ESTIMATION OF SALIVARY C-PEPTIDE IN DIABETICS

THESIES

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(ENDOCRINOLOGY AND METABOLISM)

BY

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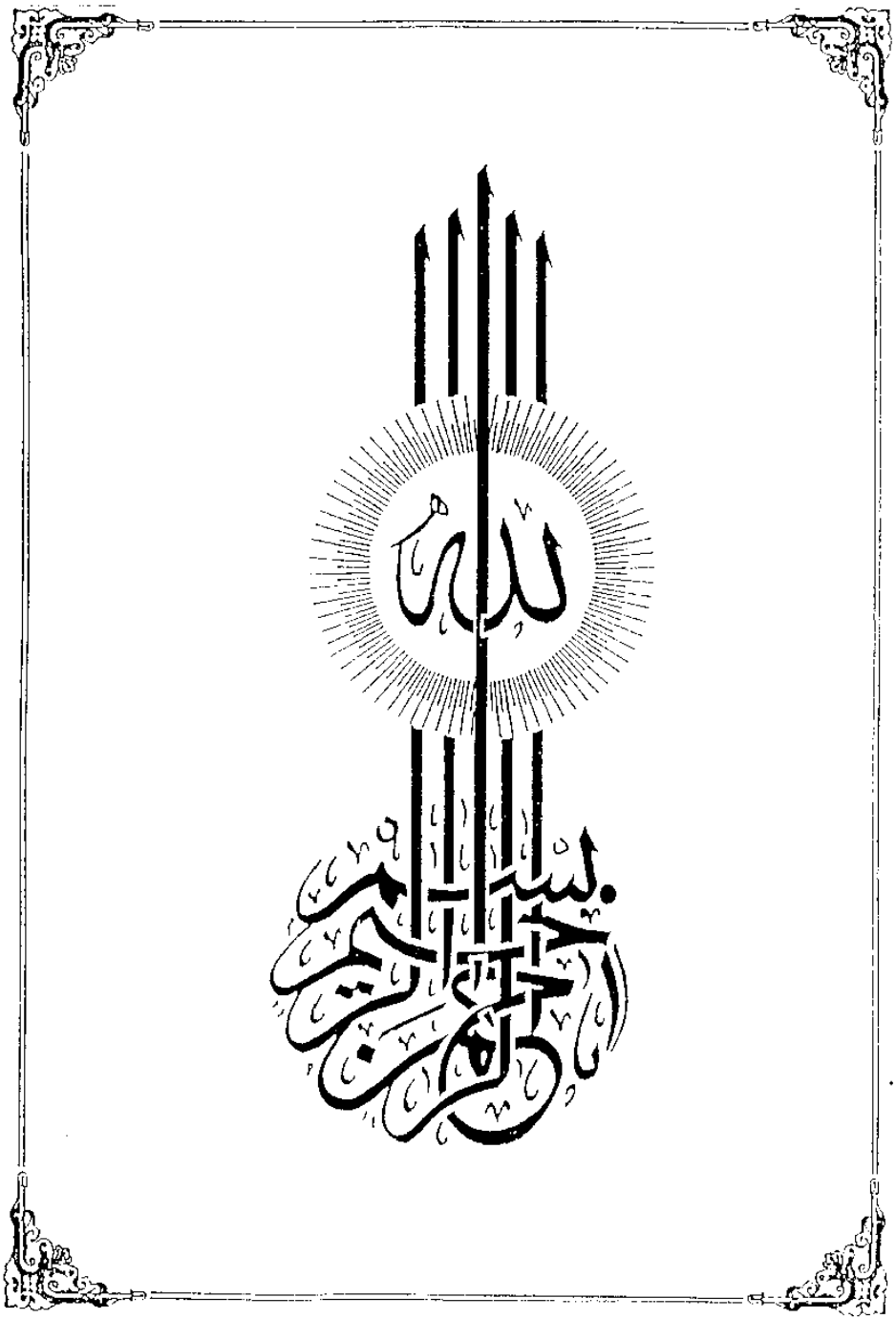
قالوا

سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا

إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

صَدَقَ اللهُ الْعَظِيمُ

سورة البقرة (الآية ٣٢)



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INTRODUCTION AND AIM OF THE WORK

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The saliva is composed mainly of the digestive enzymes (Ptyaline, mucine), Na^+, Cl^-, HCO_3^- K^+ and 1500 ml salivary secretion per day.

