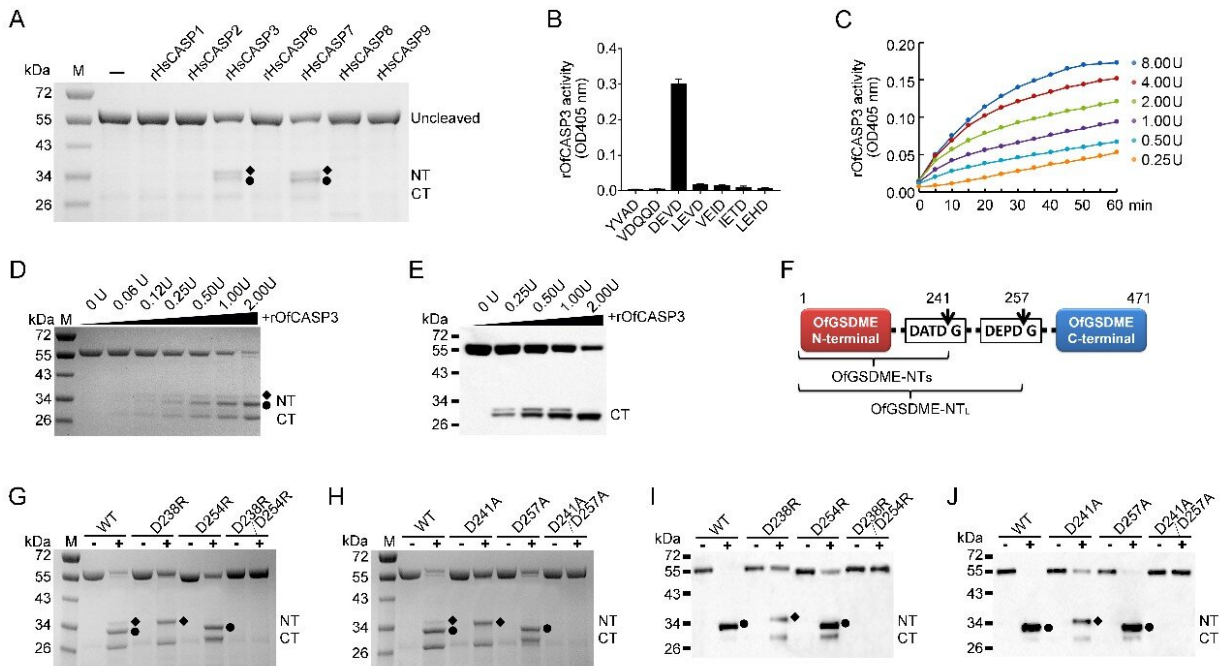


Gasdermin offers insight into coral necrotic death

December 4 2020



Cleavage of GSDME by caspase 3. Credit: IOCAS

Pyroptosis is a highly inflammatory form of programmed necrotic cell death that acts as a defense mechanism against the infection of bacterial and viral pathogens. Pyroptosis is executed by gasdermin, a family of pore-forming proteins.

