



## Azulenyl Nitrones

*Compounds for the Treatment of Ischemic Injury Associated with Stroke and other Neurological Trauma*

### Contact

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### Inventors

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### Field

Ischemic injury due to stroke and other neurological trauma

### Technology

Free radical scavengers

### Key Features

- High solubility
- Crosses blood-brain barrier
- Good oxidation potential under physiological conditions
- Facile synthesis

### Key Benefits

- Potential to reverse ischemic damage
- Potential for broader post-stroke usage than t-PA
- Low toxicity

### Stage of Development

- Thoroughly characterized
- Toxicology studies

### Status

Seeking development & licensing partner.

### Patent Status

US 6,291,702 B1  
(9/18/2001)  
US 6,197,825 B1 (3/6/2001)  
US 6,083,988 B1 (7/4/2001)

### Potential Therapeutics for Reversing Ischemic Injury

Reactive oxygen species have been linked to the ischemic trauma that occurs in stroke, head injuries, and other neurological trauma. Therefore free radical scavengers that operate within physiological conditions have potential to reverse the damage caused by ischemia. Azulenyl nitrones are a novel class of free radical scavenger compounds (or spin trapping agents) that have favorable characteristics for the treatment of ischemic injury – high solubility, permeability across the blood brain barrier, and an oxidation potential lying within physiologic range. Initial preclinical data indicates azulenyl nitrone compounds could play a therapeutic role in combating ischemic injury associated with stroke and other neurological trauma.

### Need for Improved Post-Stroke Therapeutics

Twenty-five to sixty percent of stroke victims experience mild to severe disability, and there exists a need for improved methods of treating the damage secondary to the ischemic event experienced by these patients. While intravenous thrombolytic treatments such as tissue plasminogen activator (t-PA) have shown promise, they generally require intervention within three hours of a stroke. The narrow time-window for the efficacious use of t-PA and other limitations on patient selection due to the risk of inducing hemorrhagic stroke have hampered the market potential for this therapeutic. One potential benefit of the nitrone compounds is that they may avoid these limitations, since they may be administered prior to a determination of the type of stroke.

### Market

Stroke is the major therapeutic target for the azulenyl nitrone compounds of the present inventions. Approximately 700,000 strokes occur every year in the U.S. and 2 million worldwide. It is estimated that ischemic stroke accounts for 88% of all strokes. It is anticipated that the number of strokes will increase by approximately 50% over the next 20 years then decline after 2025 (American Heart and Stroke). While the market for anticoagulants used in stroke prevention is large (estimated at \$20 billion in 2004 according to IMS Global), the current market for post-stroke therapeutics is significantly smaller and served predominantly by t-PA. Although Genentech's sales of t-PA have continued to grow over the years, by 2006 annual sales had only reached \$243 million. The need still exists for a post-stroke therapeutic that has efficacy past the three hour time point without limitations on patient selection due to safety issues. Since only 2-3% of all stroke victims are treated with t-PA, the market potential of a more broadly applicable drug is quite significant.

### Opportunity

Florida International University is looking for a commercialization partner to facilitate further development of these compounds.

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### **Inventor**

Dr. David Becker is a professor in FIU's Department of Chemistry. His research interests include: investigation of newly discovered azulenyl nitrones which are highly efficient free radical scavengers providing a new approach to neural disease processes which involve free radical initiated events, these include Parkinson's and Alzheimer's disease; synthesis of bioactive natural product analogs; and the identification of antioxidants produced in adaptation responses of biological systems exposed to solar radiation and hyperoxic atmospheres.