in murine PP compared to spleen or peripheral lymph nodes. Furthermore, it was shown that dendritic cells isolated from PP have preferential ability to secrete IL-10 and to induce differentiation of Th2 type cells (Iwasaki and Kelsall, 1999). For the important role of PP in the initiation of immune response to ingested antigens and for the reason of their immunological particularities we studied activation of PP cells and cytokine production after oral immunization with allogeneic spleen cells in mice. We selected this model, since Sayegh et al. (1992) had first shown that oral administration of alloantigen can down-regulate the immune response to histocompatibility antigens, and the ability to induce transplantation hyporesponsiveness by oral immunization had been confirmed in other models of transplantation immunity (He et al., 1996; Gorczynski et al., 1998; Ishido et al., 1999).

However, we found that oral administration of allogeneic cells for 10 consecutive days induced specific transplantation immunity, rather than tolerance, in the treated mice. The systemic immunity in orally immunized animals was demonstrated by the resistance to the growth of allogeneic tumours induced by inoculation of a high dose of tumour cells which are able to grow progressively in untreated recipients. In addition, corneal allografts in orally treated mice were rejected more promptly, i.e. in a second-set fashion, in orally treated recipients (Holáň et al., in preparation). Our results are different from those of Niederkorn and coworkers, who described hyporeactivity to alloantigens and tolerance of corneal allografts in orally treated mice (He et al. 1996; Ma et al., 1997). These authors observed a typical Th2 type cytokine response in Peyer's patch cells from orally immunized mice (Ma et al., 1998). On the contrary to the above results, we found enhanced IFN-γ production and decreased IL-4 secretion in PP of mice treated orally with alloantigens. This pattern of cytokine response was evident 1 and 7 days after the last immunization dose and was confirmed both at the protein level as detected by ELISA and at the cytokine mRNA level as measured by RT-PCR. The production of IL-2 and IL-10 was only slightly increased in orally immunized mice. Our findings of enhanced production of IFN-γ and decreased secretion of IL-4 in PP cells after oral immunization are consistent with the reports in some other models of oral immunization (Takahashi et al., 1995; George, 1996; Marth et al., 1996). Since IFN-γ is a cytokine supporting Th1 immune response, which contributes to reduction of IL-4 producing Th2 cells (Street and Mosmann, 1991), a high production of IFN-γ in our model may explain preferential induction of transplantation immunity rather than tolerance. It has been shown that positive immune reactions, such as for example graft rejection, are accompanied by an increased activity of Th1 cells and higher production of IL-2 and IFN-γ (Wu et al., 1992), while the states of tolerance are associated with an increased activity of Th2 cells and enhanced production of IL-4 and IL-10 (Chen and Field, 1995).

Thus, our results show that oral immunization with fresh allogeneic spleen cells activates PP cells, which can be demonstrated by increased proliferative response after stimulation with allogeneic cells *in vitro* and by alloantigen-induced changes in production of some cytokines. This activation of the immune system observed already in PP correlates with systemic immunity proved in the periphery.

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