LETTERS TO THE EDITOR

PREVENTIVE EFFECT OF POLYBETAINE ON THE CELL TOXICITY OF QUARTZ PARTICLES.

The preventive effects of polyvinylpyridine-N-oxide (PVPNO) on the experimental silicosis and toxic action of quartz particles to macrophages have been studied by Schlipkötter and others.¹⁾⁻⁵⁾ We recently found⁶⁾ that very small amount of PVPNO (kindly supplied by Prof. Schlipkötter) inhibited the increase of acid phosphatase activity in macrophages induced by quartz particles.

Nash, Allison and Harington⁷⁾ published the paper on physicochemical properties of silica in relation to its toxicity and referred to polybetaine. We also took an interest in the effect of polybetaine on the cytotoxic action of quartz. Recently, Nash kindly presented polybetaine to us. In the present paper the action of polybetaine on the macrophages with quartz was studied.

Effect of polybetaine on the increase of acid phosphatase activity in macrophages induced by quartz particles was studied in comparison with that of PVPNO. Polybetaine or PVPNO solutions of various concentrations were added to the cells with or without quartz particles. Each tube contained 5 million macrophages and 400 μ g of alkali-treated quartz particles less than 2 μ in diameter. The inhibitory effects of these polymers on the increase of acid phosphatase activity induced by quartz were shown in Fig. 1. The increase of acid phosphatase activity of macrophages by quartz particles was completely prevented by the addition of each polymer when the final concentration of these polymers was over $3 \times 10^{-3}\%$. And the inhibitory action of

Fig. 1. Effects of polybetaine and polyvinylpyridine-N-oxide on acid phosphatase activity in macrophages with quartz particles.

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polybetaine on the increase of acid phosphatase activity in the cells by quartz was slightly prominent in comparison with that of PVPNO.

The decrease of lactic acid production in macrophages and hemolysis by quartz particles were also prevented by the addition of small amounts of polybetaine or PVPNO. But, the erythrocyte resistance to NaCl solutions of various osmotic pressures was not changed by the addition of these polymers.

Polybetaine showed such a strong mitigating effect on the cytotoxic action of quartz to the macrophages, but the mechanism of this effect was obscure.

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