Recently it was observed that certain hormones can be found in the saliva as well. Radioimmune assay of these hormones in the saliva would be more convenient than the assay in blood as a non invasive technique and sheap, method.

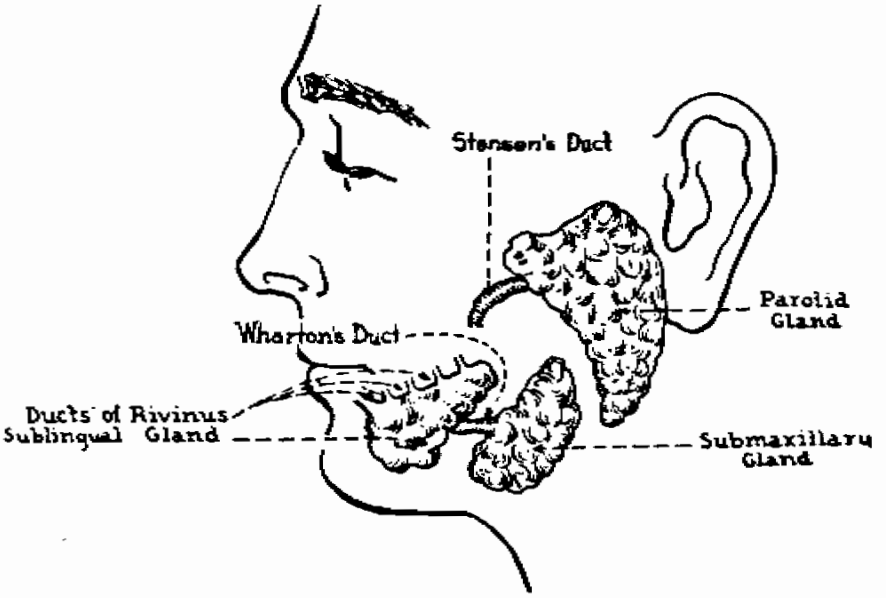
The aim of this work is to clarify the relation between blood and Salivary C-peptide. Since the determination of C-peptide level in saliva will offer a number of significant advantages as compared to blood measurments in different conditions, one of these is Diabetes Mellitus which usually need serial blood follow.

REVIEW

THE ANATOMY OF SALIVARY GLANDS

There are three major groups of salivary glands. These are all paired, other glandular masses have been described scattered about the oral mucous membranes but these merely constitute accessory salivary tissue and need not to be considered separately. The major salivary glands include parotide, the submaxillary and sublingual glands.

The ducts of these glands are stensens for parotid g, Wharton's duct for submaxillary gland and Bivinus ducts for sublingual gland (Langley, 1975).



Anatomy of salivary gland

There are 2 types of salivary secretory cells: 1. Mucous and 2. Serous.

The parotid gland possesses only serous cells, the sublingual has mostly mucous cells and the submaxillary gland contain both.

The salivary glands are innervated by both divisons of the autonomic Nervous system.

The parasympathetic fibres which innervate the submaxillary and sublingual glands arise in the superior salivary nucleus.

Postganglionic fibres arise in the submaxillary ganglion and terminate in these two glands. The parasympathetic fibres which supply the parotid gland originate in the inferior salivary nucleus and terminate in otic ganglion. Post ganglionic fibres arise here and end in the parotid gland.

Post ganglionic sympathetic fibres destined for all three glands arise in cells which are situated in the superior cervical ganglion. They reach the glands by coursing with the carotid artery and its branches.

The secretion of saliva is an active process. There is independent innervation of the serous and mucous cells so that the parasympathetic system evokes a highly mucous saliva and the sympathetic fibres promote serous flow.

At rest 25 CC of faliva per hour are produced. On the average over a litre is secreted per day under normal conditions (Sidney, 1972).

