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MAST CELLS CONTRIBUTE TO ENTEROVIRUS 71 INFECTION-INDUCED PULMONARY EDEMA IN NEONATAL MICE

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Enterovirus 71 (EV71) infections has been widely acknowledged as the main cause of severe hand, foot and mouth disease (HFMD), which may rapidly lead to fatal pulmonary edema. In this study, we established a mouse model for EV71 infection exhibiting high incidence of severe symptoms with pulmonary edema. Mast cells (MCs) accumulation, activation and allergic inflammation were found in the brains, lungs and skeletal muscle of mice after EV71 infection, especially in the lungs of mice. Levels of histamine, platelet-activating factor (PAF), interleukin (IL)-4, IL-5, IL-13, tumor necrosis factor- α (TNF- α), nitric oxide (NO), endocrine gland-derived vascular endothelial growth factor (EG-VEGF) and noradrenaline (NA) were increased in EV71-infected lungs. In addition, EV71 infection reduced the number of pulmonary T cells, dendritic cells (DCs), monocytes, and increased the number of lung eosinophils, Tregs and MCs. The number of MCs and level of tryptase expression in target organs or tissues posed a trend towards an increase from control to severe mice. There were positive correlations between the number of MCs in the brains ($r=0.701$, $P=0.003$), lungs ($r=0.802$, $P<0.0001$), skeletal muscles ($r=0.737$, $P=0.001$) and mean clinical score. Thus, our results suggested that MCs might contribute to the pulmonary edema during EV71 infection.

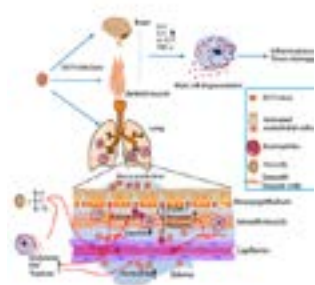


Figure 1: Proposed mechanism of action for mast cell in the pathogenesis of EV71 infection.

Recent Publications

1. Jin Y, Zhang C, Zhang R, Ren J, Chen S, Sui M, et al. (2017) Pulmonary edema following central nervous system lesions induced by a non- mouse-adapted EV71 strain in neonatal BALB/c mice. *Virology journal* 14(1):243.
2. Dang D, Zhang C, Zhang R, Wu W, Chen S, Ren J, et al. (2017) Involvement of inducible nitric oxide synthase and mitochondrial dysfunction in the pathogenesis of enterovirus 71 infection. *Oncotarget* 8(46):81014-26.
3. Feng F, Jin Y, Duan L, Yan Z, Wang S, Li F, et al. (2015) Regulation of ozone-induced lung inflammation by the epidermal growth factor receptor in mice. *Environmental Toxicology* 31(12):2016-2027.
4. Jin Y, Wu Z, Wang N, Duan S, Wu Y, Wang J, et al. (2016) Association of EGF Receptor and NLRs signaling with cardiac inflammation and fibrosis in mice exposed to fine particulate matter. *Journal of Biochemical and Molecular Toxicology* 30(9):429-37.
5. Jin Y, Wu W, Zhang W, Zhao Y, Wu Y, Ge G, et al. (2016) Involvement of EGF receptor signaling and NLRP12 inflammasome in fine particulate matter-induced lung inflammation in mice. *Environmental Toxicology* 32(4):1121-1134.

Biography

Yuefei Jin is undergoing his PhD program in Zhengzhou University and Duke University Medical Center. His mentors are Guangcai Duan and Weiguo Zhang. He is working on the mechanism of EV71 infection-induced hand, foot and mouth disease. He has established a neonatal mouse model for EV71 infection and has revealed that iNOS system and mast cells are involved in EV71 infection-induced pulmonary edema. In the future, he will be working on the children's infectious disease, hand, foot and mouth disease and the possible cellular mechanism.

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