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A Collaboration Network Model Of Cytokine-Protein Network[1]

SHENG-RONG ZOU, TA ZHOU, YU-JING PENG, ZHONG-WEI GUO, CHANG-GUI GU, DA-REN HE, Yangzhou University — Complex networks provide us a new view for investigation of immune systems. We collect data through STRING database and present a network description with cooperation network model. The cytokine-protein network model we consider is constituted by two kinds of nodes, one is immune cytokine types which can be regarded as collaboration acts, the other one is protein type which can be regarded as collaboration actors. From act degree distribution that can be well described by typical SPL (shifted power law) functions [1], we find that HRAS, TNFRSF13C, S100A8, S100A1, MAPK8, S100A7, LIF, CCL4, CXCL13 are highly collaborated with other proteins. It reveals that these mediators are important in cytokine-protein network to regulate immune activity. Dyad in the collaboration networks can be defined as two proteins and they appear in one cytokine collaboration relationship. The dyad act degree distribution can also be well described by typical SPL functions. [1] Assortativity and act degree distribution of some collaboration networks, Hui Chang, Bei-Bei Su, Yue-Ping Zhou, Daren He, Physica A, 383 (2007) 687-702

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Da-Ren He
Yangzhou University

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