



**GANDHI INSTITUTE OF TECHNOLOGY AND MANAGEMENT  
(GITAM)**  
**Multidisciplinary Unit of Research on Translational Initiatives  
(MURTI)**

**MURTI-Colloquium**

**Speaker** : Prof. Birendra Nath Mallick, FNA, FASc,  
FNASc, JC Bose National Fellow  
Ex-Professor of Neuroscience  
Jawaharlal Nehru University, New Delhi

**Topic** : **Is the brain really inactive during sleep?  
REM sleep and its evolutionary significance**

**Day and Date** : Friday, July 26, 2024

**Time** : 16.00h – 17.30 h

**Venue** : Dr B R Ambedkar Auditorium (Cotton  
Bhavan)  
GITAM (Deemed to be University)

**All are requested to attend**

(Hari Misra), 9920458791

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**Abstract enclosed**



## Is the brain really inactive during sleep? REM sleep and its evolutionary significance

Birendra N. Mallick FNA, FASc, FNASc,  
Bhatnagar Awardee, Ex-JC Bose National Fellow

*Ex-Professor of Neuroscience  
School of Life Sciences, JNU, New Delhi*

We all sleep and spend about a third of our life-time sleeping. It is understandable that intermittent rest (inactivity) following active activity (waking) is essential, which we achieve during sleep. Therefore, it is quite logical that the brain needs rest (as explained by inactivity) and that is perhaps achieved during sleep. However, have we realized that if the brain becomes completely inactive during sleep, how would the essential functions be taken care of? Additionally, all of us have experienced that during sleep, we dream, which is comparable to active brain although one is in deep sleep. This also raises philosophical question of what is consciousness and how does that get regulated?

In my talk, I will deal with these and more issues with emphasis on contributions made from my lab (School of Life Sciences, Jawaharlal Nehru University, SLS/JNU) to the knowledge base during the past three and half decades. Essentially, I will present evidence that during sleep some (NOT ALL) neurons remain inactive. For example, I will show that noradrenaline (NA)-ergic neurons must cease firing during certain stage of sleep, the rapid eye movement sleep (REMS). This cessation of NA-ergic neurons maintains the level of NA level in the brain and that helps growth, development and reduced apoptosis of the neurons in the brain. Depending on time and interest of the audience, I will present evidence from philosophy, cellular, molecular, anatomical, physiological, electrophysiological, neurochemical, behavioral, computational and mathematical modelling data to bring home my proposed hypothesis of **evolutionary significance of REMS** and that is - ***“REMS has evolved to maintain the level of NA to protect the oxidative damage of the neurons in the brain of at least species higher in evolution”***.

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**Acknowledgement :** All Indian Govt. funding agencies viz. CSIR, DBT, DST, ICMR, JNU, UGC (tax payers' money) and all my students and research associates.