

Brain power goes green

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Our brains, it turns out, are eco-friendly. A study published in *Science* and reviewed by F1000 Biology members Venkatesh Murthy and Jakob Sorensen reveals that our brains have the amazing ability to be energy efficient.

Brain cells generate and propagate nerve impulses, or action potentials, by controlling the flow of positive sodium and [potassium ions](#) in and out of the cells. Re-establishing the ion equilibrium after an action potential requires energy.

The amount of energy needed for action potentials was previously estimated using a giant nerve cell from squid. Now, researchers at the Max-Planck Institute for Brain Research in Germany show that squid cell studies overestimated the amount of energy necessary to generate an action potential by almost a factor of four, suggesting human brains have the same potential to be energy efficient.

The researchers used a novel technique to record the voltage generated by [nerve cells](#) to "show that a rather subtle separation between the timing of sodium entry and potassium exit during action potentials can determine how much [energy](#) is expended to maintain the ionic gradients," Murthy says.

Murthy goes on to say that "[these results] are important, not just for a basic understanding of [brain metabolism](#), but also for interpreting signals detected by non-invasive [brain](#) imaging techniques." Sorensen concludes that "the amazing thing is that we didn't realize the result a long time

ago!"

More information: The full text of this article is available free for 90 days at www.f1000biology.com/article/t...2cs29949r/id/1164821

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