Green Tea for HIV?

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A component of green tea blocks the ability of HIV to enter CD4 cells, according to the results of test tube studies reported by researchers at the University of Sheffield in the United Kingdom and Baylor College of Medicine in Houston. The encouraging research is published in a recent issue of the Journal of Allergy and Clinical Immunology.

Green tea is a nonoxidized, unfermented product of leaves from Camellia sinensis, an evergreen plant. It is made up of catechins, chiefly epigallocatechin gallate (EGCG), and has been credited with possessing health benefits, including cancer and cardiovascular disease prevention properties. Studies have also suggested that EGCG can prevent HIV from binding the CD4 cells, although the reason for this has remained a mystery.

Using the tools of computational and structural biology, the University of Sheffield and Baylor College of Medicine researchers modeled the structure of the EGCG molecule to find the mechanism by which it prevents the HIV gp120 protein from binding to receptors on CD4 cells.

“We found that the EGCG molecule itself binds to the same exact binding pocket on the CD4 molecule at the site of the same amino acids to which gp120 binds,” said Baylor’s Christina Nance, MD, PhD. “When it binds there, the gp120 envelope protein, and thus HIV, can’t.”

According to Dr. Nance, the investigators were determined to show that physiological levels of EGCG – an amount achieved by drinking just two cups of green tea – caused inhibition of gp120 binding to CD4 cells. After all, artificially high concentrations of EGCG placed in test tubes to inhibit binding have no meaning for patients.

The test tube studies suggested that EGCG concentrations as low as 0.2 mmols/L – the amount of the molecule found in a cup or two of green tea – reduced HIV-CD4 cell binding by 40%.

Today, Dr. Nance and her colleagues are trying to develop a three-dimensional replica of the molecule for a definitive determination of EGCG binding and inhibition of HIV. From that, researchers may be able to model synthetic molecules that might be even better at inhibiting HIV binding, or additives that could make the EGCG activity more sustainable.

EGCG has already been studied in cancer, Dr. Nance said. Those studies have shown it to be safe and non-toxic. However, its effect on immunological cells is not yet determined. Her group is currently doing studies of those effects in the laboratory at Texas Children’s Hospital.

Dr. Nance does not recommend that people drink large quantities of green tea with the expectation that it will prevent infection with HIV. These studies, she said, were designed to determine whether a drug derived from green tea would have that effect. A Phase I/II clinical trial of EGCG is being planned.

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