Nicolas G. Bazan, M.D., Ph.D.
Boyd Professor
Ernest C. and Yvette C. Villere Professor of Ophthalmology, Biochemistry and Molecular Biology, and Neurology
Director, LSU Neuroscience Center of Excellence

Education
MD – 1965, Medical School, U. Tucuman, Argentina
Research Thesis Work - 1966-1968, Harvard Medical School
PhD – 1971, Medical School, U. Tucuman, Argentina

Positions

1968-70	Assistant Professor of Biochemistry, University of Toronto, Canada, and Assistant Director, Neurochemistry, Clarke Institute of Psychology
1970-81	Professor of Biological Chemistry and Director, Institute of Biochemistry. Investigator, U. Nac. del Sur CONICET, Argentina
1981-	Professor of Ophthalmology, Biochemistry, Molecular Biology, and Neurology, LSU Health Sciences Center, School of Medicine, New Orleans
1988-	Director, LSU Neuroscience Center of Excellence, New Orleans

Current Research
A major goal of the N. Bazan laboratory is to understand the principles underlying endogenous responses of the retina and brain to injury and neurodegeneration. For this purpose, a convergence of approaches, including cellular, neurochemical and molecular, are used, complemented by cell cultures (e.g. hippocampal neurons) and experimental models of neurological (epilepsy, stroke, Alzheimer's disease) and retinal diseases (age-related macular degeneration, retinitis pigmentosa, diabetic retinopathy). We are investigating the pro-inflammatory mediator, platelet-activating factor (PAF). This mediator also is produced at the synapse and is physiologic as well. However when it accumulates, it triggers cell injury. Our laboratory has developed specific PAF antagonists and is using these tools to explore further its significance. We are also exploring a gene, the inducible prostaglandin synthase (COX-2). We have found that PAF induces this gene. The product of COX-2 accumulates in hippocampus in models of epilepsy, as well as in retina in light-induced photoreceptor degeneration. The lab is also studying membrane biogenesis, in terms of the supply and trafficking of docosahexaenoic acid, a key building block in synapses and photoreceptors. In our studies of excitable membrane biogenesis, we have discovered that the essential fatty acid, docosahexaenoic acid, which is a major component of photoreceptors, is conserved by means of metabolic loops involving the liver and the interstitial space surrounding photoreceptors. These loops are altered in certain retinal degenerations and, possibly, also in some neurological diseases. The central hypothesis being explored is that lipid messengers mediate critical responses for cell survival. Phospholipases A2-generated messengers modulate both synaptic receptors, as well as downstream signaling through endogenous lipid neuroprotective messengers (e.g. docosanoids). Sites of pharmacological action, as well as novel drugs acting on these informational pathways, are being identified. The essential docosahexaenoic acid, in addition, is the precursor of neuroprotectin D1 (NPD1). This new lipid mediator is anti-inflammatory, a potent upregulator of Bcl-2 anti-apoptotic and a downregulator of Bcl-2 pro-apoptotic proteins. Our goal is to determine the crosstalk between synapses and genes, and between neurons and astrocytes, that modulate long-term responses, which could perhaps be pharmacologically manipulated to prevent or repair injury, inflammation and cellular damage occurring in diseases.

Research Interests and Goals
Neuroprotection and Neural Plasticity: Unraveling Cell Signaling in Injury and Neurodegeneration

Awards/Recognitions/Lectures

1991 – Citation Classic, "Neural Stimulation or Onset of Cerebral Ischemia Activates Phospholipase A2" Current Contents/Life Sciences
1993 – Member, Royal Academy of Sciences, Spain
1994 – Boyd University Professor, Louisiana State University
1999 – Doctor Honoris Causa, Universidad Nacional del Tucuman, Argentina
2000 – Endre A. Balazs Prize, XIV International Congress of Eye Research
1999-2001 – President, American Society for Neurochemistry
2004 – First Leon Wolfe Lecturer, Montreal Neurol. Inst., Canada
2007 – The Association for Research in Vision and Ophthalmology, Proctor Medal and Lecture, Fort Lauderdale, FL

Key Recent Papers

Mukherjee PK, Marcheselli VL, Barreiro S, Hu J, Bok D, **Bazan NG**. Neurotrophins enhance retinal pigment epithelial cell survival through neuroprotectin D1 signaling. Proc. Natl. Acad. Sci. USA. 104 (2007) 13152-13157.

