

Interaction among Homogeneous Glycolytic Oscillating Networks Arranged in a Certain Topology

**Ravins and
R.K. Brojen Singh**

Centre for Interdisciplinary Research in Basic Sciences, Jamia Millia Islamia, New Delhi 110025, India

Address for correspondence:
E-mail: ravinsdohare@yahoo.com

We investigate the effect on the stability of an ensemble of N interacting identical glycolytic oscillators arranged in a three dimensional topological structure where nearest neighbours diffusion of insulin molecule is allowed to couple the systems. Switching of coupling is done at different instant of time in the temporal dynamics of glycolytic substrate and product and found that synchronization is achieved after some time just after the switching is done, indicating transition states. This leads to exhibiting correlated behavior of all interacting oscillators which is independent of topological position of each

oscillator in the system. The local and global stability in each oscillator and whole network is analyzed using the model we considered and found that local stability is significantly influence by the diffusion of insulin molecule, and is reflected in the numerical results of the interacting oscillators especially in desynchronization, transition and synchronized states. The global stability is found to be dependent significantly on local stability condition. However this global stability becomes independent of local stabilities after certain strength of coupling rate constant of insulin.