Particulate antigen sampling, migratory and naïve T cell priming abilities of monocyte-derived phagocytes in Peyer’s patches

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The small intestine is the largest surface of exchange with the external environment. The intestinal immune system has the critical task to detect and eliminate food or water-borne pathogenic agents. Peyer’s patches (PPs) are the most important antigen sampling and immune inductive sites. They are composed of clustered B cell follicles forming domes, interspersed with T cell zones termed interfollicular regions (IFR). Immune responses induction depends on antigen sampling, processing and efficient presentation by PP phagocytes. In the subepithelial dome (SED), at the detection frontline, are located specialized monocyte-derived phagocytes termed LysoDC which main function is to sample antigens. LysoDC encompass four differentiation states. Whether all these states have similar functional properties is currently unknown. Here, we have studied their particulate antigen uptake, migratory and T cell priming abilities. All LysoDC differentiation states display similar phagocytosis activity in vitro. However, in vivo their maturation occurs the closer they get to the epithelium, suggesting that mature LysoDC may have better access to luminal antigens than immature ones. At steady state, mature LysoDC stay in the SED and do not migrate in the IFR. Nevertheless, upon stimulation, they acquire the chemokine receptor CCR7 and migrate from the SED to the IFR where they interact with helper T cells. Only fully mature LysoDC can induce helper T cells proliferation in vitro without stimulation. In conclusion, we show that LysoDC sampling activity does not depend on their maturation state whereas their antigen presenting cell activity is limited to mature subepithelial cells that migrate to the T cell zone only upon stimulation.

Keywords : Peyer's patch, phagocytes, mucosal immunity, dendritic cells, monocyte-derived
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