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Metabolic reprogramming of alveolar macrophages plays an important role in acute lung injury

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Background: Acute lung injury (ALI) is a life-threatening inflammatory disease without effective therapeutic options. Macrophage polarization plays a critical role in the initiation and development of pulmonary inflammation, but the specific mechanisms underlying the phenotype transition remain unclear.

Materials and methods: A mouse model of ALI was established by intratracheal instillation of LPS to study the polarization of alveolar macrophage phenotype during ALI. Mouse alveolar macrophages MH-S were stimulated with LPS in vitro to further investigate the mechanism of alveolar macrophage polarization and metabolic reprogramming changes ALI.

Results: ALI mice exhibited a significant decrease in food-intake and activity, significant lung tissue edema, and increased pulmonary inflammatory cell infiltration. In vitro and in vivo results indicated that LPS stimulated the polarization of alveolar macrophages towards the M1 phenotype, leading to increased secretion of inflammatory factors. Further mechanism studies showed that LPS stimulation increased glycolysis levels in alveolar macrophages. Inhibition of glycolysis could induce the transformation of alveolar macrophages from the M1 to M2 phenotype and alleviate LPS-induced ALI.

Conclusion: These findings suggest that inducing the transition of alveolar macrophages from the M1 to M2 phenotype

through regulating macrophage metabolic reprogramming might be a potential therapeutic strategy for ALI. Inhibiting glycolysis in alveolar macrophages could be a potential treatment for ALI.

Recent Publication

1. Liu, Bo et al. "Affinity-coupled CCL22 promotes positive selection in germinal centres." *Nature* vol. 592,7852 (2021): 133-137. doi:10.1038/s41586-021-03239-2
2. Qi, Hai et al. "The humoral response and antibodies against SARS-CoV-2 infection." *Nature immunology* vol. 23,7 (2022): 1008-1020. doi:10.1038/s41590-022-01248-5
3. Liu, Bo et al. "Author Correction: Affinity-coupled CCL22 promotes positive selection in germinal centres." *Nature* vol. 592,7852 (2021): E6. doi:10.1038/s41586-021-03384-8

Biography

Liu Bo is a cardiothoracic surgeon who has been working at the Children's Hospital of Children's Hospital of Chongqing Medical University & Chongqing Medical University for 7 years. His primary responsibilities include providing diagnosis and treatment for thoracic and cardiovascular-related diseases, training and educating medical students, and conducting research on the mechanisms and prevention of acute lung injury. Over the course of his career, Liu Bo has published numerous research articles in reputable medical journals and has been invited to speak at various international conferences. He is highly respected among his peers and patients alike for his dedication to providing high-quality medical care and his commitment to advancing medical knowledge through research and education.

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