Editorial

iMedPub Journals
www.imedpub.com

Molecular Enzymology and Drug Targets
ISSN 2572-5475

2021
Vol.7 No.3:e010

Characterizing Macromolecule Structures by Biophysical Methods

Toni Morrison*

Department of Biochemistry and Molecular Chemistry, University of Yale, Newhaven, USA

***Corresponding Author**: Toni Morrison, Department of Biochemistry and Molecular Chemistry, University of Yale, Newhaven, USA, E mail: morrison65@hotmail.com

Received Date: December 8, 2021; **Accepted Date:** December 22, 2021; **Published Date**: December 30, 2021.

Citation: Morrison T (2021) Characterizing Macromolecule Structures by Biophysical Methods. Mol Enzy Drug Targ. Vol. 7 No.3:e010

Description

Enzymology is a field of biochemistry that studies the relationship between structure and function of enzymes, as well as how they fold into their original state. To properly understand enzyme catalytic mechanisms, a series of steady-state and pre-steady-state kinetic assays must be carried out, as well as the precise three-dimensional structure of the enzyme. This chapter explains how to conduct pre-steady-state kinetic experiments. Biochemistry, microbiology, molecular biology, molecular genetics, and biophysics are all part of the study of enzymology. The development of reliable activity assays, (over)expression and purification, steady-state kinetic characterization, and an initial basic structural characterization, which may include determination of subunit structure, molecular mass, prosthetic group content, cofactor requirement, and post-translational modifications, are all essential components of enzymology.

Biophysical Methods

For biological scientists, characterization of molecule structure, measurement of molecular properties, and observation of molecular behaviour is a huge task. To study molecules in crystals, solution, cells, and organisms, a variety of biophysical approaches have been developed. These biophysical approaches reveal information on biological molecules' electromagnetic structure, size, shape, dynamics, polarity, and modalities of interaction. Images of cells, subcellular structures, and even individual molecules can be obtained using some of the most interesting techniques. For example, it is now feasible to study the biological behaviour and physical attributes of single protein or DNA molecules within a living cell and identify how their behaviour effects the biological function of the organism.

Imaging and microscopy

Improvements in our ability to generate images of cellular and molecular structures with diameters ranging from microns to nanometers are perhaps the most accessible breakthroughs in biophysics. Individual molecules or cellular structures can now be "seen" using atomic force, electron, or confocal fluorescence microscopy.

Electrophysiology

Two electrodes in a shared solution, a voltage source, and a picoammeter are the basic needs for the types of electrochemical experiments used at single cells. The reference electrode, for example, should have a low impedance and be capable of maintaining a constant potential. The normal hydrogen electrode (NHE) was accepted as a standard early in the development of electrochemical techniques. As a result, standard potential reference tables are provided for this electrode. In fact, the NHE is difficult to employ, hence the Ag/AgCl electrode is more usually used. The NHE, by convention, has a standard potential, or The potentials of the Eo, of 0 V., and other types of reference electrodes are frequently compared to the NHE. In electrochemical terms, the Eo of the Ag/AgCl electrode vs the NHE is 0.197 V, or Eo = 0.197 V vs. NHE. The Ag/AgCl electrode is made up of metallic Ag covered with AgCl and placed in contact with an aqueous solution having a predetermined amount of chloride ion.

When modest currents pass through this electrode layout, it provides a steady potential that is only slightly affected. In biological applications, the other electrode is usually a carbon fibre microelectrode, which is referred to as the working electrode. Information on the charge transfer processes that occur at the carbon-solution interface can be obtained by adjusting the surface potential of the working electrode while simultaneously measuring the amount of current passing through it.