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Effects of Chitin/Chitosan and Their Oligomers/Monomer on Macrophages Migration

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We have investigated on some of the mechanisms of wound healing acceleration induced by chitin and chitosan *in vivo* and *in vitro* [1, 2]. All mechanisms have not yet been elucidated completely. One of the interesting characteristic of wound healing with chitin and chitosan is presence of macrophages in granulation tissue. This phenomenon was notable in the granulation tissue induced by chitin. Macrophages are important cell components on wound healing process [3]. In the present study, we investigated effects of chitin/chitosan and their oligomers/monomers on macrophages migration *in vitro*.

Materials and Methods

Chitin and chitosan (mean particle size: approximately 3 μm) were kindly supplied by Sunfive Co. Ltd. (Tottori, Japan). Oligomers and monomers of chitin and chitosan were kindly supplied by Yaizu Suisankagaku Industries Co. Ltd. (Shizuoka, Japan). These agents were adjusted to 1.0 and 10 mg/ml with phosphate buffer solution before

use. Mouse peritoneal macrophages (PEM) were obtained by induction with proteose peptone. Cell migratory assay was performed with blind well chamber method. In the preliminary study, we determined a suitable condition of the assay (pore size of the polycarbonate filter was 5 μm and incubation time was 90 min).

Results

Migratory activity of PEM was reduced by chitin, chitosan and glucosamine (GlcN), while it was enhanced by chiti- and chito- oligomers in the presence of serum. In the absence of serum, there were no samples influencing the migratory activity of the PEM.

Discussion

It was found that oligomers of chitin and chitosan enhanced migratory activity of PEM, while polymers like chitin and chitosan inhibited it in the presence of serum. Furthermore, GlcN was also found to inhibit PEM migration, while N-acetyl-D-glucosamine (GlcNAc) was not. Inhibition of migratory activity seen with polymers was due to polymorphonuclear cells contamination or absorption of some substances related to cell migration in the serum by those particles.

Reference

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