

What are the three layers of tissue that cover the brain? Describe the function of two of them.

The dura mater (hard mother) is the outer and toughest coating. The arachnoid (so named because its hairs are “spider-like”) is the middle layer. The pia mater (delicate mother) is the innermost covering, and can be compared to the visceral pericardium of the heart in that it adheres to the brain and will tear the brain if the two are forced to separate.

The dura mater is a hard protective covering, and separates the left and the right side of the brain. The arachnoid layer holds the arteries that supply the brain and the veins that carry the blood away from it, but also has a special function. The arachnoid villae, which are housed in the brain's sinuses (open spaces), secrete cerebrospinal fluid, which covers the brain and has three purposes: a) It provides physical protection and buoyancy for the brain, b) it provides chemical protection and c) it circulates nutrients.

How does the the Circle of Willis provide insurance against brain infarction?

The brain is supplied with blood through the internal carotid artery and the basilar artery (where the left and right vertebral arteries meet), which join to form the Circle of Willis, named after Dr Willis, who discovered it. It provides insurance against infarction (blockage of a tissue's blood supply) by providing a way for blood to get around to all parts of the brain in the event of an artery being blocked.

Unfortunately, some people are born with an incomplete Circle of Willis, and these people are in more danger of damage to the brain if an artery fails.