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Letter to the Editor

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Neurobiobanking in Africa: Accelerating stroke care equity, curation and research—a functional approach

Patrick Ashinze[1], Babas Puamus Oki[2], Frederick Moody[1], Sikiru Ademola Aremu[1], Abdulgafar Yusuf[1], Toyeeb Olasunkanmi Nurudeen[1], Umoh Unyimeobong Jackson[3], Adeshina Abdulbasit Ahmed[4], Peace Ngozi Okoro[5]

[1]Faculty of Clinical Sciences, University of Ilorin Teaching Hospital, Ilorin, Nigeria
[2]I Horbachevsky Ternopil National Medical University, Ukraine
[3]Faculty of Clinical Sciences, University of Uyo, Uyo, Nigeria
[4]Federal Medical Center Ebute Metta, Lagos, Nigeria
[5]David Umahi Federal University Teaching Hospital, Uburu, Ebonyi, Nigeria

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Corresponding Author: Patrick Ashinze, patrickashinze@yahoo.com

ABSTRACT

Neurobiobanking—the systematic collection, processing, and storage of central nervous system (CNS) tissues and associated data—holds immense promise for elucidating the genetic, molecular, and environmental determinants of stroke. In Africa, where stroke incidence is rising, age of onset is younger, and outcomes are poorer than in high-income settings, region-specific neurobiologic repositories can drive equitable research and tailored interventions. Despite significant advances through precision healthcare initiatives like H3Africa and the National Health Laboratory Service (NHLS) National Biobank, most countries still grapple with funding shortfalls, infrastructure gaps, trained personnel inadequacy and schismic regulatory frameworks. This focused communication outlines the current visage of neurobiobanking in Africa, showcases its critical role in addressing the continent's huge stroke burden, and proposes actionable strategies to establish inclusive, ethically governed, and sustainable neurobiobank networks.

Keywords: Neurobiobanking, Africa, stroke care

Dear editor,

We bring to your attention a topic of prospective and active significance.

INTRODUCTION

Biobanking, defined as the organized collection, assessment, storage, and sampling of biological specimens linked to rich clinical and demographic data, is pivotal for biomedical research.[1] Neurobiobanks extend this paradigm to CNS tissues—whole brains, sections, neural fluids—and integrate imaging and clinical datasets, enabling insights into neurological disorders, including stroke.[2] Globally, stroke remains a leading cause of mortality and disability; sub-Saharan Africa exhibits some of the world's highest age-adjusted prevalence rates, with hemorrhagic strokes accounting for 29–57% of cases and a notably younger age of onset compared to other populations.[3] These disparities underscore the urgent need for African-centric neurobiobank resources to inform equitable stroke care.

Current State of Biobanking in Africa

Pan-African genomic initiatives: The Human Heredity and Health in Africa (H3Africa) consortium, launched in 2012 by the NIH and Wellcome Trust, has established genomic research hubs and bioinformatics networks across 30 countries, training hundreds of African scientists and generating continent-specific genomic data.[4]

National biobank leadership: South Africa's National Health Laboratory Service (NHLS) houses a premier National Biobank—ISO-certified in 2019—which archives serum, plasma, DNA, histological slides, and more under robust quality-management and ethical governance frameworks.[5]

Persistent Challenges

Yet, most African nations face constrained budgets, intermittent power and cold-chain infrastructure, and a dearth of trained biobank personnel.[6] Fragmented or outdated ethical and regulatory guidelines further hinder harmonized governance, risking exploitative "parachute research" and undermining local trust.[7] Simultaneously, awareness of

biobanks' translational value is growing, as evidenced by increased stakeholder engagement through networks like MBirSA.[8] Furthermore, there is the place of policymaking and public apathy towards credible interventions - which is most likely fueled by ethico-moral inclinations and biases.

Importance of Neurobiobanking for Stroke Treatment

With sub-Saharan Africa's stroke incidence climbing, and case fatality and disability rates exceeding those in high-income settings, robust neurobiobanking can reveal genetic and environmental risk factors unique to African populations.[9] Most stroke genomics research to date has centered on European ancestry cohorts, leaving vast knowledge gaps for continental Africans.[10] Neurobiobank-driven discovery of novel biomarkers—such as plasma VEGF levels—and population-specific risk loci promises precision prevention and targeted therapeutics.[11] Beyond science, these repositories foster equitable collaborations, retain local expertise, and ensure that African patients benefit directly from research conducted on their samples.[11,12] A typical example of this is the McGill's university Neuro Research Open Biobank Repository, depicted below-Figure.[13]

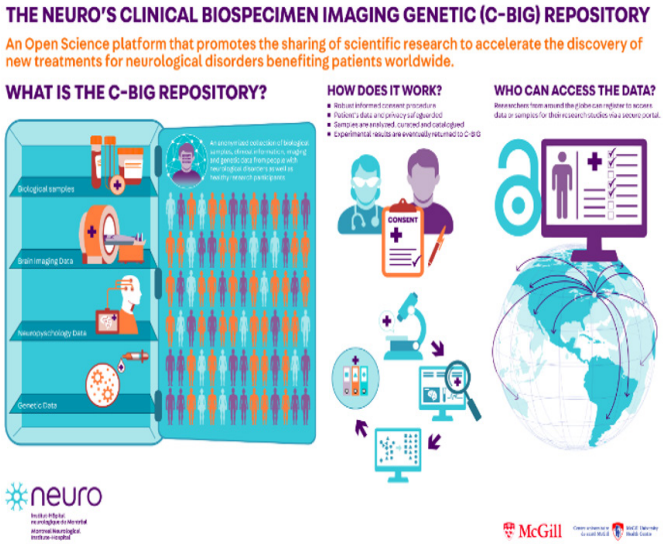

Figure: The schematic illustration of the Neuro C-BIG repository, McGill University, Canada[13] Open Biobank (research). The Neuro. Available from: https://www.mcgill.ca/neuro/research/open-biobank/research © 2025 by McGill University is licensed under CC BY-NC 4.0

Recommendations for Equity-Driven Neurobiobanking

1. Regional Neurobiobank Hubs: Governments, the African Union, and WHO-AFRO should mandate neurobiobanking as a health priority, establishing multi-country hubs modeled on H3Africa, with seed funding from NIH, Wellcome, and African development banks.

2. Sustainable funding streams: Global funders must earmark non-communicable disease grants to include neurobiobanking components. Intra-continental partnerships (e.g., Africa-India) can pool resources and reduce costs.

3. Capacity building: Leverage institutions such as the African Academy of Neurology for specialized training in biobank management, genomic analysis, and neuroethics. Deploy mobile laboratories and drone logistics to bridge rural infrastructure gaps.

4. Community engagement and governance: Co-develop consent models and benefit-sharing plans with local leaders to build trust and ensure reciprocal benefits, avoiding extractive research practices.

5. Technology and innovation: Integrate AI for data management, blockchain for secure sharing, and renewable-energy-powered freezers to ensure sustainable storage in low-resource settings.

6. Inclusive global collaboration: Journals and consortia should require representation of African neurobiobank data and authorship, with data-sharing policies that protect local ownership while facilitating open science.

CONCLUSION

Neurobiobanking represents a transformative strategy to confront Africa's disproportionate stroke burden. By bolstering infrastructure, harmonizing governance, and fostering equitable partnerships, Africa can generate critical insights into stroke pathophysiology, tailor interventions to its populations, and advance global precision medicine. The neurology and public health communities must unite to ensure that African voices, samples, and researchers are integral to the future of stroke research and care.

ETHICAL DECLARATIONS

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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