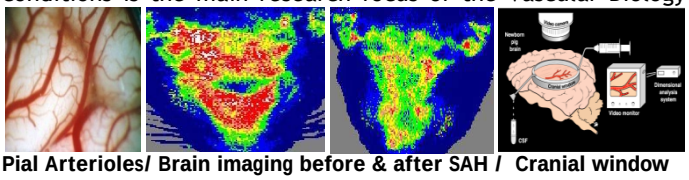
Vascular Biology Unit

The vascular system plays a vital role in the normal functioning of the body system and it is a major target for the pathogenesis of various diseases especially those that affect the circulatory system such as hypertension, diabetes, heart disease and stroke. The debilitating effects of these diseases result in vascular dysfunction, the most common cause of death and disability in Western societies.

The main focus of the Vascular Biology Unit is to understand the normal functioning of the vascular system and its alteration following pathological conditions with the view to identifying the vascular targets for correction of the resulting dysfunction. Thus, the study of cellular, molecular, and integrated vascular function under normal and pathologic conditions is the main research focus of the Vascular Biology Unit. Ongoing projects seek to elucidate the cellular and molecular mechanisms involved in cell signaling, gene expression, and growth in the walls of normal and abnormal vessels as well as the mechanisms that regulate vascular integrity – reactivity, thrombosis, inflammation, flow and other processes that guarantee vascular homeostasis.



Pial Arterioles/ Brain imaging before & after SAH / Cranial window

MOMOH A. YAKUBU, PhD: **D**r. Yakubu, the Head, Vascular Biology Unit obtained a BS (Honors) in Pharmacology and Therapeutics from the University of Ibadan, Nigeria (1982) and joined the University of Maiduguri College of Medicine, Department of Pharmacology in 1984. In 1985, he enrolled in the University Department of Materia Medica at the Stobhill General Hospital, Glasgow-Scotland where he earned his PhD (1989). Dr. Yakubu received special trainings in Neuropharmacology of the Imidazoline Receptor at the University of Glasgow Department of Medicine and Therapeutics (1989-1990); Cellular and Molecular Mechanisms of Parasite Infectivity at the Michigan State University Department of Microbiology and Molecular Genetics (1990-1992); Neurophysiology of Neonatal Cerebral Microcirculation in the Laboratory for Research in Neonatal Physiology, Brain Injury Research Center, University of Tennessee, Memphis (1992-1994). Thereafter, Dr. Yakubu was employed as an Instructor (1994-1996) and Assistant Professor (1996-2001) at the University of Tennessee Department of Physiology and Biophysics, Health Science Center, Memphis. He was also a Program faculty of the University Vascular Biology Program (1998-2001) and CME faculty at the Neonatology/Pediatrics Dept, the New Born Center, University of Tennessee Health Science Center, Memphis,TN.

Dr. Yakubu joined the NIH funded Center for Cardiovascular Diseases (2001) as a Senior Scientist/Visiting Associate Professor and head of the Vascular Biology Unit of the Center. Dr. Yakubu is also an Adjunct Professor of the Environmental Toxicology Program and an Adjunct graduate faculty of the Texas Southern University Graduate School.

Dr. Yakubu's research interest focuses on the regulation of cerebral blood flow and brain perfusion. His laboratory investigates the cellular and molecular mechanisms involved in subarachnoid hemorrhage (SAH)-induced cerebral vasospasm and stroke. The overall objective of the studies is to identify signaling molecules involved in cerebrovascular dysfunction following subarachnoid hemorrhage and traumatic brain injury as well as pathology-induced brain dysfunction. Such molecules will serve as molecular targets for neuroprotection and therapy to stem the sequelae of cerebral vasospasm and stroke. Dr. Yakubu's laboratory employs techniques involving animal models of cardiovascular disease, Laser Doppler flowmetry and imaging; vascular biology, cellular, molecular as well as protein profiling strategies to meet his research objectives. His research has attracted various honors, awards, and funding from the American Heart Association, the National Heart, Lung and Blood Institute of the NIH, amongst others. His research has appeared in several peer-reviewed publications in frontline scientific journals.

Dr. Yakubu is a member of many professional bodies, including the American Heart Association, American Physiological Society, and the Association of African Biomedical Scientists (*AABS Inc).* He is currently the Editor of the *BioMed Scientist* – an official Newsletter of AABS Inc. Dr. Yakubu also reviews for scientific journals – Journal of Physiology, Acta Pharmacologia, Journal of Vascular Research, Brain Research etc.

ONGOING PROJECTS:

1. PPARα and Heme-oxygenase: Molecular targets for hemorrhage-induced cerebral dysfunction.
2. Role of gasotransmitters (CO, NO, and H_2S) in the regulation and pathology of cerebral microcirculation.
3. Small signaling proteins PKC and PTK in early brain injury-induced cerebrovascular constriction.
4. Mechanism of Cyclooxygenase inhibition-induced cerebrovascular dysfunction.
5. Consequences of accumulation of persistent chlorinated organic compounds PCBs on vascular functions.

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SELECTED PUBLICATIONS:

Yakubu, MA, Anozie O, Nsaif, RH and Oyekan AO. Differential effects of activation of tyrosine kinase and protein kinase C on acute subarachnoid hemorrhage-induced changes in cerebral hemodynamics in rats. *Brain Research* (In review)

Yakubu, MA, Nsaif, RH and Oyekan AO. Regulation of PPAR¤ expression and NO production in cerebrovascular endothelial cells by PKC. *Brain Research Bulletin* (In review)

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Yakubu, MA, and CW Leffler. Regulation of cerebral microvascular endothelial cell cyclooxygenase-2 message and activity by blood derived vasoactive agents. *Brain Res Bull* 68(3) 150-156, 2005.

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