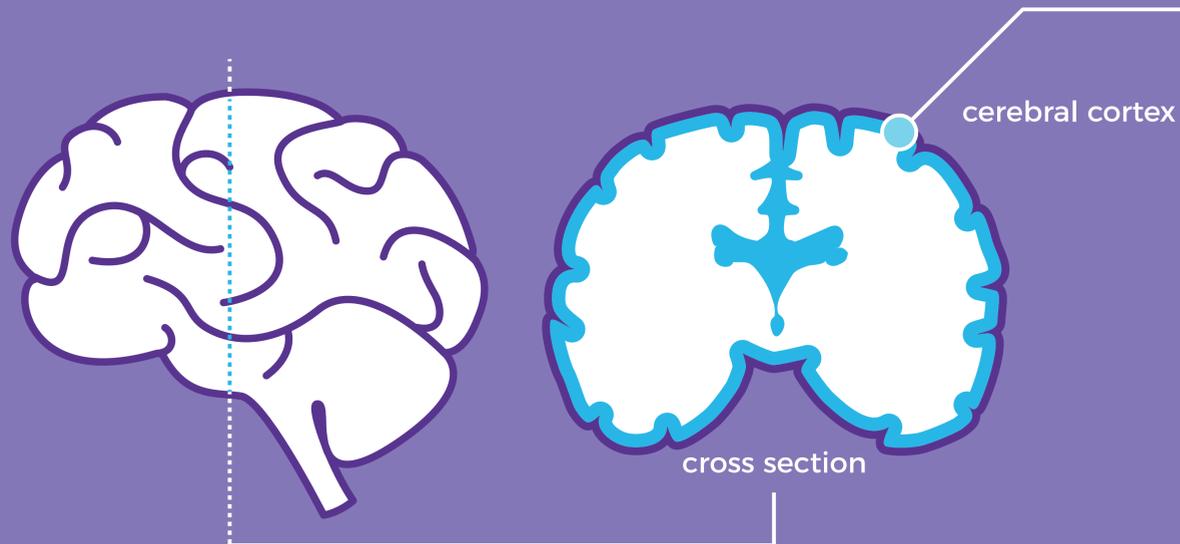


# Role of nutrients in brain structure and function

Like any other organ, the brain needs specific nutrients to function properly.<sup>1,2</sup>



Adult human brain:

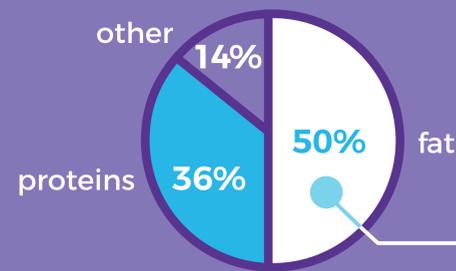
weight<sup>4</sup>



total energy expenditure<sup>1</sup>



dry weight<sup>5</sup>



Neurons form a communication network by connecting with each other through junctions called synapses.<sup>2</sup>

Average number of neurons in the brain<sup>6</sup>:

**86,000,000,000**



Nutrients are involved in many different synaptic processes, such as neurotransmitter and phospholipid synthesis.<sup>1</sup>

Neurotransmitters are the key molecules in the communication at synapses, and their synthesis depends on ingested nutrients.

Estimation of total number of synapses in the cerebral cortex<sup>7,8</sup>:

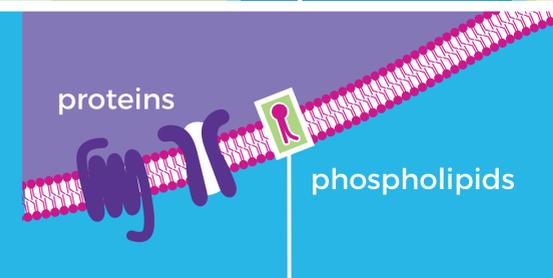
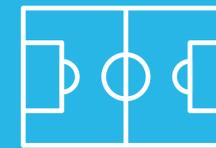
**60-240 trillion**



Phospholipids are major building blocks of synaptic membranes.

Total membrane surface area in the brain<sup>9</sup>:

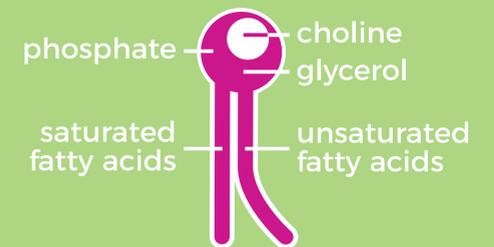
**4x**



Phospholipids are made from ingested nutrients, e.g. DHA, uridine, choline, folate.<sup>1,3</sup>

phospholipid fraction<sup>4</sup>:

**50%**



The brain needs lifelong nourishment to maintain its structure and function and to help ensure optimal cognitive performance.<sup>1</sup>

**Choline**

precursor for the neurotransmitter acetylcholine.

**Vitamin B6**

cofactor in the synthesis of the neurotransmitters serotonin, dopamine, and noradrenaline.

**Vitamin C**

cofactor for synthesis of the neurotransmitter noradrenaline.

**Folate**

essential in the one-carbon metabolism, which is involved in the synthesis of neurotransmitters and phospholipids.

**Tryptophan**

precursor for the neurotransmitter serotonin.

**DHA**

docosahexaenoic acid, an omega-3 polyunsaturated fatty acid present in neuronal membranes and which influences membrane-related processes such as neurotransmission.

**Vitamin E**

antioxidant that protects cell components, like the neuronal membranes, from oxidation by free radicals.

**Tyrosine**

precursor for the neurotransmitters dopamine and noradrenaline.

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