葛蘭氏陽性菌產物脂壁酸對發育中鼠腦內或培養中小神經膠細胞免疫分子變化之研究

Changes of Expression of Microglial Immune Molecules in Developing Rats Or In Vitro after Treatments of Lipoteichoid Acid

中文摘要

本實驗中，將出生七天後的幼鼠經腹腔注射革蘭氏陽性菌產物脂壁酸，觀察注射後隔日鼠腦內小神經膠細胞其免疫分子受脂壁酸刺激後的影響情形為何。小神經膠細胞的免疫分子如主要組織相容性抗原第二型、補體第三型受體及巨噬細胞溶脢體不明抗原（ED-1）分別用 OX-6、OX-42 及 ED-1 抗體標誌。結果顯示，受 OX-42 和 ED-1 標誌之小神經膠細胞在胼胝體處的細胞數量，與出生後七天對照組比較，其細胞數量有明顯的增加，免疫染色深度也較深；腦膜及脈絡叢內的巨噬胞也有類似的改變。而在正常幼鼠腦內，小神經膠細胞極少或不具主要組織相容性抗原第二型免疫分子；經脂壁酸處理後，受 OX-6 標誌之變形性小神經膠細胞的數量也有增加的趨勢。另外，利用腦內注射脂壁酸來探討脂壁酸直接刺激小神經膠細胞的反應，結果顯示在注射處有些受 OX-42 和 ED-1 標誌的分枝狀小神經膠細胞，漸漸的收回突起轉變成圓形，顯示小神經膠細胞有被活化的情況。更明顯的證據是經直接注射或處理脂壁酸後，出現數量可觀的 OX-6 標誌小神經膠細胞，而直接注射或處理生理食鹽水後，僅有少數的細胞具有主要組織相容性抗原第二型免疫分子。類似的反應也發生在培養中小神經膠細胞；在這活體外研究中，培養中小神經膠細胞同樣會因應脂壁酸的刺激，使細胞形態逐漸改變為圓形，同時免疫分子的表現也隨藥物劑量的增加而更加明顯。

英文摘要

The present study was aimed to examine the changes of different immune molecules on microglial cells in 7-day-old rats receiving an intraperitoneal injection of Gram-positive bacteria product, lipoteichoid acid (LTA). Microglia constituted several immune molecules, such as the major histocompatibility complex class II antigens, complement type 3 receptors and macrophage lysosomal antigens of unknown function, and can be labelled with OX-6, OX-42 and ED-1 antibodies, respectively. Of the above-mentioned immune molecules, microglia labelled with OX-42 or ED-1 were increased in their populations and staining intensity in LTA-treated rats than those in saline-treated ones. It is also true for OX-42 or ED-1 labelled macrophages in the meninges and the choroids plexuses. In normal rat brains, microglia do hardly express MHC class II antigens that were remarkably

increased in number and staining intensity when the rats were challenged with LTA. Moreover, using the intracerebral injection of LTA to evaluate the direct effect of LTA on developing microglia, we showed that ramified microglia labelled with OX-42 or ED-1 progressively retracted their processes then became amoeboid form, indicating that microglia were activated in response to LTA. The evidence was strongly confirmed by the significant appearance of numerous OX-6 positive microglia after LTA treatment, in contrast to the saline treatment, only few microglia expressed MHC class II molecules. Similar responses of microglia to LTA were also evidenced in cultured microglia. In this in vitro study, LTA-stimulated microglia responded with a rounding-up profile and an enhanced expression of immune molecules with dose