ISSN 2542-2049

Saint-Petersburg State University

16 International School-Conference

Magnetic resonance and its applications

proceedings

Spinus

31 March – 5 April 2019

Saint-Petersburg, Russia

Magnetic Resonance and its Applications. Spinus-2019.
Proceedings. Saint Petersburg State University, 2019. 304 pp.
ISSN 2542-2049

Schola **Spinus**

Evaluation of protein viscosity in Sickle Cell Disease

Yulianela Mengana Torres[1], Manuel Arsenio Lores Guevara[1], Juan C. García Naranjo[1], Beatriz T. Ricardo Ferro[1], Edalis Guerrero Piña[2], Carlos Alberto Cabal Mirabal[3], Lidia C. Suárez Beyrio[4], María A. Marichal Felue[4], Teresa Simón Brada[4], Inocente C. Rodríguez Reyes[4], Jan Philippé[5]

[1]*Centro de Biofísica Médica, Universidad de Oriente, Patricio Lumumba S/N. CP: 90500. Santiago de Cuba. Cuba.*
[2]*Departamento Física, Facultad de Ciencias Naturales y Exactas, Universidad de Oriente, Patricio Lumumba S/N. CP: 90500. Santiago de Cuba. Cuba.*
[3]*Facultad de Física, Universidad de la Habana, Cuba.*
[4]*Hospital General "Dr. Juan Bruno Zayas Alfonso", Carretera del Caney S/N. Santiago de Cuba. Cuba.*
[5]*Department of Clinical Chemistry, Immunology and Microbiology, Ghent University, Ghent, Belgium.*
Key words: Dynamic viscosity, hemoglobin, plasma, Sickle Cell Disease.

Summary

The viscosity of proteins is a very important parameter used to evaluate the viscosity of whole blood, which strongly influence the hemodynamics of the human bllod circulation. The classical viscometers (Capillary, Falling Body and rotational viscometers) are not adecuated to do clinical measurement of dynamic viscosity because its require big amount of samples, are affected by turbidity and are dependent of the skill of the oerator. A new magnetic resonance based method to evaluate dynamic viscosity of proteins is presented, which is based in the straigh forward relation between dynamic viscosity and the proton relaxation rate in teh solutions. A good agreement is obtained between the results obtained with the NMR based method and the gold standar used (Ostwald viscometer) for intracellular hemoglobin and Plasma.Was possible to evaluate the increasing of the dynamic viscosity in protein solutions (Plasma and hemoglobin) belongin to the whole blood from sickle cell patients.

Interaction of statins with cell membrane by NMR spectroscopy

G. S. Musabirova, A. V. Aganov, I. A. Latfullin, V. V. Klochkov

Kazan (Volga region) Federal University, Kazan, Russia
E-mail: Guzel.musabirova@bk.ru

Statins are drug which reduce the amount of low-density lipoprotein (LDL) cholesterol by inhibiting hydroxyl-methyl-glutaryl-coenzyme A (HMG-CoA) reductase. Cholesterol is known as a well-established risk factor for atherosclerosis. Furthermore statins have an additional pharmacological properties which are called pleiotropic. Despite the fact that statins have a similar molecular structure their pleiotropic properties vary considerably. There is a hypothesis that this difference depend on location of statins in the cell membrane [1, 2], but to the present day there is a lack of information in literature on interactions of statins with the surface of the cellular membrane.

Micelle of dodecylphosphocholine (DPC) were used as a model cellular membranes system for investigating the interactions of atorvastatin, cerivastatin, fluvastatin, simvastatin and pravastatin. Investigation were carried out by NMR spectroscopy with Nuclear Overhauser Effect (NOESY and ROESY experiments). This method apply research intercellular interaction and obtain information about structure of molecular complex and also about parts of molecules which form binds.

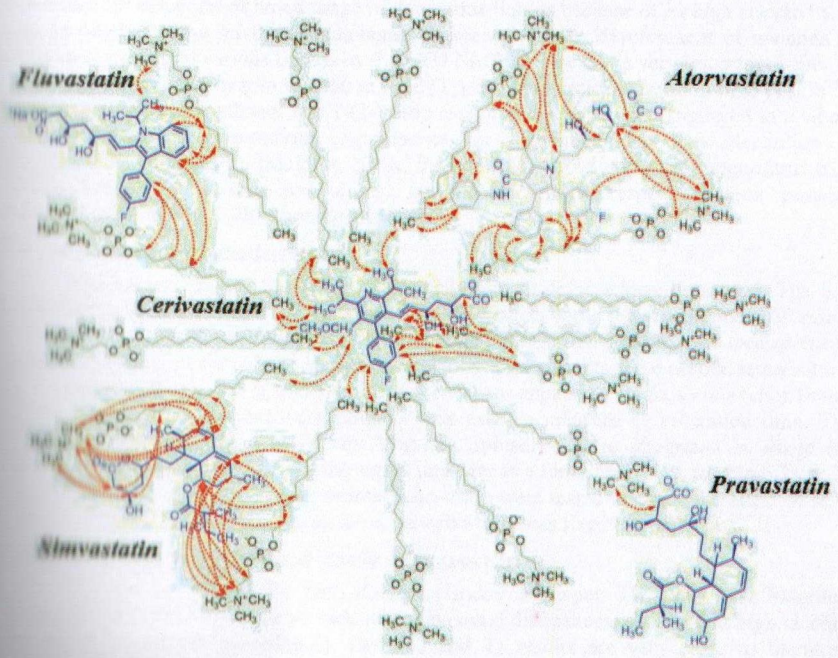

Figure 1. Schematic presentation of the NOEs (dashed arrows) observed in NMR spectra of different statins in D_2O + DPC micelles