Pattern of Segmental Innervation of the Somatic Body Wall

The body has a segmental structure that has become modified and somewhat distorted by the development of the limbs. A body segment consists of a group of muscles, and an overlying area of skin supplied by a spinal nerve, an artery and a vein.

A spinal nerve:
- is formed by union of a ventral and a dorsal root
- emerges from the intervertebral foramen
- divides into an anterior primary ramus and a posterior primary ramus

The posterior primary ramus:
- Divides into medial and lateral branches
- Supplies the deep muscles of the back from both medial and lateral branches
- Supplies a strip of skin close to the posterior midline from one of the two branches
  - From the medial branch in the upper half of the body
  - From the lateral branch in the lower half of the body
- The posterior primary rami of C1, C7-8, L3-4 do not have a cutaneous branch

The anterior primary ramus of the thoracic nerves gives the following branches
- A collateral branch that supplies muscles
  - T1-T6 supply the intercostal muscles
  - T7 –T11 supply the intercostal and abdominal muscles
  - T12 and L1 supply the lower abdominal muscles
- A lateral cutaneous branch that divides into anterior and posterior branches to supply an oblique strip of skin of the antero-lateral body wall
- An anterior cutaneous (terminal) branch that supplies a strip of skin next to the anterior midline

The anterior primary ramus of T1:
- Gives a small branch to the muscles of the 1st intercostal space.
- Its main part crosses the neck of the 1st rib to join the lower trunk of the brachial plexus

The lateral cutaneous branch of T2 is the intercostobrachial nerve supplying the floor of the axilla (armpit)

The anterior primary ramus of L1 divides into two branches:
- Iliohypogastric nerve is the muscular branch to the lowermost abdominal muscles
  (It corresponds to the collateral branch of the thoracic nerves)
- Ilioinguinal nerve is the cutaneous branch to the skin over the pubis, the anterior half of the scrotum in males, or labia majora in females
  (It corresponding to the lateral cutaneous branch of a thoracic nerve)

The anterior primary rami of the other nerves form plexuses:
- C2,3,4 form the cervical plexus that supplies muscles and skin of the neck
- C5,6,7,8and T1 form the brachial plexus that supplies the upper limb
- L2,3,4.5, S1and S2 form the lumbo-sacral plexus that supplies the lower limb
- S3,4 form part of the sacral plexus that supplies the muscles of the pelvic floor and skin of the perineum