Chemiluminescence and Superoxide Anions Generated by Phagocytes in Uraemia

E.N.

Wardle

Dr. E.N. Wardle, MD, 33, Hawthorn Gardens, Kenton, Newcastle upon Tyne, NE3 3DE (England)

Dear Sir,

The article by Glazer et al. [1] draws ones attention to the fact that there are certain discrepancies in the experimental results obtained in this field [2]. When Torres et al. [3] examined normal human polymorphonuclear leucocytes, they found good correlations between oxygen consumption by the cells, hydrogen peroxide production, reduction of NBT or cytochrome c as measures of super-oxide anion production, and microbicidal capacity evaluated by the iodination test of Klebanoff. Superoxide anion production in response to membrane perturbation of cells (e.g. monocytes) causes both NBT reduction and ferricytochrome c reduction in parallel [4]. Hence the quoted observations of Urbanitz and Sieberth also seem odd. I am now wondering how one can possibly explain urea inhibition of ferricytochrome c reduction [1] unless it is that the urea is contaminated by urate, which is a recognised scavenger of singlet oxygen, superoxide anion, and hydroxyl radicals ?

When I was examining leucocyte function in uremia [5], I found evidence of reduced leucocyte iodination in undialysed uraemic patients that could be rationalised by the actions of dihydroxybenzoic acids and $>$ hydroxy-phenylacetic acid. In fact, in my ferricytochrome c reduction assay I found 80–90% inhibition of reduction by 5×10^{-5} M free phenol or 1×10^{-5} M 3,4-dihydroxy-benzoic acid, 40% inhibition by 10^{-3} M $>$ hydroxy-phenylacetic acid and 20% inhibition by means of 10^{-3} M Indole-3-ace-tic acid.

I would like to emphasise that the phenols, indoles and thiols that accumulate in uraemia [6] are all free radical scavengers, as indeed is urate. Indeed I have suggested elsewhere [7] that free radical scavengers may account for aspects of depressed cell-mediated reactions in uraemia. Yet it seems that there may be quite considerable variations between patients. Since the gut flora makes a contritition to toxin formation, this is understandable. Secondary [8] hyperparathyroidism also plays a role in stimulating chemiluminescence.

References

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