COMPOSITION OF SALIVA

Substance	Mg. Per cent.
Sodium	30
Potassium	80
Calcium	5
Chloride	50
Phosphate	16
CO_2 (vol. %)	15
Riboflavin	5
Nicotinic acid	3
Pantothenic aid	8
Vitamin K	1.5
Glucose	20
Cholesterol	8
Creatinine	20
Total protein	280

There are many enzymes in saliva but only the salivary amylase, ptyalin is of importance for digestion.

The pH of saliva varies between 5.6 and 7.6 with an average of about 6.8.

Recently with the aid of radio-immune assay the presence of hormones in saliva was discovered.

THE MOST IMPORTANT HORMONES FOUND IN THE SALIVA

Progesterone:

The evaluation of the **corpus luteum function** by sereal salivary progesteron determination is considered a recent progress in ovarian function studies (Tho-S-P., 1986), the simplicity and accuracy of the radio immune assay and the convenience of salivary samples provide a practical approch to monitor human luteal function.

Also in **sterility and infertility**, measuring of progesterone by radio immune assay in saliva in serial samples may become the preferred method for monitoring ovarian function (Tallon-D-P, 1984). As the relation between plasma and salivary progesterone was confirmed after intravascular injection of progesterone both plasma and salivary progesterone level increased in a dose dependent manner (Choe-J.K., 1983).

In 1982 Connor-M.L observed that the third trimester of **pregnancy** is characterized by steadily increase in concentration of salivary progesterone untill 1-3 weeks prior to parturition, concentration following

parturition is similar to those of the follicular phase, from this the follow up of a pregnant female will be easy by measuring salivary hormones which is a non invasive method.

Oestradiol:

The levels of oestradiol in saliva followed the same pattern as in blood. The Peak of oestradiol in saliva could be used to predict accurately the time of onset of the next menstrual period. The analysis of saliva could be useful in the investigation of women in whom serial venepuncture are not possible (Evans et al., 1980).

Also in 1985 Sufi et al., conclude that assays of hormones in saliva are useful adjuncts to those performed on other body fluids, as blood samples can be difficult to be obtained in studies involving serial sampling, especially in developing countries where there may also be logistic ethical, and cultural constraints that make frequent blood collection impractical. Assyas of oestradiol in saliva may avoid some of these difficulties.

A multicenter study involving laboratories in five countries was carried out to compare the results of assays for salivary oestradiol and progesterone

performed with centrally provided reagents and assay protocols. Concentrations of salivary steroid as obtained by all centres were comparable with those reported in the literature.

Cortisol:

Measuring the cortisol in saliva could be applied clinically in **dexamethasone suppression** test (Hanada-et al., 1985) as several blood samples are usually needed and serial samples of saliva is an easier technique.

The results of dexamethasone suppression test for **endogenous depression** were compared when cortisol was measured in plasma and in saliva. Results showed a close linear relationship between free plasma and saliva cortisol. This suggests that salivary cortisol which directly reflects the biologically active fraction of cortisol can be used as a reliable and more practical index in the dexamethasone suppression test especially in out patients (Ansseau et al., 1984).

Huble et al., 1984 measure the normal values of cortisol in plasma and saliva before and after ACTH, dexamethasone, metyrapone application. And he found that saliva being easily collected, non

invasive stress-free technique is an alternative to plasma. The cortisol concentrations were significantly increased in plasma and saliva of patients with **Cushings' syndrome** and decreased in patients with addison's disease.

In routine monitoring of adrenal function in children treated with cortisol, serial measurment of the salivary cortisol concentration is a simple and sensitive method can be used (Williams et al., 1984).

Aldosterone:

Under basal conditions concentrations of aldosterone in saliva ranged from 10-63% those of plasma when plasma aldosterone responded to such acute stimuli as postural changes, exercise or ACTH infusion, this was promptly reflected in corresponding changes in saliva aldosterone concentration (Few et al., 1984).

In 1983 Huble found that the aldosterone levels in patients with Conn's syndrome was significantly increased in plasma and also in saliva. Since saliva is easily collected by a non-invasive stress free technique so it can be used as an alternative method to plasma hormon measurments.