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A solitary PRR in innate immune defense

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The accepted paradigm about innate immune response is a multi-stepped process - from recognition of the invading microbe by pathogen-recognition receptors (PRRs) to signal transduction, to the production of antimicrobial effectors by the immune cells. Contrary to this belief, we found that a PRR can act singly via a direct shortcut process bypassing multiple cascades of reactions. The extracellular respiratory protein acts a solitary frontline defense PRR, eliciting powerful antimicrobial potencies. This innate immune response phenomenon is evolutionarily entrenched. The limulus hemocyanin and the human cell-free hemoglobin take a exploite the intruding microbe's proteases and PAMPs to produce toxic reactive oxygen species (ROS) that effectively kills the pathogen. However, the cytotoxic free radicals generated are self-damaging to the host. We found that the Hb molecule rapidly reprograms its structure-function to expose multiple dual antimicrobial potencies and the host's plasma proteins and enzymes simultaneously suppress further Hb-induced redox activity, thus protecting the host from ROS-induced cytotoxicity.

Biography

Jeak Ling Ding completed her PhD at the University of London, UK. She is a Professor at the National University of Singapore, Dy. Executive Director of the NUS Graduate School for Integrative Sciences and Engineering. She has published >300 journal and conference papers; 19 patents, and has served/serves as editorial board member of Immunobiology and American Journal of Clinical and Experimental Immunology.

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