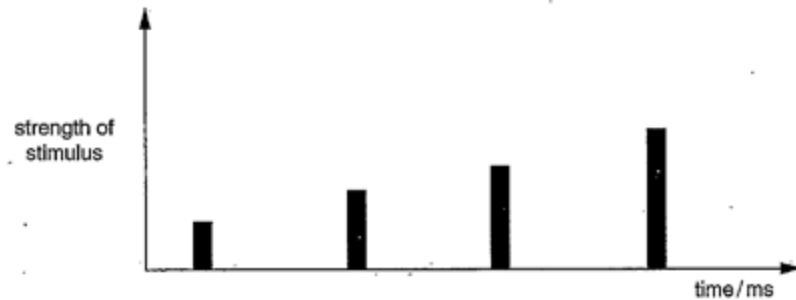


Fig. 8.3

With reference to Fig. 8.2 and Fig. 8.3, describe the relationship between the strength of the stimulus and the resulting action potential.

If the strength of stimulus is too low then the threshold won't be reached and action potential is not generated. Increasing the strength of stimulus increases the frequency of action potentials. Strength of stimulus doesn't affect potential difference of action potentials as all action potentials produced had the same P.d. [2]

[Total: 8]

Your
Mark

8(a)

8(b)

8(c)

Q8	Mark scheme
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(b)	<p>myelin insulates (axon) ; action potentials / depolarisation, only at nodes (of Ranvier) ; local circuits set up between nodes ; local circuits at nodes action potentials / impulses, 'jump' from node to node or saltatory conduction</p> <p>[max 2]</p>
(c)	<p>only, stimulus / depolarisation / receptor potential / potential difference, that reaches threshold produces an action potential ; or a A -50mV for threshold A generator for receptor</p> <p>idea that the action potential is the same size no matter how strong the stimulus ; ref. to all-or-nothing (law) ; all-and-nothing</p> <p>[max 2] [Total: 8]</p>

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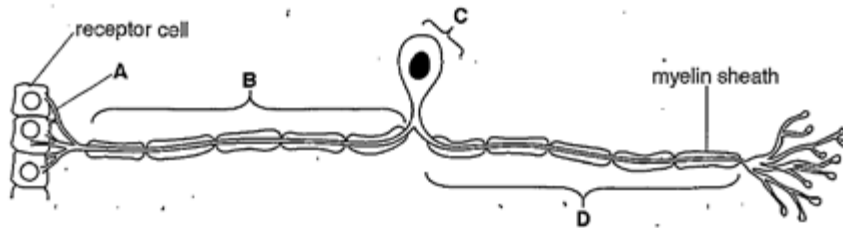


Fig. 8.1

Name the parts of the neurone labelled A, B, C and D.

- A dendrite
- B axon
- C cell body
- D axon [4]

(b) Explain how the myelin sheath increases the speed of conduction of nerve impulses.

- it ~~also~~ makes the impulse travel jumps
from nodes of ranvier to another by saltatory
movement. Increasing speed of conduction so time
it's impractical.
- [2]

Your
Mark

8(a)

8(b)

8(c)

Q8	Mark scheme
(a)	<p>A – dendrite(s) ;</p> <p>B – dendron / (sensory) axon ;</p> <p>C – cell body (of neurone) / soma / centron ;</p> <p>D – axon (membrane) ; A terminal axon [4]</p>
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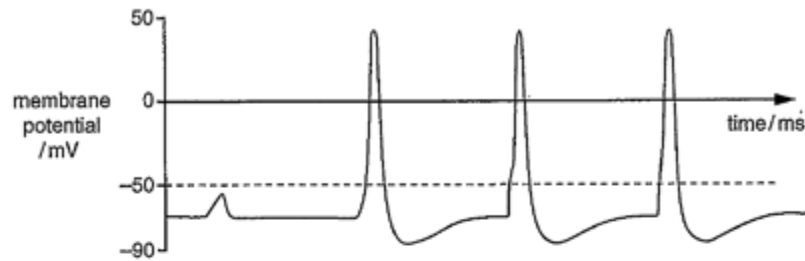


Fig. 8.2

Fig. 8.3 shows the strength of the stimuli applied to these receptor cells.

