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Experimental Program to Stimulate Competitive Research

# LSUHSC Research Breakthrough Could Limit Brain Trauma Damage

The irreversible brain damage that occurs during the first hours following a stroke or head injury could be limited or even avoided by activating a new survival brain mechanism discovered by Dr. Nicolas Bazan and his team of researchers at the LSU Health Sciences Center in New Orleans (LSUHSC). In addition, Dr. Bazan has invented and patented a new drug to achieve the same goal.

When brain cells are damaged by trauma, seizure, or in such neurodegenerative diseases as Alzheimer's, a chain of events leading to a form of cell death known as apoptosis is set in motion. "If effective neuroprotective drugs were given at the earliest possible moment after stroke or head trauma, catastrophic brain damage might be avoided or greatly limited. They could be used by emergency-room physicians on stroke victims and by other first-responders at the scene of car accidents, sports injuries and other head trauma situations," says Dr. Bazan.

Dr. Nicolas Bazan, director, Neuroscience Center of Excellence, LSU Health Sciences Center-New Orleans, left, and Dr. Victor L. Marcheselli, research assistant professor, in one of the Center's state-of-the-art laboratories.

It was while conducting research funded by the National Science Foundation (NSF) EPSCoR program that Dr. Bazan discovered a chemical signal made in the brain that promotes survival of the brain and retina: Neuroprotectin D1 is the name he gave to this new brain messenger. It has the potential to protect the eyes and brains of people who suffer a stroke or head trauma, blinding diseases of the retina such as age-related macular degeneration, and other neurodegenerative diseases.

In addition, supported by the NSF-EPSCoR, Dr. Bazan and his colleagues invented and patented a synthetic neuroprotective drug, named LAU-0901, which inhibits the infiltration of white cells and other changes that contribute to the severity of stroke. "When we administered LAU-0901 to mice after an experimental stroke, the amount of stroke-damaged brain tissue was reduced by approximately one half," adds Dr. Bazan.

"Our discovery is opening up an entirely new area of research. We are beginning to understand how the brain, using its own chemicals, can stand up to and fight insults, trauma or neurodegeneration." *(See page 2)*

## Neuroscience Research Impacts the Economy

"At the same time we are researching conditions with no cure, we are also impacting Louisiana's economy," says Dr. Nicolas Bazan, director of the LSUHSC Neuroscience Center for Excellence.

"We are attracting external funding and creating highly paid positions. By identifying and recruiting outstanding faculty, we build a critical mass of expertise, a tangible asset.

"We're educating Louisiana students to fill positions in the biomedical professions. Our annual Summer Undergraduate Neuroscience program offers students hands-on experiences in laboratory research and education in neuroscience, with the goal of stimulating an interest in biomedical research, neuroscience, and medicine as a career."

In the past seven years, the Center has been awarded $64 million in external funding, of which $24 million is a direct result of the NSF EPSCoR-funded grant.

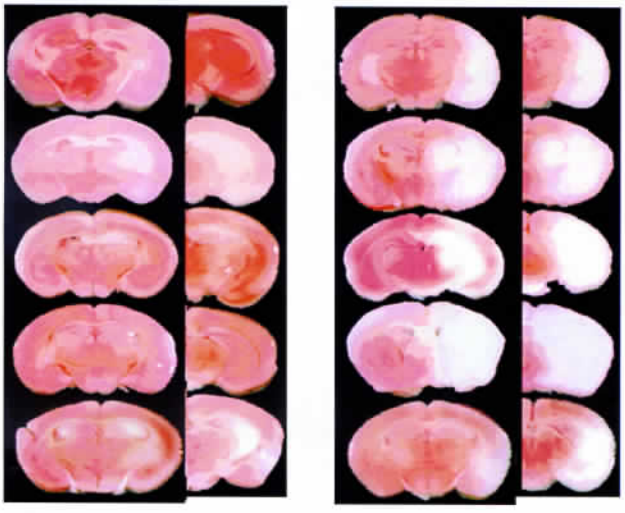
The Neuroscience Center's Drug-Discovery Program, which was created and directed by Dr. Bazan in 1994, has been awarded 17 patents or patent applications.

A local start-up company established by Dr. Bazan, St. Charles Pharmaceuticals, is testing a patented novel pain treatment.

## LSUHSC Research Breakthrough *continued*

Dr. Bazan heads one of the three teams comprising the NSF EPSCoR-funded consortium of nine Louisiana universities collaborating on micro- and nano-scale science and technology research. The other two lead universities are Louisiana Tech and University of New Orleans.

Noting that the Consortium was the Neuroscience Center's first large-scale collaboration



The ability of the newly discovered neuroprotective drug to inhibit the brain damage of a stroke (white color) is depicted in the above-shown brain sections of mice. Immediately following a stroke, those in the left column were administered Neuroprotectin D1 in a solution (vehicle) while those in the right column were administered the solution only.

with non-medical scientists, Dr. Bazan says, "It has opened many new horizons in micro- and nano-scale science and technology research, enabling us to envision solutions and tackle issues precipitated by engineering possibilities."

Dr. Bazan joined LSUHSC in 1981. In 1987 he became the founding director of the Neuroscience Center of Excellence, which is now comprised of 14 research groups, including Dr. Bazan's team, and serves as a multidisciplinary nexus of investigators from several departments that collaborate with universities across the world.

His particular research focus began in 1968 when he was a 26-year-old assistant professor at the University of Toronto. It was then that he made a puzzling breakthrough discovery: the restriction of blood flow to the brain or seizures causes a rapid rise in the presence of the free form of two fatty acids (arachidonic acid [AA] and docosahexaenoic acid [DHA]) in the brain. The journal article in which his finding was published became a Citation Classic (1991) and is cited in scientific literature as the "Bazan effect".

Yet another "Bazan effect" is his leadership role in uncovering explanations for the phenomenon of that discovery and the resulting impact on Louisiana's research capabilities and economy.

### LONI One Step Closer to Working Reality

The Board of Regents has approved a governance plan for the Louisiana Optical Network Initiative (LONI). It calls for a LONI Management Council that will be charged with making recommendations to the Commissioner of Higher Education on the management of operations and associated business activities of the statewide fiber-optics network.

LONI will link Louisiana researchers and university-based supercomputers at a speed thousands of times faster than currently possible. It will also connect them to the National LambdaRail, a consortium of research universities and technology companies deploying a nationwide networking infrastructure to support research in science, engineering, health care, and education.

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