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Institute for Healthy Aging  
Pharmacology & Neuroscience  
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## Area of Expertise

My scientific interests are focused on identifying interventions improving motor and cognitive function during aging and disease state. Our focus has been on the interaction between antioxidant supplementation and exercise, and whether combining the two anti-aging interventions would further their benefit on brain function declines associated with aging and Alzheimer's disease.

My laboratory also works on other interventions for other conditions: sigma 1 compounds and chemobrain (brain dysfunction associated with chemotherapy), hyperbaric oxygen therapy to alleviate the symptoms of Alzheimer's disease, and new antiaging therapy manipulating internal acidity. Identifying successful interventions and their interaction with factors such as genes and gender will lead to specialized recommendations to patients. Furthermore, it will allow us to determine specific mechanisms involved in positive outcomes leading to the development of therapeutic methods to ultimately improve health span of individuals.

Another project of the laboratory is to study the interaction of stroke and/or aging with drugs of abuse and to determine whether drug use makes individuals more susceptible to stroke and development of accelerated aging.

## Qualifications

PhD in Biochemistry, Southern Methodist University

BS in Physiology, University of Mont Saint Aign

## Recent Publications

### **Novel pharmacotherapy: NNI-362, an allosteric p70S6 kinase stimulator, reverses cognitive and neural regenerative deficits in models of aging and disease**

Sumien, N., Wells, M. S., Sidhu, A., Wong, J. M., Forster, M. J., Zheng, Q. X. & Kelleher-Andersson, J. A., Dec 2021, In: Stem Cell Research and Therapy. 12, 1, 59.

### **Neurodegenerative Disease: Roles for Sex, Hormones, and Oxidative Stress**

Sumien, N., Cunningham, J. T., Davis, D. L., Engelland, R., Fadeyibi, O., Farmer, G. E., Mabry, S., Mensah-Kane, P., Trinh, O. T. P., Vann, P. H., Wilson, E. N. & Cunningham, R. L., 1 Nov 2021, In: Endocrinology (United States). 162, 11, bqab185.

### **Behavioral effects of four novel synthetic cathinone analogs in rodents**

Gatch, M. B., Shetty, R. A., Sumien, N. & Forster, M. J., Jul 2021, In: Addiction Biology. 26, 4, e12987.

### **Evaluation of substituted n-phenylpiperazine analogs as D3 vs. D2 dopamine receptor subtype selective ligands**

Lee, B., Taylor, M., Griffin, S. A., McInnis, T., Sumien, N., Mach, R. H. & Luedtke, R. R., 1 Jun 2021, In: Molecules. 26, 11, 3182.

### **Estrogen receptor involvement in vascular cognitive impairment and vascular dementia pathogenesis and treatment**

Nguyen, D. H., Cunningham, J. T. & Sumien, N., Feb 2021, In: GeroScience. 43, 1, p. 159-166 8 p.

### **Early loss of cerebellar Purkinje cells in human and a transgenic mouse model of Alzheimer's disease**

Chaudhari, K., Wang, L., Kruse, J., Winters, A., Sumien, N., Shetty, R., Prah, J., Liu, R., Shi, J., Forster, M. & Yang, S. H., 2021, In: Neurological Research. 43, 7, p. 570-581 12 p.

### **Long-term hypogonadism diminishes the neuroprotective effects of dietary genistein in young adult ovariectomized rats after transient focal ischemia**

Oppong-Gyebi, A., Metzger, D., Doan, T., Han, J., Vann, P. H., Yockey, R. A., Sumien, N. & Schreihof, D. A., 2021, (Accepted/In press) In: Journal of Neuroscience Research.

**Astrocyte HIV-1 Tat Differentially Modulates Behavior and Brain MMP/TIMP Balance During Short and Prolonged Induction in Transgenic Mice**

Joshi, C. R., Stacy, S., Sumien, N., Ghorpade, A. & Borgmann, K., 15 Dec 2020, In: *Frontiers in Neurology*. 11, 593188.

**Chronic Testosterone Deprivation Sensitizes the Middle-Aged Rat Brain to Damaging Effects of Testosterone Replacement**

Smith, C., Contreras-Garza, J., Cunningham, R. L., Wong, J. M., Vann, P. H., Metzger, D., Kasanga, E., Oppong-Gyebi, A., Sumien, N. & Schreihofner, D. A., 1 Oct 2020, In: *Neuroendocrinology*. 110, 11-12, p. 914-928 15 p.

**ApoE genotype-dependent response to antioxidant and exercise interventions on brain function**

Chaudhari, K., Wong, J. M., Vann, P. H., Como, T., O'bryant, S. E. & Sumien, N., Jun 2020, In: *Antioxidants*. 9, 6, p. 1-16 16 p., 553.

## **Sponsored Projects**

**Acid-Sensing Ion Channels as Molecular Targets in the Improvement of Age-Related Cognitive Dysfunction**

Sumien, N.

Intramural Research(UNTHSC)

15/10/14 → 14/04/16

**AMPK and Cerebellar Aging**

Yang, S. & Sumien, N.

William & Ella Owens Med Research Foun

1/12/16 → 31/12/18

**Anti-Angiogenic Effect of Curcumin on Obesity-Related Inflammation and Oxidative Stress in Middle-Aged C57BL/6 Mice**

Filipetto, F., Franks, S., Forster, M. & Sumien, N.

Intramural Research(UNTHSC)

15/01/12 → 14/01/13

**Brain Stem Mechanisms for Altered Autonomic Regulation of Blood Pressure in Obesity**

Schreihofner, A., Sumien, N. & Schreihofner, D.