Gasdermin-mediated pyroptosis is characterized by rapid cell swelling,

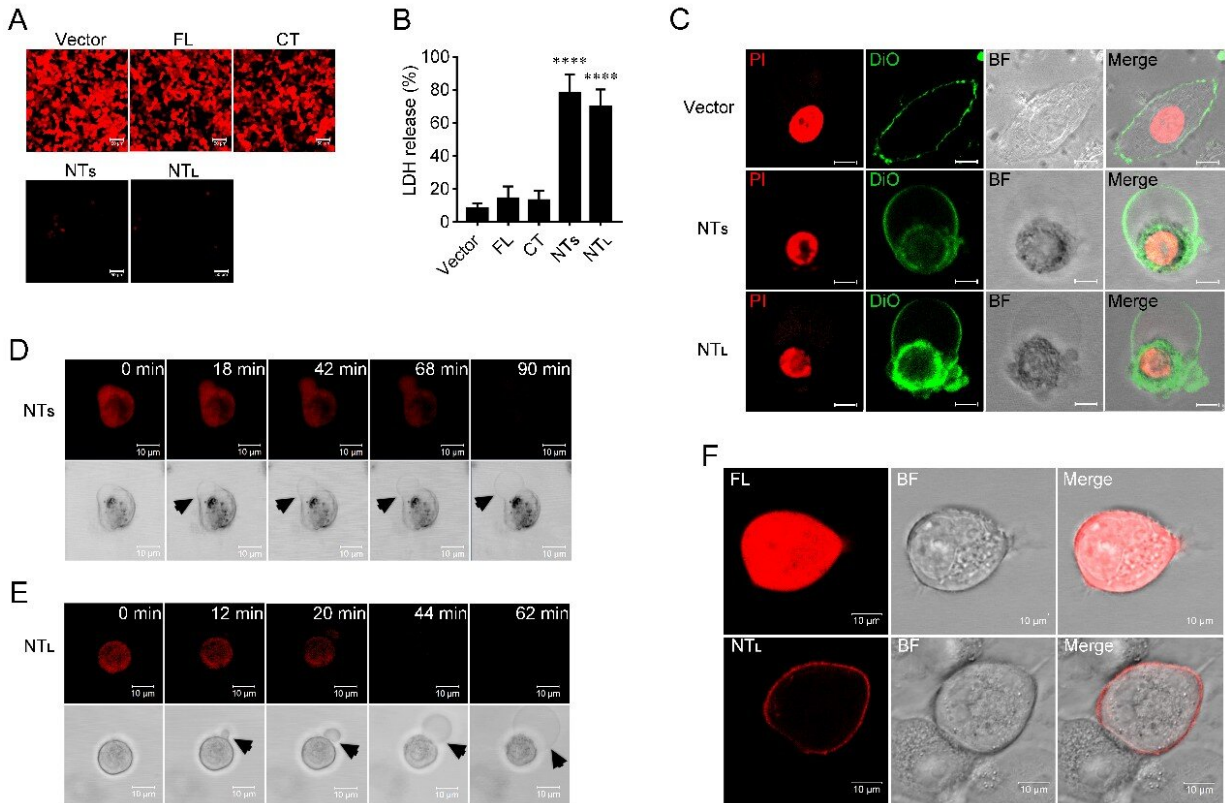
membrane disruption, and massive cytoplasmic content release. To date, pyroptosis-inducing gasdermins have only been reported in vertebrates. It remains unclear whether functional gasdermins exist in invertebrates.

Recently, a research team led by Prof. Sun Li from the Institute of Oceanology of the Chinese Academy of Sciences (IOCAS), in collaboration with Prof. Zhou Zhi from Hainan University, has identified gasdermin E (GSDME) from the reef-building coral *Orbicella faveolata* and demonstrated that coral GSDME triggers pyroptosis and is involved in pathogen-induced coral death.

Their study was published in *Science Immunology* on Dec. 4, 2020.

Via biochemical and cellular studies, the researchers revealed that *O. faveolata* GSDME was activated by caspase 3, which cleaved GSDME at two different sites. This resulted in two forms of the N-terminal domain of GSDME, and both of them were able to induce pyroptosis.

"When co-present with caspase 3, GSDME switched cell fate from caspase 3-induced apoptosis to pyroptosis," said Dr. Jiang Shuai, the first author of the study.



