implants. No MGCs colonized the implants prepared from pHEMA-*co*-NaMA (Fig. 4). The extent of MGC formation estimated by the FI values was significantly elevated in cells colonizing the pHEMA-*co*-DMAEMA strip in comparison with the pHEMA and pHEMA-*co*-NaMA implant (Fig. 5).

Discussion

The results clearly demonstrated a remarkable difference in MGC formation *in vitro* using either *NB* or synthetic hydrogels as inductors. All synthetic hydrogels were very weak stimulators of the MGC formation *in vitro*, although the fusogenic potential of two of them (pHEMA, pHEMA-*co*-DMAEMA) was quite extensive *in vivo* (Smetana et al., 1990; Smetana et al., 1993). Moreover, in the *in vitro* assay it was not possible to discriminate the extent of foreign-body reaction against different types of polymers, although the differences in the fusion index were statistically significant *in vivo*: pHEMA-*co*-DMAEMA > pHEMA > pHEMA-*co*-NaMA. Very similar results were also observed in our previous studies (Smetana et al., 1990; Smetana et al., 1993). MGC formation after the application of *NB* was very extensive and led to the formation of granuloma-like structures *in vitro*. The very limited and donor-specific extent of MGC formation after the bead application *in vitro* may also be influenced by the immunological properties of the donor, because the results were quite heterogeneous in comparison with the results of *in vivo* experiments. Moreover, the extent of MGC formation *in vitro* was very similar to the finding observed earlier with unstimulated cultures of human PBMCs (Seitzer et al., 1997) (in this study no MGCs were detected in the absence of stimulation). The nature of polymers used in the experiments may influence this result because beads prepared from latex are weaker inductors of granuloma formation *in vitro* than the beads prepared from dextran (Warren, 1982). Cytokines are known as potent inductors of macrophage fusion into MGCs (McNally and Anderson, 1995; Sorimachi et al., 1995; Ikeda et al., 1998) and these molecules are produced *in vitro* by the PBMCs during the *NB*-induced granuloma formation (Seitzer et al., 1997). MGC formation without contact with the polymer beads, which we observed in this study, can be explained by the cytokine-induced fusion of MPhs (McNally and Anderson, 1995; Sorimachi et al., 1995). MGCs are generally observed in granulomas induced by bacterial or metazoan pathogens such as *Mycobacterium tuberculosis* or *Schistosoma mansoni*. The specific schistosomal antigens such as soluble egg antigen and adult worm antigen preparation were described as substances with a strong stimulatory effect on MGC formation (Silva-Teixeira et al., 1993). Similarly, living or heat-killed mycobacterial cells in combination with a cytokine cocktail elicited MGC formation in contrast with mycobacterial extract and/or supernatant combined with cytokines (Gasser and Möst, 1999). In analogy, a product of *NB* metabolism may contribute to MGC formation, because non-living nematodes have no MGC-inducing effect on MGC formation (not demonstrated).

In conclusion, the assay for the granuloma formation *in vitro* is not suitable for the foreign-body reaction testing yet. Compared to *NB* larvae, the synthetic materials seem to be weaker inducers of foreign-body MGC formation *in vitro,* suggesting differences in granuloma formation in reaction to these stimuli. Moreover, the possibility to discriminate among different materials using this *in vitro* assay is inferior to the comparison with the *in vivo* experiment.

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