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# Integrating Nanotechnology with Cell Biology and Neuroscience

## INCBN IGERT Seminar

**Monday, 9 November 2009, 2:30 pm**

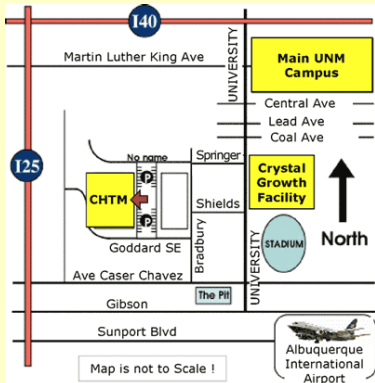
**Speaker: Stephen A. Stricker**  
Professor, *Dept. of Biology, UNM*



### Signaling Pathways During Egg Maturation in a Marine Worm

For animal development to proceed normally, eggs must first undergo a maturation process. Since elucidating the mechanisms of this fundamental process can lead to advances in animal husbandry, *in vitro* fertility practices, and our understanding of cell cycle progression in general, numerous studies have been conducted on maturing eggs. For example, such studies have shown that the secondary messenger cAMP prevents mammalian eggs from maturing, whereas the breakdown of cAMP into AMP promotes maturation. Moreover, the AMP generated from cAMP can stimulate AMP-activated kinase (AMPK) and thereby also induce egg maturation in mice. However, unlike in mammals, cAMP elevations actually trigger egg maturation in some marine worms, and the roles of AMPK in such eggs remain unknown. Thus, AMPK was monitored in eggs of the nemertean worm *Cerebratulus* during treatment with seawater (SW) or cAMP elevators in the presence or absence of AMPK agonists. In control assays of SW- or cAMP-induced maturation, AMPK was initially active in immature eggs, but then became deactivated as maturation proceeded. Accordingly, treatment with either ice-cold calcium-free seawater or AMPK agonists added to SW kept AMPK active and inhibited maturation. Conversely, combining cAMP elevators with AMPK activators restored maturation while promoting AMPK deactivation. Collectively, such data suggest that, unlike in mice where AMPK triggers maturation, AMPK activity must decline for *Cerebratulus* eggs to mature. Furthermore, the selective inhibition of SW-, but not cAMP-induced, egg maturation by AMPK agonists may provide novel insights into interactions between cAMP and AMPK signaling pathways in these and other eggs.

Location:  
Room 101, Center for  
High Technology  
Materials (CHTM)  
1313 Goddard SE  
SW corner of UNM's  
Science and Technology  
Park



For additional information,  
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