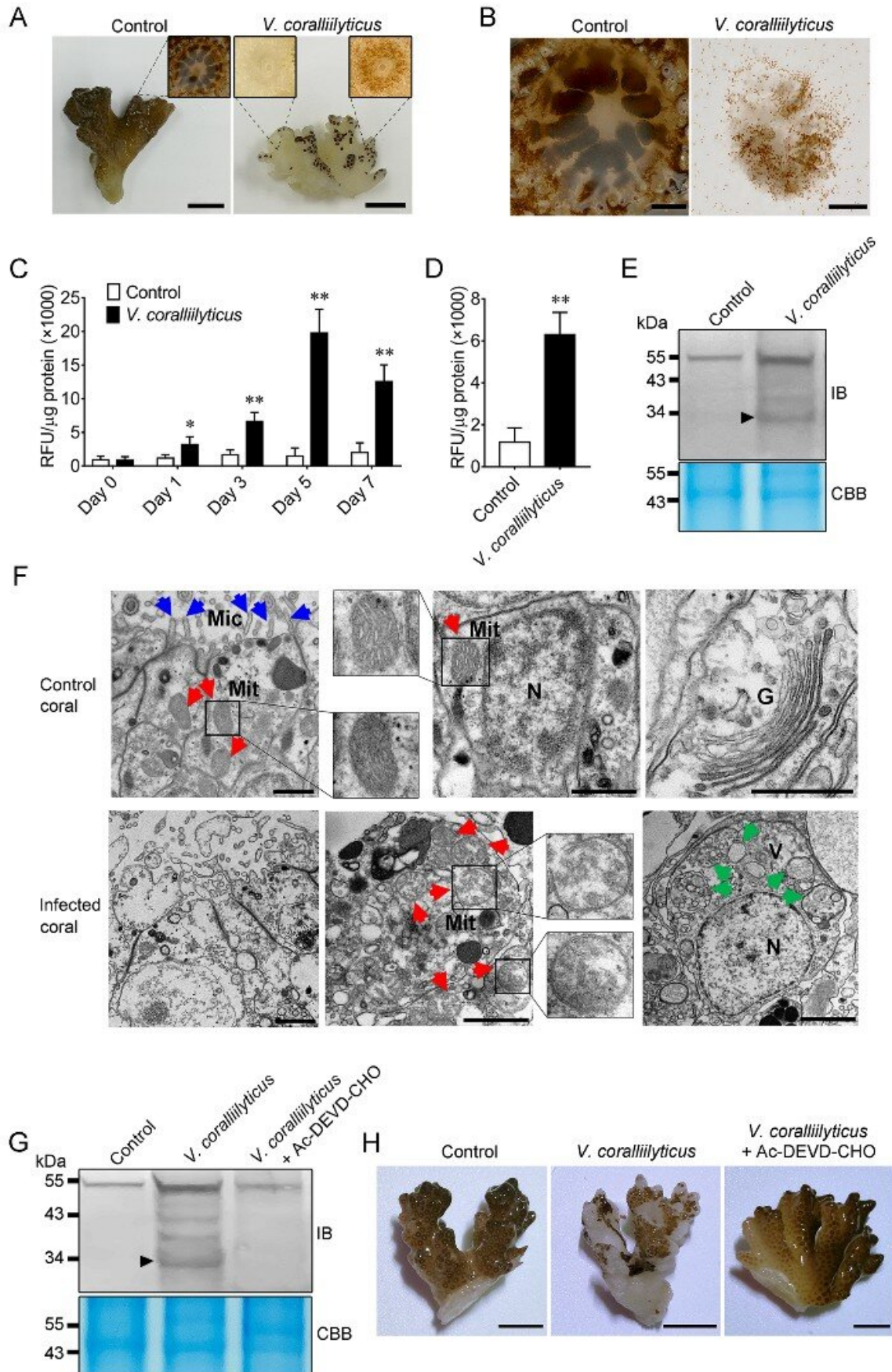
GSDME induces pyroptosis. Credit: IOCAS

Vibrio coralliilyticus is a coral pathogen found worldwide. In this study, the researchers demonstrated in a coral death model that *V. coralliilyticus* infection caused rapid tissue necrosis with activation of caspase 3 and GSDME, as well as subcellular structural damage including disorganization of mitochondria and Golgi apparatus.

Furthermore, inhibition of [caspase](#) 3 was found to block GSDME cleavage and protect corals from necrotic death.

The researchers revealed the activation mechanism and pyroptosis-executing capacity of coral GSDME as well as its involvement in

pathogen-induced coral necrotic death.



GSDME is involved in pathogen-induced coral death. Credit: IOCAS

Their findings shed light on the evolution, function, and activation mechanism of gasdermins, and promote our understanding of coral [death](#) caused by environmental stress.

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More information: S. Jiang et al., "Coral gasdermin triggers pyroptosis," *Science Immunology* (2020).
immunology.sciencemag.org/look...6/sciimmunol.abd2591

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