Fat on the brain

We need fats for our nervous system

Your brain is 60 per cent fat.

As the human brain develops in the womb and in childhood, it needs a constant fatty acid supply to support the growth of nerve cells (neurons). Even the adult brain needs fat to maintain the membranes and myelin sheaths surrounding these cells – all 86 billion of them – and in comparison to the protein components of neurons, the fatty components need to be replaced more regularly.

The myelin sheath is a fatty insulating layer that speeds transmission of nerve impulses along neurons. It is produced by oligodendrocytes in the central nervous system and Schwann cells elsewhere.

Without myelin, our nervous systems couldn’t function properly. In multiple sclerosis, people gradually lose the myelin in parts of their brain, which causes problems with movement, sight and thinking. In the 1990s, scientists found that people with multiple sclerosis had very low levels of certain fatty acids in their red blood cells and plasma.

We think of fish as brain food, partly because the omega-3 oils found in oily fish are key to a healthy brain. Studies have linked mental health conditions such as depression and hyperactivity to low or altered levels of essential fatty acids. Beware bogus claims, however.

It’s not clear whether we get the benefits of omega-3 when it is taken in fish oil supplements. For example, some recent studies suggest the supplements do little to prevent the decline of brain function in older people. There is a billion-dollar industry built on fish oil supplements, but the evidence for beneficial effects for a range of conditions is mixed.

REFERENCES

- Essential fatty acids and human brain (2009)
- Nature: Are there really as many neurons in the human brain as stars in the Milky Way?

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ABOUT THIS RESOURCE

This resource first appeared in ‘Fats’ in December 2015. Published by the Wellcome Trust, a charity registered in England and Wales, no. 210183.
bigpictureeducation.com
• Nature: Myelin – a specialized membrane for cell communication

• Effect of fish oil on cognitive performance in older subjects: a randomized controlled trial (2008) [PDF]