Each vertebral artery branches from the supero-posterior aspect of the first part of the subclavian artery at the level of the first thoracic vertebra. They are the main arteries that supply the cervical vertebrae and spinal cord, cerebellum, the interior of the cerebrum as well as the muscles of the neck.

Close to their origin, each vertebral artery ascends between the longus colli and scalenus anterior muscles, posterior to the common carotid artery and vertebral vein. At this level, each artery is situated anterior to the transverse process of C7, the cervicothoracic (or inferior) sympathetic ganglion and ventral rami of C7 and C8. It then passes through the foramen transversarium of C6 with a branch from the inferior sympathetic ganglion and vertebral venous plexus and ascends almost vertically through the foramina transversaria of C5 to C2, anterior to the ventral rami of C6 to C2. From the foramen transversarium of C2 (axis) the vertebral artery passes laterally to enter the foramen transversarium of C1 (atlas). Each artery lies medial to rectus capitis lateralis and curves postero-medially behind the lateral mass of C1, thereby leaving the first cervical ventral spinal ramus medial to it. Each vertebral artery then lies in the groove on the superior surface of the posterior arch of C1 and enters the vertebral canal below the inferior border of the posterior atlanto-occipital membrane. At this level the artery is covered by semispinalis capitis in the subcostal triangle and the dorsal ramus of C1 lies between the vertebral artery and the posterior arch. The vertebral artery subsequently pierces the dura and arachnoid mater, ascends into the skull through the foramen magnum and passes anterior to the roots of the hypoglossal nerve (XII cranial nerve). Once through the foramen magnum, the left and right vertebral arteries join at the lower pontine border and form the basilar artery.

Branches
The vertebral arteries have several branches including the spinal and muscular branches from the cervical region and meningeal, spinal and cerebellar branches from the cranial region.