

# Insula vascular supply

The insula receives most of its vascular supply from short perforating vessels originating from the M2 and M3 segments of the MCA <sup>1) 2) 3)</sup>.

These short perforators, often engulfed and hidden by the superficial aspects of the tumor, can be safely coagulated and cut during subpial resection, effectively devascularizing the tumor. The M2 segments also give rise to long perforating branches that travel posteriorly and superiorly on the insula and supply the [corona radiata](#) <sup>4)</sup>.

The superior branch of the middle cerebral artery supplies the majority of the anterior insular gyri, and the inferior branch supplies the majority of the posterior insular gyri <sup>5)</sup>.

It seems that all the arteries supplying the insula come from the [middle cerebral artery](#) (MCA), and predominantly from the M2 segment. Some of them arise from the M1 segment and from the M3 segment. Among the insular arteries, there are short and medium perforating arteries that supply the [extreme capsule](#), the [claustrum](#) and the [external capsule](#).

The [lenticular nucleus](#) and the [internal capsule](#) are vascularized by the [lenticulostriate artery](#), which are very important perforating vessels, particularly for motricity.

Some insular long perforating arteries that are as important as the lenticulostriate arteries arise from the MCA trunks, the early branches and the cortical arteries, as they cross the insula.

They most commonly penetrate into the posterior insular region and vascularize the corona radiata <sup>6)</sup>.

Arterial vascularization of the insula was studied in 20 human cadaver brains (40 hemispheres). The cerebral arteries were perfused with red latex to enhance their visibility, and they were dissected with the aid of an operating microscope. Arteries supplying the insula numbered an average of 96 (range 77-112). Their mean diameter measured 0.23 mm (range 0.1-0.8 mm), and the origin of each artery could be traced to the middle cerebral artery (MCA), predominantly the M2 segment. In 22 hemispheres (55%), one to six insular arteries arose from the M1 segment of the MCA and supplied the region of the [limen insulae](#). In an additional 10 hemispheres (25%), one or two insular arteries arose from the M3 segment of the MCA and supplied the region of either the superior or inferior periinsular sulcus. The insular arteries primarily supply the insular cortex, extreme capsule, and, occasionally, the [claustrum](#) and external capsule, but not the putamen, globus pallidus, or internal capsule, which are vascularized by the lateral lenticulostriate arteries (LLAs). However, an average of 9.9 (range four-14) insular arteries in each hemisphere, mostly in the posterior insular region, were similar to perforating arteries and some of these supplied the corona radiata. Larger, more prominent insular arteries (insulopercular arteries) were also observed (an average of 3.5 per hemisphere, range one-seven). These coursed across the surface of the insula and then looped laterally, extending branches to the medial surfaces of the opercula.

Complete comprehension of the intricate vascularization patterns associated with the insula, as well as proficiency in insular anatomy, are prerequisites to accomplishing appropriate surgical planning and, ultimately, to completing successful exploration and removal of pathological lesions in this region <sup>7)</sup>.

Tanriover found a total of 194 insular perforating arteries, equal to or larger than 0.3 mm in diameter, arising from the middle cerebral artery trunks, the early branches and the cortical and stem arteries as they crossed the insula. In Tanriover's study, the branches larger than 0.3 mm most commonly

arose from the central, angular and posterior parietal arteries and penetrated into the posterior half of the central insular and inferior limiting sulci and the long gyri. Twenty percent of the 194 larger insular perforating arteries had a diameter greater than 0.5 mm and were directed predominantly to the posterosuperior part of the long gyri <sup>8)</sup>.

All studies agree that there are insular perforators arising from the M2 segment and destined for the motor tract of the corona radiata. They explain that these perforators most commonly penetrate into the posterosuperior part of the insular long gyri.

But contrary to Tanriover, these arteries arise mainly from the precentral, central, anterior parietal and posterior parietal arteries, but only 3.3 % arise from the angular artery <sup>9)</sup>.

<sup>1)</sup> <sup>8)</sup>

Tanriover N, Rhoton AL Jr, Kawashima M, Ulm AJ, Yasuda A (2004) Microsurgical anatomy of the insula and the sylvian fissure. J Neurosurg 100:891-922

<sup>2)</sup> <sup>4)</sup> <sup>7)</sup>

Türe U, Yaşargil MG, Al-Mefty O, Yaşargil DC. Arteries of the insula. J Neurosurg. 2000 Apr;92(4):676-87. PubMed PMID: 10761659.

<sup>3)</sup>

Varnavas GG, Grand W: The insular cortex: morphological and vascular anatomic characteristics. Neurosurgery 44:127- 138, 1999

<sup>5)</sup>

Afif A, Mertens P. Description of sulcal organization of the insular cortex. Surg Radiol Anat. 2010 Jun;32(5):491-8. doi: 10.1007/s00276-009-0598-4. Epub 2009 Dec 10. PubMed PMID: 19997920.

<sup>6)</sup> <sup>9)</sup>

Delion M, Mercier P. Microanatomical study of the insular perforating arteries. Acta Neurochir (Wien). 2014 Oct;156(10):1991-7; discussion 1997-8. doi:10.1007/s00701-014-2167-9. Epub 2014 Jul 2. PubMed PMID: 24986536.

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