NHLBI: Nat Heart, Lung & Blood Institute

1/07/17 → 31/08/21

**Cocaine-induced Stroke Susceptibility: Brain Function and Metabolism Signaling Pathways**

Sumien, N., Forster, M. & Yang, S.

Intramural Research(UNTHSC)

1/05/16 → 31/08/18

**Dietary Targeting of Dihydropyridine Dehydrogenase for Stroke Tolerance**

Forster, M., Huang, R. & Sumien, N.

NINDS: Neurological Disorders & Stroke

1/04/13 → 31/03/18

**Effect of Novel Compound on Auditory Function and on Biochemical Markers in Aged Mice**

Sumien, N.

Neuronascent, Inc.

1/06/19 → 30/06/20

**Effect of Novel Compound on Neurogenesis in Aged Mice**

Sumien, N.

Neuronascent, Inc.

1/06/13 → 30/06/14

**Effects of Aging on Blood Vessels in the Cerebellar Vermis**

Jin, K., Forster, M. & Sumien, N.  
NIA: National Institute on Aging  
1/04/19 → 31/01/21

**Effects of antioxidants and exercise on protein oxidation (For: Saad Jafri)**

Sumien, N.  
Intramural Research(UNTHSC)  
5/06/17 → 31/05/18

**Exercise Antioxidants and APOE Interactions in Cognitively Impaired Mice**

Sumien, N.  
Alzheimer's Association  
1/10/10 → 30/09/12

**Exercise, Antioxidants and APOE Interactions in Cognitively-Impaired Mice (For: Kiran Chaudhari)**

Sumien, N.  
Intramural Research(UNTHSC)  
1/09/13 → 31/08/14

**Identify the Molecular Targets Involved in Cognitive Improvement of Aged Mice Supplemented with Ammonium Chloride**

Sumien, N.  
Intramural Research(UNTHSC)  
1/09/14 → 31/12/15

**Improving Cognitive Impairments: Role of Acid Sensing Ion Channels**

Sumien, N.  
William & Ella Owens Med Research Foun  
5/01/15 → 30/06/17

**Improving Impaired Cognitive Function with Novel Neurogenic Agent, NNI-362: A Dose Response Study**

Sumien, N.  
Classified  
1/06/12 → 30/06/13

**Interactions between Testosterone and Oxidative Stress in Dopamine Neurons**

Cunningham, R. & Sumien, N.  
NINDS: Neurological Disorders & Stroke  
1/07/15 → 30/06/20

**Interactive Effect of Exercise and Antioxidants on Age-Related Functional Declines**

Sumien, N.  
Intramural Research(UNTHSC)  
1/10/13 → 31/08/15

**Mechanisms of Cognitive Decline During Aging - Core B**

Sumien, N. & Forster, M.  
NIA: National Institute on Aging  
1/03/13 → 29/02/16

**Mechanisms of Cognitive Decline During Aging - Project 1**

Forster, M., Sumien, N. & Yan, L.  
NIA: National Institute on Aging  
1/03/13 → 29/02/16

**Metformin and Cognition**

Liu, R., Huang, R., Yang, S. & Sumien, N.  
Intramural Research(UNTHSC)  
1/05/16 → 31/08/17

**Neuronal Survival, HIV-1 and Astrocyte-TIMP-1**

Ghorpade, A. & Sumien, N.  
NINDS: Neurological Disorders & Stroke  
15/05/14 → 30/04/19

**Neuroprotection of Nonfeminizing Estrogens Against Cognitive Deficits of Alzheimer's Disease**

Huang, R. & Sumien, N.  
Texas A&M Health Science Center  
1/10/15 → 31/03/18

**Novel Mechanistic Targets of Steroid Hormones in the Brain - Core B**

Forster, M., Shetty, R., Yang, S., Liu, R. & Sumien, N.  
NIA: National Institute on Aging  
1/12/12 → 30/11/18

**Pilot Study on the Risks of Testosterone Replacement to the Brain**

Schreihofner, D., Sumien, N. & Cunningham, R.  
NIA: National Institute on Aging  
15/08/15 → 31/05/18

**Post Stroke Cognitive Impairment: Mechanism and Therapy**

Yang, S., Liu, R., Sumien, N. & Jin, K.  
NINDS: Neurological Disorders & Stroke  
1/02/19 → 31/01/24

**Predoctoral Training in the Neurobiology of Aging**

Forster, M., Sumien, N., Singh, M., SIMPKINS, J., SINGH, M., FORSTER, M., SUMIEN, N., Simpkins, J. W., FORSTER, M. & SUMIEN, N.  
National Institute on Aging  
1/05/02 → 30/04/22

**Sigma 1 Receptor as a Target for Repetitive Concussive Brain Injury**

Schreihofner, D., Luedtke, R. & Sumien, N.  
Intramural Research(UNTHSC)  
1/08/16 → 30/04/18

**Training in the Neurobiology of Aging and Alzheimer's Disease**

Sumien, N. & Forster, M.  
NIA: National Institute on Aging  
1/05/19 → 30/04/24

**Training in the Neurobiology of Aging and Alzheimer's Disease**

Sumien, N. & Forster, M.  
NIA: National Institute on Aging  
1/05/19 → 30/04/24

**Training in the Neurobiology of Aging and Alzheimer's Disease**

Singh, M., Forster, M., Sumien, N., SIMPKINS, J., Forster, M. & Sumien, N.  
National Institute on Aging  
1/05/02 → 30/04/22

**Using rodent behavioral models to identify substance abuse pharmacotherapies**

Forster, M., Gatch, M., Sumien, N. & Shetty, R.

NIDA: National Institute on Drug Abuse

20/09/18 → 3/01/23