

Putting Nigerian neuroscience research under the microscope

By [Mahmoud Bukar Maina](#)

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Researchers are working hard to unravel the complex mysteries of the human brain and nervous system, as well as to find treatment for often incurable brain diseases. These neuroscientists are [mostly based](#) in Europe, the US, Japan and China. So most of our understanding of the brain comes from the global North, with only minor contributions from places like Africa.



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That's not to say neuroscience isn't being researched across the continent. But there are huge barriers to innovation and productivity.

Most universities [do not have equipment](#) for scientific research. And where research is happening, it's often being carried out using [outdated equipment](#). The [lack of reliable power](#) across large stretches of the continent is another issue. This makes it difficult to acquire, use or store common materials used in biomedical research such as antibodies and tissue samples.

For neuroscience, a number of local and international programmes are trying to address these shortcomings. For example the [International Brain Research Organisation](#) and the [International Society for Neurochemistry](#) have invested in the training of many scientists across Africa. Not for profit bodies like [Teaching and Research in Natural Sciences for Development in Africa](#) and [Seeding Labs](#) have helped in setting up laboratories in some African countries. Such efforts have helped to boost the neuroscience skills of scientists in many African countries.

But this hasn't yet levelled the difference in scientific output between researchers in Africa and those in the "global North". Perhaps bridging this gap and identifying methods that could boost the continent's neuroscience capacity, requires more knowledge about scientists' challenges and strengths in different countries.

With this in mind, my colleagues and I set out to examine the state of Nigerian neuroscience. By [analysing](#) more than 1,200 neuroscience extracted publications from PubMed, a free full-text archive of biomedical and life sciences journal literature, we found that Nigerian neuroscience research has its own strengths and shortcomings.

Only a few laboratories use modern methods. The research models used are expensive and don't necessarily reveal a great deal, and there's a disconnect between research findings and eventual patient care. However, Nigeria has many young, passionate neuroscientists. This means that the coming years could be exciting for neuroscience in Nigeria – if proper investments are made.

There's never been an in-depth investigation of this nature. Our work can guide scientists and policy makers in making the right decisions for Nigeria's neuroscience landscape.

Shortcomings and challenges

Nigeria is Africa's [most populous](#) nation. It's also a hot spot for neuroscience research, [third only to South Africa and Egypt](#).

Some of our findings included:

- Nigerian researchers tend not to use affordable and powerful models for their research. For instance, many of the studies we examined were conducted using rats and mice. This makes sense, at face value: these rodent species are commonly used because of their similar genetic make up to humans.

But it costs money to manage rodents. And, to answer research questions relevant to human diseases, these rodents need to be genetically modified to have or mimic these diseases, which makes them even more expensive. The models used in Nigerian neuroscience are not genetically modified.

- Only 8% of studies used many key "advanced" methods that are readily available to researchers outside Africa, such as real-time polymerase chain reaction, fluorescence or electron microscopy among others.

To put this in perspective, more than half of the Nobel Prizes won in Physiology or Medicine in the past two decades employed genetically amenable models and advanced research techniques. This emphasises the importance of using advanced tools and suitable models for big discoveries.

- Nigerian neuroscience is also guilty of under exploiting its strengths. In Africa, medicinal plants have been used [for centuries](#) to treat disease. Nigeria, with its rich medicinal plant resources, could become a leader in the field of drug discovery.

41% of all Nigerian basic neuroscience publications examined in our study set out to establish the utility of medicinal plants for future medical application.

It would be expected that some of these medicinal plants would be tested through clinical research. However, we found no clinical studies that used the results from the basic research or reported the benefits or toxicity from the wide use of these plants among people. This disconnect between basic and clinical research may have many consequences, such as reducing homegrown health-driven innovation.

- More broadly, infrastructure and training need to be properly funded.

There are a few things that can be done to address these issues and better support Nigerian neuroscience.

Potential solutions

For starters, it's important for Nigerian neuroscience researchers to realise there are many genetically amenable models available for their work. These models, among them fruit flies, Zebra fish and the roundworm species *C. elegans*, are far cheaper than rats and mice.

Money must be invested to equip Nigerian laboratories with modern research tools to make them globally competitive.

More time and money must be invested in introducing Nigerian scientists to advanced research methods. This would greatly enhance the quality of work produced in the country and drive scientific innovation in biomedical research coming from Africa.

Research programmes, grants and rewards need to be put in place to encourage collaboration between basic and clinical scientists. This will help to enhance the relevance of research to patient care and allow for basic research to be properly tested in a clinical setting.

We also hope our findings will encourage more Nigerian scientists and scientific societies to get involved in science advocacy. They need to sell what they're doing to the public and policymakers, and explain why it should be funded.

In the coming months, we'll be putting together similar research about other African countries to create a fuller picture. From there, we hope to identify targeted solutions to the challenges facing scientists in different parts of the continent.

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