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LETTER TO THE EDITOR

Could iodine be effective in the treatment of human immunodeficiency virus and AIDS-associated opportunistic infections?

Retroviruses share similarities in structure, genomic organization and replication and are associated with immunodeficiencies. AIDS describes the most advanced stages of HIV infection and is characterized by a progressive loss of the CD4+ helper subset of the T-lymphocytes resulting in immune suppression, constitutional diseases and opportunistic infections. The feline immunodeficiency retrovirus (FIV) has a clinical pathology not unlike that of HIV/AIDS, including AIDS-related complexes and chronic immunodeficiency.[1–2] In an uncontrolled case study, it was found that an adult cat diagnosed with end-stage FIV recovered within eight weeks of treatment with a daily oral gavage of a commercially available iodine solution (tincture of iodine (2.5% w/v), 4 μg in 10 ml water, three times daily). Moreover, for at least five years there was no further clinical evidence of disease in this cat. The animal's recovery may have been due to iodine's broad spectrum therapeutic effect on opportunistic infections, or possibly because of suppression of viraemia.

In HIV and FIV infection, viral load is dependent on the stage of infection, however it generally predominates in cells of the reticulo-endothelial system. Iodine is commonly prepared in two forms: conjugated with a cation, which is soluble in aqueous media, or complexed as two molecules which has lipophylic properties. A number of studies have demonstrated that iodine, and in particular the lipophylic form, possesses potent antiviral and microbiocidal properties in vitro.[3–4] The triglyceride-rich lipoproteins, including chylomicrons and very low-density lipoproteins, serve as an energy substrate for inflammatory cells. It is our contention that the lipophylic form of iodine, when ingested orally, may be particularly effective as a microbiocidal/antiviral agent, because it would be incorporated into chylomicrons, transported via the lymphatic system and be delivered to the cells of the reticulo-endothelial system.

A Folch extraction of the commercial preparation of iodine used to treat the cat with FIV was carried out in order to explore the relative abundance of the lipophylic and hydrophilic form of iodine. The absorbance profiles of the aqueous and solvent phases found that the iodine suspension contained both forms, with a distribution of approximately one third as the more potent antiviral lipophylic moiety.

Absorption and distribution of iodine was determined by isotopic tracer studies in lymph cannulated and intact rodents. In cannulated rats, lymph delivery of iodine peaked at approximately 2 hour following infusion of iodine into the duodenum (see Figure 1) and was complete after 6 hour. Analysis of the chylomicron versus non-lipoprotein fraction of lymph found that iodine was distributed essentially equally (Figure 1).

The pattern of plasma iodine concentration administered to intact animals by oral gavage (Figure 1) was consistent with a phase of rapid delivery and thereafter at increasing concentration as plasma lipoproteins (data not shown). The tissue distribution of iodine was determined 4 hour post gavage in intact animals. It was found that concentration was greatest in the spleen per unit weight of tissue and some 1.6-fold greater than in thyroid, liver or muscle tissue.

Inhibiting opportunistic infections or viral load may reduce or prevent some of the clinical manifestations associated with retroviral infections. Incorporating microbiocidal compounds into triglyceride-rich lipoproteins may enhance delivery to cells harboring bacteria and viruses. The authors' pilot studies suggest that using a common preparation of iodine, significant quantities of the lipophylic form were incorporated into chylomicrons and delivered to cells of the reticulo-endothelial system. Based on the relative distribution of iodine

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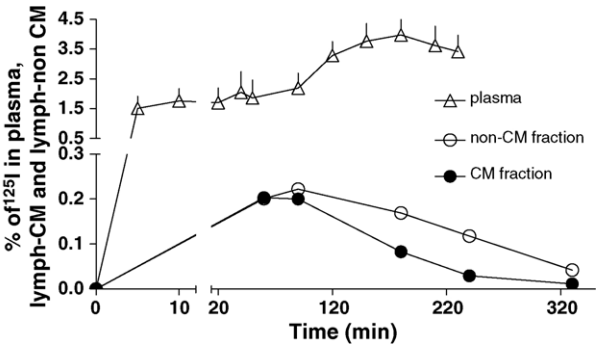

Figure 1 Approximately 4 μg of radiolabelled iodine suspended in water was given by oral gavage and the concentration in plasma determined. In lymph-cannulated animals, iodine was introduced via a cannula placed directly into the duodenum. Data are expressed as a percentage of the dose given. CM = lymph chylomicron.

found in plasma and lymph (i.e. as a percentage of the dose administered), concentrations known to be effective in vitro could be readily achieved by oral ingestion. These observations are presented in the context of hypothesis generating and have not considered different iodine preparations, species or the dose of iodine administered. Of particular interest would be the putative effects of iodine preparations in modulating viral load which needs to be explored in animal models at different stages of disease.

Conflict of interest: No conflict of interest to declare.

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