

ENDOGENOUS SCIENCE AND TECHNOLOGY FOR SUSTAINABLE PRIMARY HEALTH-CARE SYSTEMS

Inyang, U.S.

Director General, National Institute for Pharmaceutical Research and Development, Idu Industrial Area, Abuja

Introduction

In the second and third centuries AD, there was a seeming parallel development in the physical and biological sciences. Today, the most impact on the biological and health sciences has been created by physical advances in the form of digital technology including an ability to carry out millions of sophisticated calculations in extremely short times and displaying results on liquid crystals as well as storing such results for re-use at another time. Other examples of this advancement in technology are the availability of web services and the introduction of new encryption technologies. The health-care systems that seem to have benefitted most from advances in science and technology include those for intervention e.g. facilities for diagnosis (x-ray) and physical treatment (radiotherapy).

In Nigeria, the emphasis for quite some time has been on preventive health-care which forms the bedrock of our primary health-care. Among the primary health-care systems that can be sustained by science and technology as practice-able in Nigeria include, logistics for programme management of preventive health-care such as immunization against childhood diseases, use of syringes and needles for anti-malarial treatment as well as some disease interventional measures like for sickle cell disease and for diabetes mellitus. The sustenance of these primary health-care systems can be anchored on some endogenous science and technology.

The development of science and technology derived from within Nigerian scientists has been slow mostly because specific factors have hindered a rapid progress as has been the case in say, the Southeast Asian countries of Philippines and Malaysia. Some of these anti-development factors have included, a long period of military rule with its lack of indigenous military technology and gross financial mismanagement. These years of bad dream for science and technology manifested as non-funding of science, acculturation of low level or low quality scientific work among university-based scientists, a strong inability of these low level scientists to partner or collaborate with scientists in the international community and lastly the escape of many local scientists into the diaspora (brain drain?) as a survival strategy.

Traditional health systems' development

In Nigeria and in many sub-Sahara African countries, traditional medicine-use has extended to herbal products, botanicals, dietary supplements, phytomedicines, or nutraceuticals presented to the population from different parts of the world particularly from China. We have seen products like, antihypertensive tea, anti-malaria herbal tea, weight reducing herbs and aphrodisiacs among others. According to the World Health Organization, traditional medicine is the sum total of knowledge and practice, whether explicable or not, used in diagnosis, prevention and elimination of physical, mental and social imbalance and relying extensively on experience and observation handed down from generation to generation, whether verbally or in writing. Therefore, traditional medicine has included diverse health practices, approaches, knowledge and beliefs incorporating plants, animal and mineral-based medicines, spiritual therapies, manual techniques and exercises, applied singularly or in combination, to maintain well being as well as to treat, diagnose or prevent illness.

Discovery and development of traditional health systems seems to be a continuous and costly process. The identification, isolation, characterization, and preparation of organic compounds to produce medicinal, biological, and industrial products are some of the inherent activities that add up to its high cost. Again, institutional research for the development of traditional pharmaceuticals such as artemisinin and biologicals e.g. vaccines and diagnostic kits including ethno-botanic studies, chemical and pharmacological investigations, and human clinical studies require established professionals to carry out, appreciate and document results for posterity. This huge

cost and effort are all aimed at perceiving and understanding traditional health systems development from the view point of orthodox medicine training and practice.

Sustenance of primary health-care systems

The potential of locally developed pharmaceutical and biological products for use in sustaining health-care systems in Nigeria is beyond imagination but their acceptability by informed health professionals has been limited by the absence of data and documents on their standardization, proof of efficacy and safety of use in humans. Therefore, pre-clinical studies may precede clinical use. It has been argued that since these medicinal plants had been in use for hundreds of years, their continued subjection to clinical trial will constitute a waste of resources. However, since partial purification or semi-synthetic activity had taken place then a need arises for complete drug development process to be undertaken especially determination of safety and efficacy.

The National Institute for Pharmaceutical Research and Development (NIPRD), is developing the process technology for two locally produced phytodrugs that may be useful in the management of two prevalent diseases. One of these is Niprisan R for the management of sickle cell disorders in humans and the other is a product of *Vernonia amygdalina* for the management of diabetes mellitus.

Drug discovery and development process in NIPRD can be exemplified by our anti-sickling product, NIPRISAN[®]. Our attention reached a herbal medicinal preparation that has been in use in south-western, Nigeria, for more than one hundred years for traditional clinical management of symptoms associated with sickle cell disease in the local population. We acquired this plant material and passed it through a scientific evaluation and development process that culminated in a United States of America patent. Eventually, an American-based pharmaceutical company expressed interest in the product, signed a memorandum of understanding with us and made payment for purchase of patent and rights of further development and production to satisfy global marketing requirements.

Another drug discovery and development process in NIPRD can be exemplified by our ongoing evaluation and development process for a product from *Vernonia amygdalina* following its patent in a United States of America by a Nigerian scientist. An American-based pharmaceutical company has expressed interest in the product. This development process is a contract with the Akwa Ibom State Government. We expect that on completion of our development process, it will be the responsibility of Akwa Ibom State Government to actualize the logistics for further development and production to satisfy global marketing requirements.

Intellectual property rights

NIPRD has used agreeable percentages, to continue to uphold intellectual property rights of persons who have sufficiently contributed in the discovery of new drugs from natural product sources. It will be unwise and counter productive to tap age-long knowledge and tradition without extensive compensation to individuals, local community or even the research community. This policy of upholding intellectual property rights by offering and actually giving adequate compensation will also facilitate establishment of collaboration between several parties and laboratories engaged in natural product-driven drug discovery as well as build trust.

I will like to highlight some of the factors that we must work against to move forward in this new millennium which are actually working against scientific advancement in Nigeria.

Science itself

This is changing at unprecedented rate to the extent that scientists of any age who lack scientific infrastructure for a period of five years will seem to loose both the know-how and latest methods e.g. In blood analysis, how many of who had counted cells of the whole blood can use an automatic blood analyser, interpret the printed out results and explain the results against the background of new and emerging diseases to the molecular levels.

Availability of scientific information is intimidating

If you go to the internet, and using a search engine look for a bio-health phrase, your returns will likely be in tens of million. It is true that some sites have been repeated but can any one of us here present review one million publications on any subject matter for one week or so? Therefore only the dogged or special scientists are required for now.

Funding

This factor should have come up first but if you do not know what to do with money in the scientific environment, then you do not truly need the money. Anyhow, that there are no federally funded grants that can be accessed by research scientists seems a limitation. We generally feel happy and contented when we have gained direct or indirect access to American or European funding for research in the biological and health sciences. There is plenty of hope for advancement in President Obasanjo's recently consolidated fund for development of science and technology.

Intellectual property rights

In the international scientific community, intellectual property extends to the design, implementation and documentation of research proposals, protocols, studies and agreements. The onus lies on scientist to ensure that intellectual property rights are upheld at all times.

Low industry-driven demand for applied science and technology in health-care systems

Although many scientific discoveries had been attributed to 'chance', there are still many that have arisen from intentional or deliberate experiments. Health system problems such as incineration of hospital waste by indigenous means still exist.

Mr. Chairman, we Nigerian people of science and technology, have to work harder in this new millennium to catch up with lost time and produce quality science and technology products to be able to interface with the international scientific community. Thank you.