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UTSW specialists tracking how brain's pleasure chemical reacts to UV light in study on tanning

DALLAS – Aug. 12, 2013 – Neuroimaging specialists at UT Southwestern Medical Center are launching the first clinical trial involving frequent and infrequent tanners designed to identify whether UV light triggers the brain's pleasure sensors.

The study, dubbed GOLDEN for Gauging of Light-Dependent Experiences through Neuroimaging, will assess levels of dopamine, the brain's pleasure chemical, before and after exposure to ultraviolet (UV) rays in frequent and infrequent tanners.

"When you give somebody alcohol or cocaine – or anything rewarding – you see an increase in dopamine in the brain," said Dr. Bryon Adinoff, professor of psychiatry who leads the division on addictions. "This will be the first study to explore whether dopamine is released in response to UV light, and the first to look at whether there are brain differences in people who compulsively tan compared to those who don't."

Researchers are seeking about 20 local study participants between 18 and 45 years of age. For details, call 214-645-6901 or go to [Dopamine Response to Ultraviolet Light in Frequent and Infrequent Tanners](#).

Dr. Adinoff's previous studies in compulsive tanners showed increased blood flow in areas of the brain related to reward during tanning, and noted that compulsive tanning shares similarities to other addiction behaviors. While a good first step, Dr. Adinoff said the GOLDEN study is needed to determine what UV light physically does to specific brain receptors and to make crucial comparisons between those who tan frequently and those who do not.

"Blood flow is a relatively nonspecific marker. What rewards do more specifically is they increase dopamine," he said. "We hypothesize that the increase in dopamine will be less in the frequent tanners compared to the infrequent tanners."

The GOLDEN investigation seeks to answer two questions:

1. When UV light is administered, does dopamine increase in the brain?
2. Is there a difference in dopamine receptors in people who compulsively tan compared to those who don't?

Researchers will use a single-photon emission computed tomography (SPECT) scan, similar to

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a PET scan, of the brain to track a compound that attaches to dopamine receptors. The more receptors, the more the compound attaches. When dopamine is released it pushes the compound off the receptors. Comparing the compound's levels before and after exposure to UV light allows researchers to indirectly track how much dopamine is released.

Eventually, researchers hope to raise money to design and build a unique machine that would allow them to control the UV frequency during functional magnetic resonance imaging (fMRI) scans that would show brain reactions in real time. Currently, the metal of the tanning machines interferes with MRI scans. UT Southwestern, UT Dallas, and UT Arlington are collaborating on such a potential design.

“We would have to design a new type of tanning light. By doing that, we could then also change the frequency in real time,” Dr. Adinoff said. “We could look at specific frequencies of UV light and see how they influence the brain.”

The GOLDEN study is supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases.

Dr. Adinoff's UT Southwestern colleagues in the trial include Dr. Michael Devous, professor of radiology, and Dr. Heidi Jacobe, associate professor of dermatology. Other collaborators include Dr. Francesca Filbey, assistant professor at the Center for BrainHealth at UT Dallas; and Dr. John Seibyl, CEO, co-founder, and senior scientist at the Institute for Neurodegenerative Disorders.

About UT Southwestern Medical Center

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