麩醯胺於急性肺損傷模式中對嗜中性白血球趨化程度之影響

Effect of glutamine on neutrophil recruitment in a model of acute lung injury

中文摘要

急性肺損傷為臨床上重症病人常見的併發症，死亡率很高。當肺受到感染時嗜中性白血球會大量遷移到肺部組織，毒殺外來物質，但嗜中性白血球亦可能傷害肺臟組織，嚴重時會造成急性呼吸窘迫症候群致死。前之研究顯示麩醯胺(Glutamine, GLN)具有免疫調節的效用，本研究主要在探討以 Lipopolysaccharide (LPS)引致急性肺損傷模式中，GLN 對嗜中性白血球聚集程度與肺部損傷的影響。將 C57BL/6 品系雄性小鼠餵食以 GLN 取代總氮量 25%之飲食，10 天後以氣管滴入 LPS 方式引發急性肺損傷，並於引致肺損傷後 0、6、12、18 和 24 小時採全血、肺泡灌洗液及肺臟組織進行分析。結果顯示 GLN 組肺臟灌洗液之 IgA 在 6 小時高於控制組(CON)，KC、MIP-2、TNF-α 與嗜中性白血球數目亦高於 CON 組；總白血球數目 GLN 組則在 12 小時高於 CON 組。GLN 組血中嗜中性白血球表現 LAF-1、Mac-1 之百分比在 12 小時高於 CON 組。ICAM-1 表現則無差異。分析肺臟組織脂質過氧化物濃度，GLN 組於 12 和 18 小時皆高於 CON 組，組織切片也顯示 GLN 組在 24 小時時肺浸潤較嚴重，但 GLN 與 CON 組的存活率並無差異。本實驗結果顯示，在 LPS 引發急性肺損傷的模式中，GLN 添加會增加呼吸道黏膜 IgA 的分泌，使 CXC chemokines 提前生成，促進嗜中性白血球提早聚集到肺部，肺部組織脂質過氧化物堆積的程度也較嚴重，推測可能是在肺損傷之前給予富含 GLN 的飲食會增強嗜中性白血球毒殺的能力，但也因此增加肺損傷的程度。

英文摘要

Neutrophils are central to the pathogenesis of acute lung injury (ALI). They influx into the lung to kill pathogens and increase lung injury, which may lead to acute respiratory distress syndrome. Glutamine (GLN) is considered to modulate immune function. This study investigated the effects of GLN on neutrophil recruitment in a model of lipopolysaccharide (LPS)-induced ALI. C57BL/6 mice were fed either standard diet with casein as the nitrogen source or replaced 25% of total nitrogen as GLN. After 10 days, intratracheal instillation of LPS was used to induce ALI. Mice were killed at 0, 6, 12, 18 and 24 hours, respectively. Blood, bronchalveolar lavage fluid and lung tissue were collected for further analysis. The results showed that compared with the control group, IgA concentrations increased at 6 h and KC, MIP-2 as well as TNF-α were higher at 12 h in the GLN group. Also, LAF-1 and Mac-1 expression on neutrophils and lipid peroxide in lung were higher in the GLN group.

However, there were no differences in ICAM-1 levels in lung homogenate and survival rates between the two groups. These results suggest that GLN increased IgA and lipid peroxide production and recruited neutrophils to lung at early stage of ALI which may consequently resulted in a more severe damage to the lung tissue.