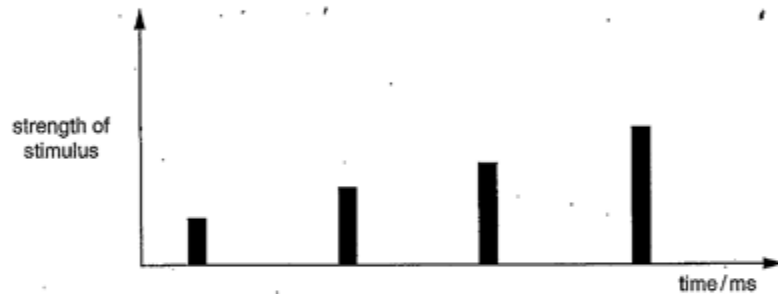


Fig. 8.3

With reference to Fig. 8.2 and Fig. 8.3, describe the relationship between the strength of the stimulus and the resulting action potential.

As more action potential is stimulated,
the strengths of stimulus increases.
Action potential happens at +30 v. means
it passed threshold.
If more impulses are given
each minute increases. [2]

[Total: 8]

Your
Mark

8(a)

8(b)

8(c)

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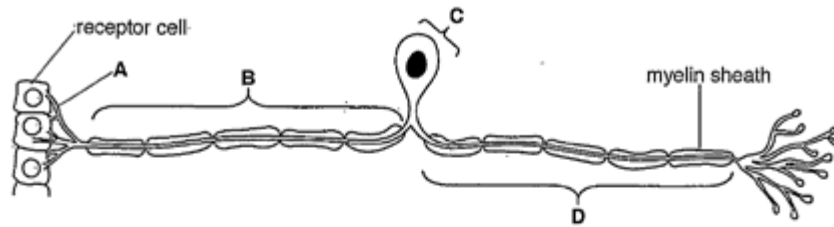


Fig. 8.1

Name the parts of the neurone labelled A, B, C and D.

- A dendrite
- B Sensory neurone
- C cell body
- D motor neurone [4]

(b) Explain how the myelin sheath increases the speed of conduction of nerve impulses.

- action potential occur each at different
- discrete
- each at node of ranvier
- local circuit occurs at node of ranvier
- [2]

Your
Mark

8(a)

8(b)

8(c)

Q8	Mark scheme
(a)	<p>A – dendrite(s) ;</p> <p>B – dendron / (sensory) axon ;</p> <p>C – cell body (of neurone) / soma / centron ;</p> <p>D – axon (membrane) ; A terminal axon [4]</p>
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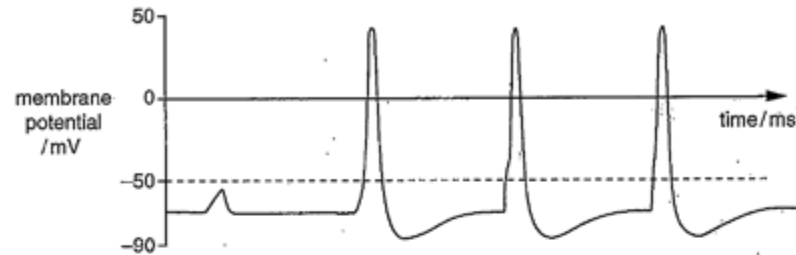


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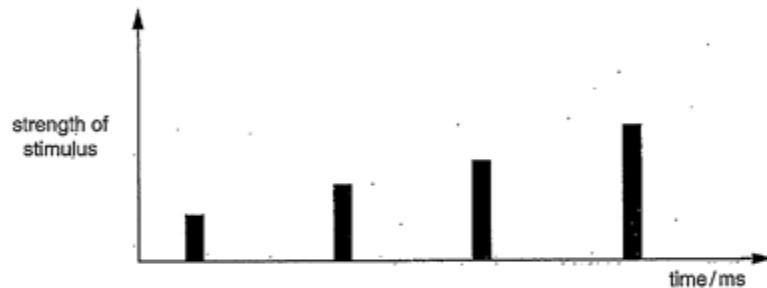


Fig. 8.3

With reference to Fig. 8.2 and Fig. 8.3, describe the relationship between the strength of the stimulus and the resulting action potential.

As the strength of stimulus increase the action potential increase, the first stimulus, potential difference didn't reach threshold so depolarization occurred at higher strength of stimulus, the potential difference reaches threshold, action potential occurs [2]

[Total: 8]

Your
Mark

8(a)

8(b)

8(c)

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