Mukherjee PK, Marcheselli VL, de Rivero Vaccari JC, Gordon WC, Jackson FE, **Bazan NG**. Photoreceptor outer segment phagocytosis attenuates oxidative stress-induced apoptosis with concomitant neuroprotectin D1 synthesis. Proc. Natl. Acad. Sci. USA. 104 (2007) 13158-13163.

Bazan NG. Homeostatic regulation of photoreceptor cell integrity: Significance of the potent mediator neuroprotectin D1 biosynthesized from docosahexaenoic acid. The Proctor Lecture. Invest Ophthalmol Vis Sci. 48 (2007) 4866-4881.

Bazan NG. Cell survival matters: docosahexaenoic acid signaling, neuroprotection and photoreceptors. Trends Neurosci. 29 (2006) 263-271.

Lukiw WJ, Cui JG, Marcheselli VL, Bodker M, Botkjaer A, Gotlinger K, Serhan CN, **Bazan NG**. A role for docosahexaenoic acid-derived neuroprotectin D1 in neural cell survival and Alzheimer disease. J Clin Invest. 115 (2005) 2774-2783.

Belayev L, Marcheselli VL, Khoutorova L, Rodriguez de Turco EB, Busto R, Ginsberg MD, **Bazan NG**. Docosahexaenoic acid complexed to albumin elicits high-grade ischemic neuroprotection. Stroke 36 (2005) 118-123.

Mukherjee PK, Marcheselli VL, Serhan CN, **Bazan NG**. Neuroprotectin D1: a docosahexaenoic acid-derived docosatriene protects human retinal pigment epithelial cells from oxidative stress. Proc Natl Acad Sci USA. 101 (2004) 8491-8496.

Marcheselli VL, Hong S, Lukiw WJ, Tian XH, Gronert K, Musto A, Hardy M, Gimenez JM, Chiang N, Serhan CN, **Bazan NG**: Novel docosanoids inhibit brain ischemia-reperfusion-mediated leukocyte infiltration and pro-inflammatory gene expression. J Biol Chem 278 (2003) 43807-43817.

Funding

"RPE Messengers, Transcription and Photoreceptor Renewal"
Principal Investigator: Nicolas G. Bazan, M.D., Ph.D.
Agency: NIH, NEI (R01 EY005121). Period: 070/1/05-06/30/10

"Neuroprotection: Lipid Signaling in Ischemia-Reperfusion"
Principal Investigator: Nicolas G. Bazan, M.D., Ph.D.
Agency: NIH, NINDS (R01 NS046741). Period: 05/03/04-04/30/09

"Mentoring Neuroscience in Louisiana: A Biomedical Program to Enhance Neuroscience"
Principal Investigator: Nicolas G. Bazan, M.D., Ph.D.
Agency: NIH, NCRR (P20 RR016816). Period: 02/01/07-01/31/12

"Neuroprotectin D1 slows photoreceptor degeneration"
Principal Investigator: Nicolas G. Bazan, M.D., Ph.D.

Agency: Foundation Fighting Blindness (TA-NP-0808-0463-LSUNO). Period: 08/01/08-07/31/11

“A Mouse Model for Usher Syndrome Type 1C”
Principal Investigator: Nicolas G. Bazan, M.D., Ph.D.
Agency: Foundation Fighting Blindness (BR-GE-0606-0347-LSUNO). Period: 06/01/08-05/31/09