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BEAL *ET AL.* REPLY—Davies and Roberts contend that quinolinic acid striatal lesions do not spare somatostatin (NADPH-diaphorase) neurons. We have attempted to resolve the discrepancy by carefully re-examining our own material. There is one major methodological difference between the two reports. Davies and Roberts examined regions containing the lesion cores in which there is almost total neuronal loss and marked gliosis as depicted in their Fig. 1 and the data given in Fig. 2*a*. They found no selective sparing of neurons within this region and our own findings are in agreement with that result. Since we believe that sparing of somatostatin neurons is relative and not absolute, we make our counts in regions posterior to the lesion, where there is a depletion of total Nissl-stained neurons in the range of 50%. Within this region we find significant increases in NADPH-diaphorase neurons relative to acetylcholinesterase neurons. We have further examined this issue by counting numbers of NADPH-diaphorase neurons relative to the total number of Nissl-stained neurons. NADPH-diaphorase neurons are significantly increased as a percentage of the total neuronal population in this area. These results are consistent with the findings of Choi and colleagues who showed that quinolinic acid results in relative, but not absolute, sparing of NADPH-diaphorase neurons in cortical cell cultures (*Science* **234**, 73-76; 1986).

Davies and Roberts do not take issue with our neurochemical data. We have replicated these results in numerous subsequent experiments and they have been replicated by others (Nemeroff, Kitt, Dissette and Schwarcz, personal communication). Davies and Roberts explain these results by asserting that somatostatin may be contained in striatal afferents. However, this cannot explain differential effects of kainic acid and quinolinic acid on somatostatin levels, since both produce axon-sparing lesions.

It is likely that quinolinic acid lesions produce sparing of both acetylcholinesterase and NADPH-diaphorase neurons relative to other neuronal populations. We have recently found that acetylcholinesterase neurons are also spared in Huntington's disease (Ferrante *et al., Brain Res.* **411**, 162-166, 1987). These findings taken as a whole strengthen the validity of our original observations that quinolinic acid lesions are an animal model of Huntington's disease.

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The third component of complement (C3) is responsible for the intracellular survival of *Leishmania major*

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Leishmania **are obligate intracellular parasites of mononuclear phagocytes. We[1,2] and others[3] have shown that the promastigote form of all species of leishmania activates complement from non-immune serum and that this activation can result in parasite lysis. This work, as well as earlier *in vivo* studies[4], suggested that complement is an important component of host defence against leishmaniasis. We now present evidence that parasite complement fixation, in addition to increasing parasite phagocytosis[5,6], is required for the intracellular survival of leishmania in macrophages. We specifically show a strong correlation between parasite C3 fixation and intracellular survival. We attribute this survival, in part, to a decrease in the magnitude of the macrophage respiratory burst which is triggered by complement-coated, as opposed to uncoated, parasites.**

Labelled *Leishmania major* promastigotes are added to monolayers and the number of intracellular organisms is determined at either 24 or 48 h and compared to the number of parasites which were phagocytized during the first hour. The number of organisms associated with the monolayer at one hour is determined with a parasite radiobinding assay, which measures the total number of macrophage-associated organisms[1]. In separate assays, using two independent methods, we have determined that more than 85% of organisms in all groups studied are internalized during this initial incubation period.

Over a wide range of parasite inputs, in the absence of serum, resident mouse macrophages kill over 95% of the ingested promastigotes, but when fresh non-immune serum is included, there is more than a 10-fold enhancement in survival (Fig. 1). Because of the increase in binding due to serum (opsonization) the average number of parasites bound per macrophage is higher, which might account for this increased survival. We therefore measured intracellular survival after the parasite input had been adjusted by two-thirds to three-quarters to achieve similar binding in the presence or absence of serum. Table 1 shows that ~95% of the 3.1 organisms bound per macrophage in the absence of serum are killed. In addition, fewer than 5%

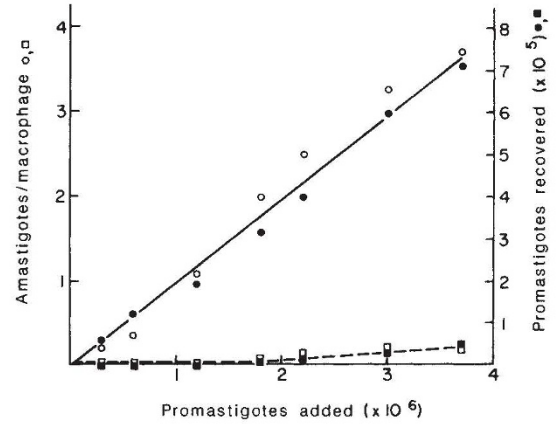

Fig. 1 The intracellular survival of *L. major* in resident murine macrophages. Increasing numbers of promastigotes were added in the presence (circles) or absence (squares) of 4% mouse C5D serum. Left axis, average number of morphologically intact amastigotes per macrophages counted on acridine orange-stained monolayers 48 h after infection (open symbols). The right axis indicates the number of viable organisms present per monolayer measured by the parasite reculture method which involves counting the number of promastigotes which tranform from amastigotes as described[7]. Amastigotes are released from hypotonically lysed monolayers 24 h after infection (closed symbols). In separate experiments we have determined that the number of intracellular organisms remains constant from 24-48 h by this assay.