Gamma Tocopherol Under Attack

Researchers at Ohio State University report that their test tube experiments using metabolites of two common forms of Vitamin E – alpha tocopherol and gamma tocopherol – injected directly into brain cells have shown that the alpha tocopherol metabolite protects brain cells in vitro (in test tubes, not live animal models) while the gamma tocopherol metabolite seems to damage brain cells in vitro. 1

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Bloomingdale, IL (PRWEB) March 9, 2006 -- Researchers at Ohio State University report that their test tube experiments using metabolites of two common forms of Vitamin E – alpha tocopherol and gamma tocopherol – injected directly into brain cells have shown that the alpha tocopherol metabolite protects brain cells in vitro (in test tubes, not live animal models) while the gamma tocopherol metabolite seems to damage brain cells in vitro. 1

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Foods or supplements containing Vitamin E family members will inevitably contain both forms, as well as measures of the 6 other isomers. These nutrients work as a team and occur together in Vitamin E-rich foods. 2-7 A person can’t eat a food or take a supplement containing isolated gamma tocopherol. That would only happen if a laboratory isolated that nutrient from a food that had also contained other forms of Vitamin E.

In this study the lab went far beyond this, producing metabolites of gamma tocopherol and alpha tocopherol and injecting them (separately) directly into cells.

This study really has no direct bearing on diets containing Vitamin E in forms that include both alpha and gamma tocopherol, nor on common supplement forms. We do not eat these isomers or their metabolites in isolation, and they do not directly flood brain cells as they follow their normal metabolic pathways. This is an artificial scenario that must be confirmed by in vivo (live animal or human) studies to validate that this theoretical effect actually happens within the body when the live beings consume multiple forms of Vitamin E in their diet or through supplementation. Since this brain cell damaging effect has not previously been noted in the clinical literature, it is not likely to be a real life concern.

As the study’s authors point out, there is a preferential transport mechanism for alpha tocopherol. 8-10 That is a key reason that the authors chose to perform this experiment to explore the different effects of alpha and gamma tocopherol. But they then chose not to test the same forms found in the diet.

The authors also tested whether adding NAC, another antioxidant, would reduce the damage associated with the gamma tocopherol metabolite and found that it did. This confirms the often-forgotten concept that antioxidants operate as a family and emphasizes that most current studies done on antioxidants, such as Vitamin E, suffer in
accuracy by not looking holistically at real-life situations where antioxidants operate as a team and recharge each other, offering functional cellular protection that is often lacking with the application of a single antioxidant nutrient; or in this case, a metabolite. There is previous evidence that gamma tocopherol is a better antioxidant and has different health benefits than alpha tocopherol, so the combination of both forms may provide superior protection to cells. The desmethyl (gamma and delta) forms of both tocopherols and tocotrienols show greater antioxidant potential and cellular health benefits than alpha tocopherol alone.11-19

I would argue that any antioxidant study that fails to utilize in vivo evidence or that fails to take into account the total antioxidant status of the individual may not provide reliably repeatable results due to a failure to measure interactive nutrients. This illuminates the reason for the often contradictory results reported in antioxidant research: the researchers often fail to measure or control additional antioxidant variables in the subjects’ diet. 20-21

This study starts out on the wrong path by assuming that the preferential transport mechanism for alpha tocopherol means that gamma tocopherol may be harmful to the body. It then compounds the error by injecting a metabolite form of gamma tocopherol - that admittedly may not even exist in the body in significant quantities – into cells in a test tube setting. It is only a theory that taking gamma tocopherol supplements, which are not sold in isolation from other tocopherol isomers, may increase the levels of its metabolites in the body and that other antioxidants present in the body may not provide sufficient counterbalance to prevent side effects.

Ironically, the theory that gamma tocopherol supplements may increase the level of these metabolites in the body has not even been tested, much less proven, by this study. The successful use of NAC in this study to counter the metabolite artificially introduced to brain cells in vitro argues that the theory that this metabolite may damage brain cells in vivo is seriously flawed.

It would be unfortunate if this study generates headlines that falsely imply that harm from consuming gamma tocopherol – from foods or dietary supplements - has been demonstrated in this totally artificial scenario. That would be inaccurate reporting.

This study only shows that isolated metabolites introduced into brain cells in a test tube may cause cell damage, not that any of this actually occurs in living beings. If it generates headlines scaring people away from this beneficial nutrient, they would be guilty of causing “much ado about nothing”.

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