Cell Mechanobiology Research for Health Development in Africa

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Abstract

Cell mechanobiology is a field of study that combines efforts from materials science, mechanics, cell and molecular biology. Mechanobiology can be described as an interdisciplinary field that involves the study of physical forces and how they affect cell mechanics[3]. It helps in understanding the role of mechanical forces in the well-being of a cell as it interacts with its neighbours and environment[2,4]. Due to the fundamental nature of the cells, the associated forces can be used to probe different diseases and illness that are peculiar to Africa. This has been noted in the ability of the cells to convert the physical signals (forces) into biochemical cues[1].

Introduction

Over the years, the physiological and pathological status of individuals have been subjected to different biochemical and radiological assessments. These have resulted to the development of various chemical substances and radiological procedures for effective understanding of the nature of the cells/tissues/organs. However, these procedures have been reported to be expensive for an average African who still have to struggle financially to meet other daily obligations. Therefore, other means of assessments need to be explored in order to understand the prognosis of different diseases and ailments that are challenging to the African continent.

In mechanobiology, force assays, which explain how the stressed cells/tissues deform as a function of time, can be set up to probe the inherent mechanical properties of cells/tissues[3]. Such mechanical properties can be used as a biomarker for diseases and ailments such as sickle cell anaemia, cancer, malaria, diabetes, Lassa fever, HIV/AIDS and wound healing[2]. Also, topography and molecular study using cell mechanobiology tools can be used as an adjuvant to the mechanical characterisation for better understanding of the clinical question. Introduction of mechanobiology to resolve health challenges in

Africa can be a great advantage because of the lower cost involved and a very minimal or no sample preparation required.

Government Support for Cell Mechanobiology in Africa

1. Governments are encouraged to make adequate funding available for procurements of facilities that can be used to carry out novel studies in mechanobiology. Funding should also be provided for the researchers as incentives.
2. Mechanobiology should be incorporated into present medical graduate studies. Government should support the collaboration with research scientists outside Africa. Such collaboration should be geared towards encouraging students and indigenous scientists to take up researches in mechanobiology for application in the health sector.
3. The barriers in clinical research should be reduced. Government should make policies that will make it easy for scientist in mechanobiology to have access to clinical specimens that will help in improving the transfer of scientific results into clinical applications.

Benefit of Mechanobiology to Africa

Adequate support for mechanobiology field of study will help to provide basic information on the (a) efficacy of locally produced sickle cell anaemia drugs; (b) metastatic nature of common cancers types in Africa; (c) procedures for fast wound healing; (d) nature of the erythrocyte of HIV/AIDS, diabetic and malaria patients.

References

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