PREFACE

Exposure of man and other animals to different xenobiotics, which, in no way, serve as nutrients or as other essential factors, can profoundly alter the equilibrium of living entities with its environment, through their toxicological properties. Such xenobiotics cannot be allowed, therefore, to concentrate beyond tolerating limits. The question, "Is fluorine an essential element?" has naturally been raised. It has not been possible to find a definite answer owing to the difficulty of producing a diet for animal experimentation that is fluorine-free but adequate in every other respect.

Since the late 1940s, the use of fluorides as anticariogen - especially, the adjustment of the fluoride content of drinking water - has been a subject of considerable controversy. Public health authorities that have contemplated adopting measures of this kind have encountered strong opposition and have often had to undertake extensive reviews of the literature in order to reach a decision. Extensive research has been carried out in order to establish the anti-cariogenic property of fluoride. But how it effects the other parts of the gastrointestinal tract, very little attention has been, so far, given, specifically on the mechanism of digestion, absorption and secretion of ions across mucosal epithelial cells.

Following oral administration of fluoride to animals, absorption from the gut involves its translocation to blood stream and then to various tissues. There are sufficient data on mechanism of fluoride absorption or transport across gastrointestinal tract to show how much fluoride is absorbed, how much is stored in the tissue. But, so far, its effect on the uptake of various nutrients and other essential factors, through its involvement in the process of digestion and absorption is concerned, very little data is available. Moreover, the binding and transport of fluorides across intestinal epithelium may effect the mobilization of physiological ions, and other solutes and the membrane permeability of the epithelial cells and thereby altering the activities of related enzymes, is still to be fully understood.

An attempt has been made by the author to investigate, in addition to the biochemical response of gastrointestinal tract to fluoride, the effect of fluoride on the uptake of sugars and amino acids, in detail, under *in situ* conditions in anaesthetised rats and under *in vitro* conditions by the isolated epithelial cells of rat intestine. The absorption of nutrients carried out by the mucosal epithelial cells of small intestine has long been recognised and appreciated by biochemists and physiologists alike. Thus, the isolated cell suspensions provided the most suitable system to study the effect of fluoride on the uptake of nutrients, because of ease of manipulation and reproducible sampling offered significant advantages over those systems using intact tissue preparations. Furthermore, noval biological variations between

control and treated rats which would make comparison of their transport activity difficult, were overcome in this system.

The present investigation has thrown sufficient light on, how fluoride levels, which otherwise, seem to induce no effect on the absorption of nutrients in the intact intestine, can produce harmful effects by depriving the tissue cells from necessary levels of nutrients and metabolites.

October 1983 RASS MASOOD SHAYIQ