CORRESPONDENCE

This department is for the publication of informal communications that are of interest because they are informative and stimulating, and for the discussion of controversial matters. The mandate of this JOURNAL is to disseminate information relating to leprosy in particular and also other mycobacterial diseases. Dissident comment or interpretation on published research is of course valid but personality attacks on individuals would seem unnecessary. Political comments, valid or not, also are unwelcome. They might result in interference with the distribution of the JOURNAL and thus interfere with its prime purpose.

Superoxide, Superoxide Dismutase, Lipoperoxidation, and *M. leprae*

TO THE EDITOR:

Gots ([4]), in the workshop on future problems in the microbiology of *M. leprae* states the following:

> There is a further paradox in that we are dealing with an aerobic organism that does not like oxygen. They can tolerate a little oxygen but not too much (microaerofilic). This is due to a deficiency in an enzyme, superoxide dismutase, which serves to detoxify the superoxide ions generated from oxygen. The question with respect to *M. leprae* is, what is the content of superoxide or superoxide dismutase?

Superoxide dismutases are soluble and copper, iron, zinc or manganese-containing enzymes considered indispensable components of the system of defenses which made aerobic life possible ([3]). These enzymes are widely distributed in animal tissues and in all aerobic organisms, and their function has been understood as a dismutase which converts two molecules of superoxide into oxygen and hydrogen peroxide. They are the first defense against oxygen reduction products ([7]).

Deficiency of superoxide dismutase, as well as deficiencies of vitamin E, glucose-6-phosphate dehydrogenase, 6-phosphogluconate dehydrogenase, glutathione peroxidase, glutathione synthetase, glutathione reductase and catalase, decrease the protection of cell membranes against activated oxygen. The final defense against such activity are the antioxidants of the cell membranes. The most important of these is vitamin E ([6]), which is also a free radical trapping agent. Bergel ([1]) demonstrated that sulfones are biological antioxidants with vitamin activity.

There is sufficient evidence to justify serious consideration of the physiologic importance of lipid peroxidation in the development of certain pathologic states *in vivo* ([5]). The content of lipid peroxides *in vivo* is controlled through the combination of three factors: superoxide dismutase, dietary free radical scavengers and homeostatic replacement of altered lipids. In this regard, it is important to point out that Curnette ([2]) associated the inadequate production of superoxide dismutase with chronic granulomatous disease in humans.

Through knowledge of the content of superoxide and superoxide dismutase of *M. leprae*, as suggested by Gots, it should be possible to establish a relationship among elements of paramount biological importance, namely: lipoperoxidation of cell membranes, superoxide, superoxide dismutase, vitamin E, dietary free radical scavengers, low dietary content of antioxidants, elevated dietary contents of iron and polyunsaturated fatty acids, sulfones and *M. leprae*. These relationships would lead to a better knowledge of the pathogenesis and chemotherapy of leprosy.

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