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Can EPA-rich supplements help brains work 'less hard' and boost mental performance?

By Stephen DANIELLS , 10-Feb-2014

Last updated on 11-Feb-2014 at 18:39 GMT



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Omega-3 supplements rich in EPA may improve cognitive performance with a reduction in neural activity observed, indicating that the brain worked 'less hard', report researchers from Australia.

On the other hand, DHA-rich supplements were associated with an increase in functional activation and no improvement in cognitive performance, according to results published in *Human Psychopharmacology: Clinical and Experimental*.

Isabelle Bauer from Swinburne University and her co-authors said that this indicated that DHA-rich supplements are

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magnetic resonance imaging (fMRI) to map functional brain activation.

Participants were randomly assigned to 30 days of supplementation with either the EPA-rich formulation (Eye-Q, Novasel) or the DHA-rich formulation (Efalex, Efamol).

less effective than EPA-rich supplements for boosting neurocognitive functioning.

However, Harry Rice, PhD, VP of Regulatory & Scientific Affairs for the Global Organization for EPA and DHA Omega-3s (GOED), told us that, while the results are fascinating, he is not certain how to interpret them given this isn't a valid EPA to DHA comparison.

"That is, the EPA-rich formula contained 590 mg EPA and the DHA-rich formula contained 417 mg DHA, a difference of 173 mg. Without a 1:1 comparison, a conclusion that EPA is more effective than DHA in enhancing neurocognitive functioning is unsubstantiated," said Dr Rice.

The Swinburne University researchers addressed this point, noting that a [2010 study by Robert McNamara](#) from the University of Cincinnati used a similar DHA dose and found it sufficient to increase the functional activation in the various brain regions during a visual attention task.

Study details

Bauer and her co-workers recruited 13 people with an average age of 24 to participate in their double-blind, counterbalanced, crossover study, which used functional

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This was followed by a 30-day 'washout' period and then crossing over to the other intervention group.

Results showed that the ratio of arachidonic acid (AA) to EPA was decreased in both groups. The EPA-rich supplements were associated with reductions in functional activation in the left anterior cingulate cortex (said to be involved in rational cognitive functions, including decision-making, reward anticipation, and impulse control), increases in activation in the right precentral gyrus (responsible for implementing corrective strategies) in the brain, and reductions in reaction times. On the other hand, increases in the right precentral gyrus were observed following DHA-rich supplementation, but there were no changes in behavioural performance recorded.

"That neural efficiency reflects a relationship between cognitive performance and brain effort perhaps helps us understand why previous reports on the effects of omega-3 supplementation on cognitive performance have been inconsistent," explained the researchers.



"The essence of neural efficiency is an interplay between cognitive performance and brain effort. Humans tend to modify their brain activity to maintain an acceptable level of performance. Hence, when only cognitive function is measured, without taking into account brain activation levels, one might expect this inconsistent interaction between supplementation and performance (leaving aside differences in the literature in terms of

age group and omega-3 content of food ingested)."

They also noted that EPA and DHA have different rates of incorporation into cell membranes, with EPA reported to be rapidly esterified into phosphatidylcholine phospholipids located in the outer layer of the membranes, while DHA is thought to be slowly incorporated into the

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phosphatidylethanolamine phospholipids in the inner layers of the membranes. Despite these differences, it is not known if the mechanism of neurocognitive changes observed in this study requires incorporation of the fatty acids into the membrane.

“By extending the theory of neural efficiency to the within-subject neurocognitive effects of supplementation, we concluded that following the EPA-rich supplementation, participants’ brains worked ‘less hard’ and achieved a better cognitive performance than prior to supplementation,” wrote the researchers.

“Conversely, the increase in functional activation and lack of improvement in time or accuracy of cognitive performance following DHA-rich supplementation may indicate that DHA-rich supplementation is less effective than EPA-rich supplementation in enhancing neurocognitive functioning after a 30-day supplementation period in the same group of individuals.”

The study was funded by Novasel Australia.

Source: [Human Psychopharmacology: Clinical and Experimental](#)

Published online ahead of print, doi: 10.1002/hup.2379

“Omega-3 supplementation improves cognition and modifies brain activation in young adults”

Authors: I. Bauer, M. Hughes, R. Rowsell, R. Cockerell, A. Pipingas, S. Crewther, D. Crewther

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