Research Hotline

UPDATE FROM THE CUTTING EDGE

Jul.-Sep. 2011

The abstracts of the recent research information appearing in Vol.11 No.7-9 of "AIST TODAY" are introduced here, classified by research area.
For inquiry about the full article, please contact the author via e-mail.

Environment and Energy

Is it possible to write an air electrode by a pencil?

Drawing an air electrode of lithium air battery by a pencil

A novel air electrode can be easily prepared by pencil-drawing on the surface of a solid state electrolyte to fabricate a lithium-air battery. This battery is based on the oxygen reduction catalytic activity of graphene. The battery provides a snapshot for a future lithium-air battery.

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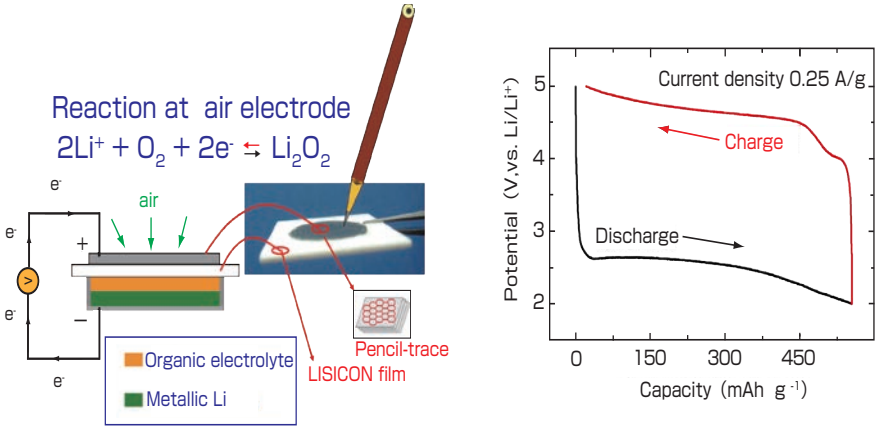
AIST TODAY Vol.11 No.8 p.12 (2011)



The image of Li-air battery and air electrode drawn by a pencil (left), The charge-discharge curve of the Li-air battery (right)

Life Science and Biotechnology

Harmine, a new candidate for sleep disorder treatment

A circadian modulator which extends the circadian period

We established an assay system using NIH3T3 cells stably expressing a *Bmal1* promoter-driven luciferase reporter gene and used the system to analyze circadian oscillation of the gene. We examined the effects of a *Hoasca* alkaloid, harmine, which has a wide spectrum of pharmacological actions, on circadian rhythms using the validated assay system. Harmine dose-dependently elongated the circadian period. Furthermore, EMSA and Western blot analysis showed that harmine enhanced the transactivating function of RORα, probably by increasing its nuclear translocation. Exogenous expression of RORα also caused a long period, confirming the phenotype indicated by harmine. These results suggest that harmine extends the circadian period by enhancing RORα function and that harmine is a new candidate that contributes to the control of period length in mammalian cells.

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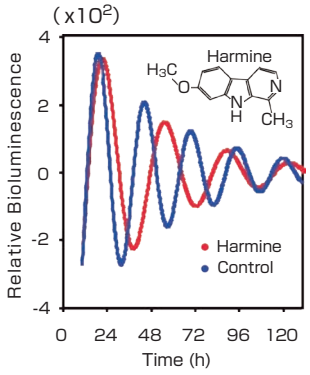
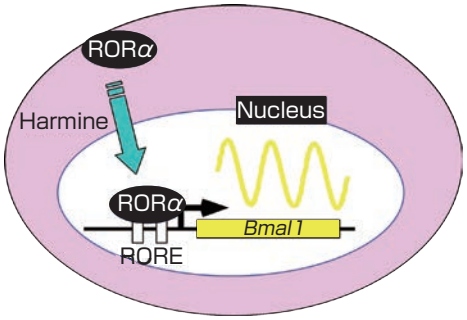


Measurement of the elongating effect of harmine on circadian period
Harmine extends period length.



Harmine induces RORα accumulation in nuclei and then the circadian period is extended.