Concentration and Nature of Iodide Secreted by the Perfused Salivary Glands of the Golden Hamster[1]

The ability of salivary glands to concentrate iodide differs in various species, and it has been found that within a particular species this property is not common to all salivary glands[2]. Furthermore, there are indications that in some glands iodide is concentrated solely as inorganic iodide, whereas others may contain a certain proportion of organically based iodide.

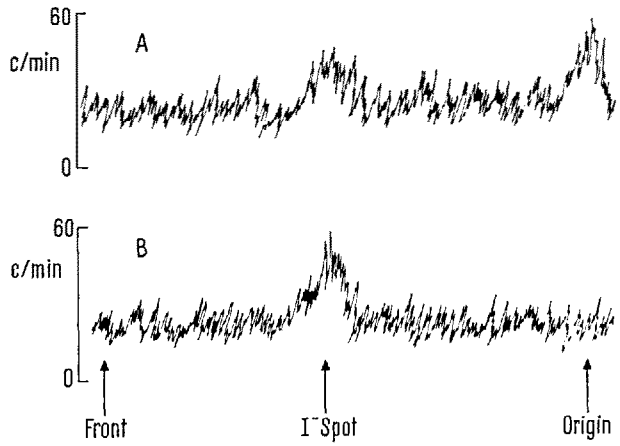
Using chromatographic methods for the detection of I^{131}, FLETCHER, HONOUR, and ROWLANDS[3] reported that the iodide obtained from extracts of submaxillary salivary glands in mice which had received I^{131} systemically, was wholly inorganic. Similar results were obtained by FREINKEL and INGBAR[4] in their investigations on mixed human saliva. TAUROG, POTTER, and CHAIKOFF[5], who also studied the submaxillary glands of mice, stated that, when the glands were removed 24 h after the administration of I^{131}, a significant concentration of iodide was revealed at the origin of the chromatogram, suggesting the presence of I^{131} protein. LOGOTHETOPOULOS and MYANT[6], working with the golden hamster, found that, in extracts of the *submaxillary gland*, 90% of the I^{131} was in the inorganic form, whereas approximately 10% remained at the origin of the chromatogram, presumably as organic iodide. In further experiments, these authors demonstrated that the *sublingual* glands of the hamster do not concentrate iodide.

In the experiments reported herewith, the submaxillary and sublingual glands of the golden hamster were perfused with a solution containing I^{131} and the saliva was collected to compare the concentrating power of the two glands with respect to iodide. In hamsters under nembutal anaesthesia, isolation of the salivary gland circulation was performed unilaterally and the salivary ducts were cannulated under a dissecting microscope. Perfusion was carried out at 20° with a Krebs-Ringer bicarbonate solution containing 3.5% PVP as plasma expander and 10–15 μC of I^{131} per 100 cm^3. Salivary secretion was stimulated with acetylcholine. The saliva collected was submitted to ascending chromatography on Whatman No.1 paper with Butanol-Bioxane-NH_4OH according to GROSS *et al.*[7]. The paper was scanned for I^{131} with a chromatogram scanner.

With respect to concentrating power, the experiments revealed that the I^{131} content of submaxillary gland saliva was from 10–30 times greater than in the perfusion fluid, while in sublingual gland saliva the concentration ratio was 1 to 1.3. The difference between the two glands, as reported by LOGOTHETOPOULOS and MYANT[6] working with extracts, is thus confirmed.

In the course of these experiments, another interesting difference between the sublingual and submaxillary gland of the hamster came to light. Whereas all of the I^{131} in the saliva from the sublingual gland appeared in the form of inorganic iodide, a considerable proportion of the I^{131} secreted in the submaxillary gland saliva remained at the origin of the chromatogram (Figure).

To test the possibility that this 'bound' I^{131} was not secreted as such, but may have been formed by reaction with inorganic I^{131} after secretion of the saliva, control perfusions without I^{131} were carried out. Labelled iodide was subsequently added to the saliva *in vitro* and the mixture immediately spotted for chromatography. When I^{131} was added to submaxillary gland saliva, some radioactive material was found at the origin. This did not occur with sublingual gland saliva subjected to the same procedure.



Distribution of radioactive iodide in chromatograms of saliva secreted during perfusion with a Krebs-Ringer solution containing I^{131}. (A) saliva from the submaxillary gland. (B) saliva from the sublingual gland.

From these experiments it may be inferred that: (a) at least part of the 'origin bound' iodide is being formed by reaction between inorganic iodide and a factor in the submaxillary gland saliva, independent of active salivary tissue; (b) the substance contributing to the formation of the 'origin-bound' iodide, while present in the submaxillary gland of the hamster, is absent from the sublingual gland saliva.

The above two findings would lead to an assumption that—unless a vestige of thyroid activity retained by the glands is thought to be involved—the salivary component, which constitutes the iodide binding factor, should be considered as playing a role in the iodide concentrating mechanism of the gland.

Résumé. L'analyse de la salive extraité par ponction de la glande sous-maxillaire du *Cricetus auratus* montre que cette glande concentre l'iodide inorganique et que la salive qu'elle sécrète, contient un facteur capable de «lier» cette substance. Ce facteur manque par contre à la glande sublinguale et l'iodide n'y est pas concentré.

Il est donc suggéré que le facteur contenu dans la salive de la glande sous-maxillaire et qui est responsable de l'iodide «lié», joue un rôle dans le mécanisme de concentration de l'iodide par les glandes.

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