Chapter VI: Summary and Conclusion

SUMMARY AND CONCLUSION

According to many scientists the salivary glands are involved in secretion and distribution of proteins, enzymes and their hormonal regulation. The salivary glands also secrete different biologically active polypeptides or growth promoting substances such as epidermal growth factor (EGF), nerve growth factor (NGF) and transforming growth factor (TGF), etc. These are largely found in submandibular gland and smaller amount in sublingual glands (Barka, 1980; Sporn, et al., 1982).

Many scientists in different laboratories have carried out research on effect of sialoadenectomy on various organs of the body i. e. on blood glucose level, testis, muscles, liver, gastrointestinal tract etc.

In India sialoadenectomy (removal of submandibular gland) is commonly performed surgical procedure in thousands of individuals due to cancers of oral cavity, which may change the homeostasis in these patients, so to find out whether the sublingual gland adopt the function of submandibular gland in such patients we have sialoadenectomised the male mice and tried to find out what will be the change in sublingual gland structure and function. In the present work three months old male mice were used because submandibular gland of male mice always show very high concentration of growth factors and secrete twenty times more growth factors than that of female mice (Barka, 1980).
To assess the structure and function of sublingual gland in absence of submandibular gland in male mice, the effect of sialoadenectomy on protein content, amylase content and glycoprotein content in male mice was examined. For this the animals were operated at the age of 20\textsuperscript{th} day as secretions of growth factors starts at the age of 20\textsuperscript{th} day in submandibular gland. They were grouped into following two groups;

1. Control group
2. Sialoadenectomised group

Operated mice were maintained in animal house with proper care and were sacrificed by cervical dislocation at the age of three months and then sublingual glands were dissected out and were subjected to the following investigations.

1. Histology of sublingual gland by HE technique.
2. Electron microscopy of sublingual gland.
3. Estimation of amylase activity
4. Estimation of Protein.
5. Electrophoretic separation of proteins.
7. Estimation of sialic acid.
10. Histochemical study of sialic acid by thionyl chloride
The effect of sialoadenectomy on sublingual gland structure was studied by histology i.e. by HE technique and by transmission electron microscopy. To support the results of HE technique the mucous acinar cell count was also done. The results reveals that there was increase in number of mucous acinar cells but size of cells was somewhat decreased and also the ducts size was increased in sublingual gland of sialoadenectomised mice as compared to control. The electron microscopy results confirmed the results of HE technique that number and volume of acinar cells was increased. In the mucus acinar cells there was increase in mucous secretory granules and size of nucleus was also increased, become exactly rounded in shape. There was no any change observed in the remaining cell organelles structure indicating increase in secretion of sublingual gland in absence of submandibular gland.

The effect of sialoadenectomy on the body weight, sublingual gland weight and protein content and amylase activity from sublingual gland was studied. The sialoadenectomised mice showed decrease in body weight and increase in sublingual gland weight. The protein content and amylase activity was also increased in the sublingual gland of sialoadenectomised mice. The electrophoresis of protein and glycoproteins was carried out to confirm the results of biochemical estimations of protein and amylase.
Increase in sublingual gland weight may be due to increase in acinar cell number in sialoadenectomised mice. Ishii and Nakagawa (2000) suggested that surgical stress enhanced the secretion of salivary proteins, which is mainly due to α-adrenergic receptor stimulation. The increase in protein, amylase and glycoprotein content biochemically and appearance of two new bands, one in region of amylase and other in region of glycosylated PRPs and increase in staining intensity of glycoprotein bands in sublingual gland of sialoadenectomised mice electrophoretically may be due to stressful condition in the sublingual gland in absence of submandibular gland.

The glycoprotein content in sublingual gland of sialoadenectomised mice was also studied by estimating sialic acids and fucose content biochemically and histochemically by AB pH-1, AB pH-2.5, PAS and PAS-sodium borohydride methods. The sialic acid and fucose are studied because sialic acid constitutes cell to cell repulsion (anti-adhesive effect), functional stability and survival of glycoproteins in blood and cell to cell matrix interaction, while fucose as it is powerful immune modulator. As a result of cell to cell repulsion and secretion of sialic acid from the cells may have increased sialic acid content in sublingual gland of sialoadenectomised mice and increase in fucose content reveals its role in reversing the process like inflammation, immunity etc.

Histochemical demonstration of acidic, sulphated, neutral glycoproteins and O-acylated sialomucins showed increase in glycoproteins of
sublingual gland of sialoadenectomised mice which proves the increase in secretion of sublingual gland. The increase in O-acylated sialomucins confirms the biochemical results of increase in sialic acid content.

**Conclusion**

In the present investigation, the sialoadenectomy have increased the cell proliferation in sublingual gland. The increase in number of mucous acini may have increased secretion of sublingual gland. Ishii and Nakagawa (2000) also suggested that surgical stress enhances the secretion of salivary proteins, thus increase in protein, glycoprotein and enzymes in sublingual gland proves stressful conditions in sublingual gland in absence of submandibular gland. Thus increase in secretion indicates that sublingual gland tries to compensate function of submandibular gland in its absence.