## Spatio-Temporal Properties of p53 States Raised by Glucose

Authors : Md. Jahoor Alam

**Abstract :** Recent studies suggest that Glucose controls several lifesaving pathways. Glucose molecule is reported to be responsible for the production of ROS (reactive oxygen species). In the present work, a p53-MDM2-Glucose model is developed in order to study spatiotemporal properties of the p53 pathway. The systematic model is mathematically described. The model is numerically simulated using high computational facility. It is observed that the variation in glucose concentration level triggers the system at different states, namely, oscillation death (stabilized), sustain and damped oscillations which correspond to various cellular states. The transition of these states induced by glucose is phase transition-like behaviour. Further, the amplitude of p53 dynamics with the variation of glucose concentration level follows power law behaviour, As(k) ~ kY, where, Y is a constant. Further Stochastic approach is needed for understanding of realistic behaviour of the model. The present model predicts the variation of p53 states under the influence of glucose molecule which is also supported by experimental facts reported by various research articles.

Keywords : oscillation, temporal behavior, p53, glucose

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