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The epidermal growth factor receptor regulates cofilin activity and promotes transmissible gastroenteritis virus entry into intestinal epithelial cells

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Transmissible gastroenteritis virus (TGEV), a coronavirus, causes severe diarrhea and high mortality in newborn piglets. Porcine intestinal epithelium is the target of TGEV infection, but the mechanisms by which TGEV disrupts the actin cytoskeleton and invades the host epithelium remain largely unknown. In this study, we found that TGEV infection causes F-actin to gather at the cell membrane, and disruption of F-actin inhibits the TGEV entry into IPEC-J2 cells. The actin depolymerizing factor cofilin is critical for actin reorganization and its activity affects TGEV entry. The TGEV spike protein interacts with epidermal growth receptor (EGFR), activating the downstream phosphoinositide-3 kinase (PI3K)-serine/ threonine kinase (Akt) signaling pathway, in turn causing the phosphorylation of cofilin and F-actin polymerization via Rac1/ Cdc42 GTPases. EGFR is also the upstream regulator of mitogen-activated protein kinase (MAPK) signaling pathways that regulate F-actin. Our research shows that inhibition of EGFR and PI3K inhibits the entry of TGEV and confirms that EGFR is a receptor for TGEV entry. Additionally, lipid rafts act as signal platforms for the EGFR-associated signaling cascade and affect the adhesion of TGEV. Taken together, these results provide valuable insight into the mechanisms responsible for TGEV pathogenesis and may lead to the development of new methods for controlling TGEV

Biography

Qian Yang has completed her PhD from College of Veterinary Medicine in Nanjing Agricultural University. She worked in Shandong Agricultural University as a Teacher in Department of Veterinary and Husbandry from 1982 to 1984. Then she worked in Animal Quarantine Institute of Agricultural Ministry as an Assistant Researcher from 1987 to 1991. Now, she works in the Department of Animal Medical College of Nanjing Agricultural University. She has published more than 50 papers in reputed journals.

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