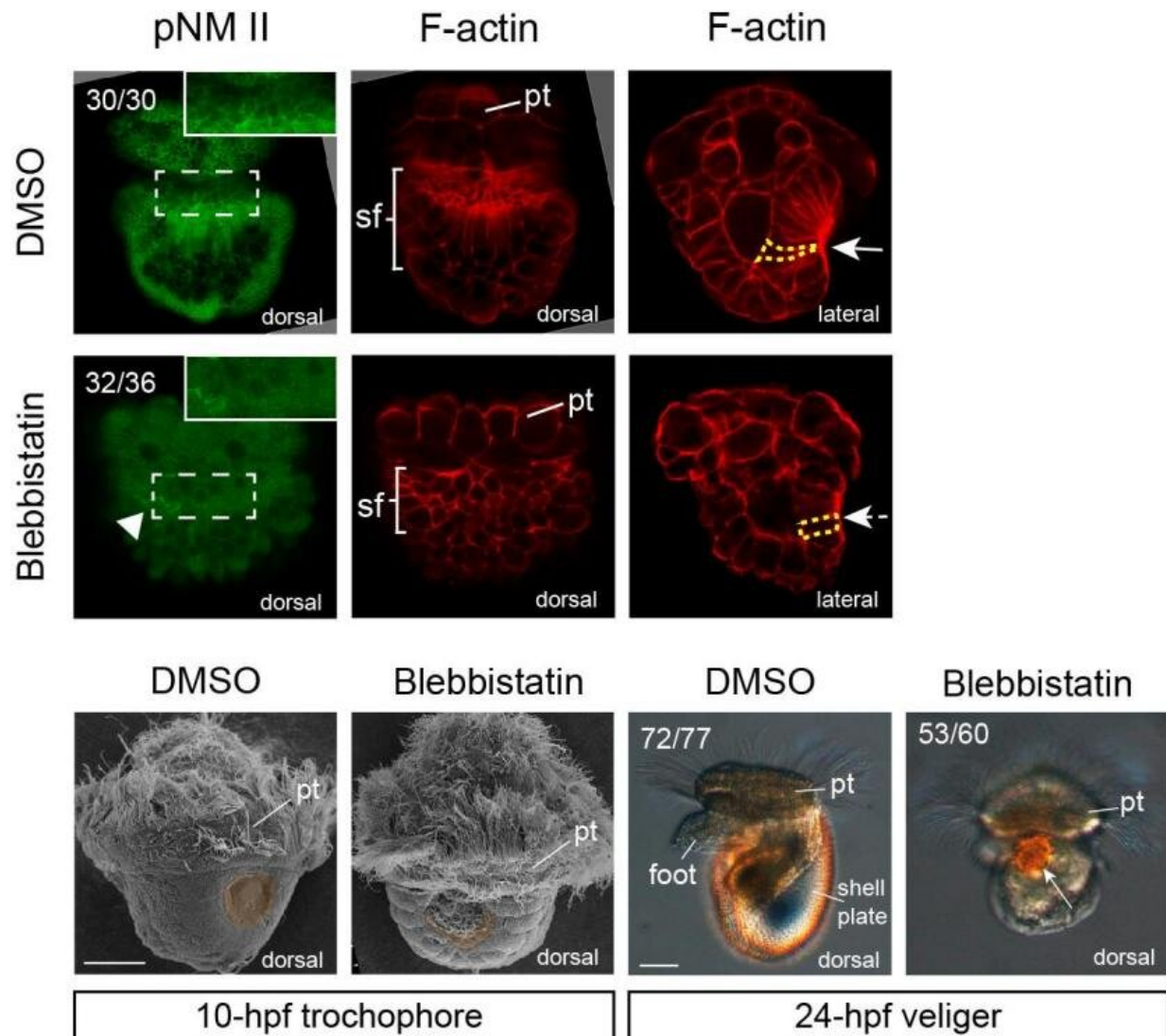


Larval shell formation in patellogastropod mollusk requires nonmuscle myosin II

March 21 2022, by Li Yuan



Inhibition of NM II causes the disorganization of the shell field and prevents the formation of larval shell plate. Credit: IOCAS

A research team led by Prof. Liu Baozhong from the Institute of Oceanology of the Chinese Academy of Sciences (IOCAS) revealed that cytoskeletal molecules (actomyosin) play a key role in the early shell formation of the patellogastropod mollusk *Lottia goshimai*.

Their findings were published in *Frontiers in Cell and Developmental Biology* on Feb. 3.

The [shell](#) is the main protective structure and a key feature of mollusks. In 2020, the researchers noticed that one cytoskeletal molecule (F-actin) was strongly aggregated in the shell field of the early embryos of *L. goshimai*. This suggests that F-actin is involved in early shell formation.

In this study, they focused on the roles of F-actin and a related molecule, nonmuscle myosin II (NM II), in early shell formation. Based on functional study, they confirmed that NM II played a key role in the morphogenesis of shell field by regulating cell rearrangements and cell shape changes.

In [normal development](#), tissues from lateral and ventral sides rearranged to the dorsal side to form the shell field with a characteristic rosette-like pattern. This critical process was prevented when inhibiting NM II, resulting in a disorganized shell field (despite largely unaffected gene expression patterns). The nascent shell plate could not be formed in these manipulated embryos, which then developed to shell-less veliger larvae.

These results revealed the molecular and [cellular mechanisms](#) through which actomyosin regulated shell development. "As one of the few available functional studies focusing on early shell development, this work reports for the first time the roles of cytoskeletal molecules in

molluskan shell development," said Prof. Huan Pin, a co-author of the study.

"This work reveals a novel aspect of shell development, which provides essential information for understanding the molecular mechanisms of molluskan shell [development](#) and evolution," said Prof. Liu.

More information: Xinyu Liu et al, Nonmuscle Myosin II is Required for Larval Shell Formation in a Patellogastropod, *Frontiers in Cell and Developmental Biology* (2022). [DOI: 10.3389/fcell.2022.813741](https://doi.org/10.3389/fcell.2022.813741)

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