

Cerebral blood flow (CBF) regulation is essential for normal brain function. The mammalian brain has evolved a unique mechanism for CBF control known as neurovascular coupling. This mechanism ensures a rapid increase in the rate of CBF and oxygen delivery to activated brain structures.

CBF is tightly regulated to meet the brain's metabolic demands.

Ischemia results if **blood flow** to the **brain** is below 18 to 20 ml per 100 g per minute, and tissue death occurs if flow dips below 8 to 10 ml per 100 g per minute.

CBF < 20 is generally associated with **ischemia** and if prolonged will produce **cell death** ¹⁾.

The arteries deliver oxygenated blood, glucose and other nutrients to the brain, and the veins carry deoxygenated blood back to the heart, removing carbon dioxide, lactic acid, and other metabolic products. Since the brain is very vulnerable to compromises in its blood supply, the cerebral circulatory system has many safeguards including **autoregulation** of the blood vessels and the failure of these safeguards can result in a stroke. The amount of blood that the cerebral circulation carries is known as cerebral blood flow. The presence of gravitational fields or accelerations also determine variations in the movement and distribution of blood in the brain, such as when suspended upside-down.

¹⁾

Astrup J, Siesjö BK, Symon L. Thresholds in cerebral ischemia - the ischemic penumbra. Stroke. 1981 Nov-Dec;12(6):723-5. PubMed PMID: 6272455.

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