



SRNT Newsletter

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Research Activities at a Featured Program: The Duke Center for Nicotine and Smoking Cessation Research

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by Jennifer W. Barnett

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*Jed Rose, Ph.D.,
CNSCR Director*

The Center for Nicotine and Smoking Cessation Research (CNSCR) at Duke University seeks to develop, evaluate, and disseminate new methods of smoking cessation, and to find new applications and combinations of existing treatments. The CNSCR, originally established at UCLA as the Nicotine Research Program, became a part of Duke in 1989. In 2004, with financial support from Philip Morris, USA, it was expanded into the CNSCR. The main goal of the expansion has been to allow for the development of more advanced research. Over the years, the Nicotine Research Program's work led to several smoking cessation treatments, including the nicotine skin patch.

Under the direction of founder **Jed Rose**, Ph.D., the CNSCR brings together researchers examining different facets of the complicated issue of nicotine addiction. The CNSCR conducts Phase II and III human subject trials that assess the effects of nicotine on smoking behavior and the ability of subjects to quit smoking successfully. Researchers also use pre-clinical models (including effects of nicotine on rodents) to address the questions about nicotine and medications that are more difficult to address in human subjects. The overarching goals of the CNSCR's multi-faceted approach to research are to elucidate the biological and psychosocial mechanisms underlying nicotine addiction and dependence, and then to integrate research findings across disciplines to arrive at a clear understanding of nicotine use and addiction. Researchers hope their understanding of nicotine addiction can be used to promote the development of more effective smoking cessation treatments.

The CNSCR's approach to research focuses on the following key strategies:

- Evaluation of rational combinations of existing behavioral and pharmacologic approaches to smoking cessation treatment;
- Determination of which treatments are most effective for different subpopulations of smokers, based on demographic, genetic, medical, or psychological classifications;
- Study of the motivations underlying tobacco addiction, such as cognitive enhancement, mood regulation, or weight control, so that more effective replacement or blockade treatments might be designed; and,
- Identification of novel compounds that show promise for medication development through laboratory and animal studies.

Current Research

The largest of the CNSCR's most recent studies explores the use of Nicotine Replacement Therapy (NRT) for two weeks before a target quit smoking date. The purpose of the study is to explore whether smoking in the presence of continuous levels of nicotine attenuates the reinforcing effects of cigarette smoking and leads to a decline in dependence on inhaled nicotine, thus facilitating cessation. Based on preliminary results from the first 236 participants, results suggest that wearing nicotine patches two weeks before the quit-date has the potential advantage of doubling abstinence rates without substantially increasing nicotine exposure over baseline levels.

A second current project evaluates whether the use of Donepezil and Mecamylamine will help subjects switch from high nicotine-content cigarettes to low nicotine-content cigarettes. The study hypothesizes that using Donepezil in conjunction with Mecamylamine will enhance the efficacy of Mecamylamine in terms of abstinence, by reducing or offsetting the Mecamylamine-related side-effects.

A third study, in collaboration with Wake Forest University, focuses on differences in nicotine absorption and brain effects of nicotine between dependent smokers and chippers. Smokers are asked to take a puff of a cigarette containing C-11 nicotine or receive a C-11 injection through an IV tube, and then receive a lung scan using Positron Emission Tomography (PET) imaging. CNSCR researchers hope to determine the action of nicotine and the mapping of the pharmacokinetics of inhaled nicotine.

Planned Studies

In addition to the current studies, CNSCR researchers are planning a number of upcoming Phase II and Phase III studies that examine all aspects of nicotine addiction and cessation methods. Among the planned studies are:

- A collaboration with Womack Army Medical Center (on the Fort Bragg Military Base in Fayetteville, NC) investigating whether a low carbohydrate and/or low calorie diet can prevent weight gain in smokers trying to quit.
- A Phase III trial investigating the use of an oral nicotine solution for smoking cessation treatment.
- A study exploring the feasibility of developing a lung-delivery nicotine inhalation system, which would deliver a dose of nicotine similar to that of cigarette smoking, having a similar pharmacokinetic profile, but without any of the combustion products

(e.g. carbon monoxide) or carcinogens (e.g. nitrosamines) present in cigarette smoke.

In addition to research evaluating new treatments in normal healthy volunteers, CNSCR researchers are also interested in studying cigarette smoking in patients with disorders including substance abuse, affective disorders, ADHD, PTSD, and schizophrenia.

Sharing the results

CNSCR researchers, along with top researchers from other universities, discuss their findings each year at the Duke Nicotine Research Conference, presented annually by the CNSCR. This year's conference focuses on *Individualizing Smoking Cessation Treatments: What Works Best for Whom?* and will be held October 12 on the Duke University Campus. This exciting forum brings together researchers from all over the world who have a common goal: to end nicotine and tobacco addiction. More information about the conference may be found at: <http://www.cnscri.org>.

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