



PRESS RELEASE (2018/06/22)

Serine protease zymogen Prochelicrase C is intermolecularly activated through a lipopolysaccharide-induced active transition state

The research group led by Prof. Shun-ichiro Kawabata and Assoc. Prof. Toshio Shibata at Kyushu University's Faculty of Science succeeded to confirm the presence of an active transition state of Prochelicrase C induced by interactions with LPS.

Horseshoe crab hemolymph coagulation is initiated by the autocatalytic activation of a serine protease zymogen Prochelicrase C to the active form, α -Chelicrase C. The autocatalytic activation of Prochelicrase C has been believed to be triggered through an active transition state of Prochelicrase C responding to bacterial lipopolysaccharide (LPS), designated Prochelicrase C*. However, the existence of Prochelicrase C* is only speculative and its proteolytic activity has not been validated. Moreover, it remains unclear whether the proteolytic cleavage of the Phe-737-Ile-738 bond (F737 site) of Prochelicrase C required for the conversion to α -Chelicrase C occurs intramolecularly or intermolecularly.

Here the group shows that the F737 site of a catalytic Ser-941-deficient mutant of Prochelicrase C is LPS-dependently hydrolyzed by an F737 site-uncleavable mutant, clearly indicating the existence of the active transition state of Prochelicrase C without cleavage of the F737 site. Moreover, found that the autocatalytic cleavage of Prochelicrase C occurs intermolecularly between Prochelicrase C* molecules on the LPS surface.

For more information about this research, see *Intermolecular autocatalytic activation of serine protease zymogen factor C through an active transition state responding to lipopolysaccharide*.

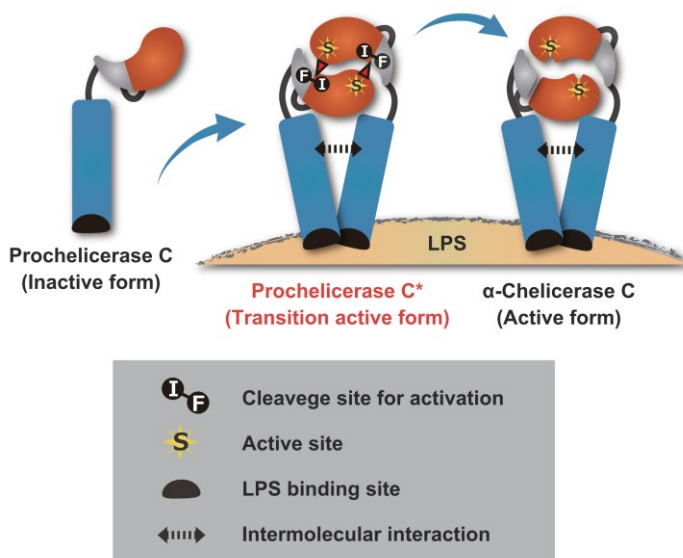


Figure: A proposed model for the autocatalytic activation of Prochelicrase C on LPS. Coagulation factor Prochelicrase C, a precursor form, is secreted from hemocytes at injured sites in response to the LPS stimulation derived from Gram-negative bacteria. The autocatalytic activation and the initiation of the coagulation cascade occurs through the active transition state Prochelicrase C* on the lipopolysaccharide surface.

【Contact】

Shun-ichiro Kawabata, Professor
Department of Biology/Faculty of Science
Tel : 092-802-4288 / Fax : 092-802-4288
Mail : skawascb@kyudai.jp
Toshio Shibata, Assistant professor
Department of Biology/Faculty of Science
Tel : 092-802-4290
Mail : t_shibata@kyudai.jp