

ROLE OF MEMBRANE SYNTHESIS IN MACROPHAGE FUNCTION

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Macrophages are a type of white blood cell that is part of the first-line response to an infection. Bacteria and other foreign bodies are ingested and broken down into peptides that are presented as antigens by specialized molecules on the cell's surface. With phagocytosis within the macrophage, there is a need for phospholipids within the cell membrane, due to the development of the phagosomes, vesicles that contain the foreign body in the macrophage. Two mammalian genes encode isoforms of CTP:phosphocholine cytidyltransferase (CCT), a key rate-controlling step in membrane phospholipid biogenesis. CCT α is the most ubiquitously-expressed and well-studied, while the CCT β form is present at significantly lower levels. We investigated the role(s) of the CCT α in macrophages by generating knockout mice. The CCT α gene knockout macrophages had a slower proliferation rate compared to the wild-type macrophages which doubled in 7 days. The CCT α gene knockout macrophages also were limited in the amount of bacteria that they were able to ingest. These data suggested that replication and phagocytosis were impaired, but not absent, from the CCT α -deficient cells. Therefore, the data shows a definite reduction in macrophage activity due to the decrease in phosphatidylcholine from the CCT α -deficient cells.

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