2013 Second Sitting  Paper 2  Question 17

2013-2-17  Describe the anatomy of the sympathetic nervous system

Posterior hypothalamus is the main site of **sympathetic nervous outflow**
Receives input from cardiovascular centres of medulla and pons

Sympathetic efferent outflow consists of two neurons in series
- Pre-ganglionic neuron
- Post-ganglionic neuron
Synapse in an autonomic ganglion

Exception is adrenal medullary outflow
- Modified post-ganglionic cells release adrenaline into circulation
- Innervated directly by pre-ganglion sympathetic fibres

Preganglionic neurotransmitter is acetylcholine (nicotinic receptors)
Postganglionic neurotransmitter is noradrenaline
(acetylcholine in muscles, sweat glands and hair follicles)

**Sympathetic outflow** is from T1 to L2
Sympathetic preganglionic fibres originate in the grey matter of the spinal cord lateral horn

**Leave the spinal cord** through ventral roots (with spinal nerves)
Leave spinal nerves, travel as white rami communicantes
(myelinated B fibres)
Meet with the ganglia of the sympathetic trunk
- Synapse with post-ganglionic neurons

**Sympathetic trunk:**
4 parts
- Cervical part
  - Head
  - Neck
  - Thorax
- Thoracic part (T1-T5)
  - Aortic plexus
  - Pulmonary plexus
  - Cardiac plexus
  - Thoracic splanchnic nerves
- Lumbar sympathetic ganglia
  - Coeliac plexus
- Pelvic part
  - Hypogastric plexus
  - Pelvic plexus
Post-ganglionic neurons leave the ganglia as grey rami communicantes
- Unmyelinated C fibres
Rejoin the spinal nerves to travel to target organs

Examiners Comments:
Knowledge of the anatomy of the sympathetic nervous system is important in helping to understand its physiology, and the pharmacology of drugs that affect it. Such information is widely available within most physiology, and even pharmacology texts when mentioning the sympathetic nervous system. In general candidates lacked depth and often were inaccurate in their description. A systematic approach (e.g. spinal levels, pre-ganglionic, post-ganglionic, etc.) was often lacking.

3 candidates passed (11.1%).