Virus-like particles in the apical cytoplasm of some ductal epithelial cells of the rat major sublingual gland.

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In the morphological study of the duct systems of the rat major sublingual gland, we found many unusual particles in the epithelial cells of the duct. The morphological aspect of the these particles was investigated in this study.

Five adult male rats were perfused through the ascending aorta with 3% glutaraldehyde in 0.1 M cacodylate buffer (pH 7.2). Parts of the terminal portion of the major sublingual gland were taken and postfixed in 1% osmic acid for two hours at 4°C. After dehydration through a graded series of ethanol and acetone, they were embedded in Epon 812. The thin sections were stained with uranyl acetate and lead citrate and then examined under a JEOL JEM-100B electron microscope at 80 KV.

The duct systems consisted of intercalated, striated and main excretory ducts. However, the striated ducts were different from those of the parotid and submandibular glands. The apical cytoplasm of the light cells of the striated duct was characterized by abundant secretory granules (210-1,000 nm) and very poor basal infoldings. However, sacks of rough and smooth endoplasmic reticulum were abundant throughout the cytoplasm. A number of particles were found in the apical cytoplasm of several light cells in the striated duct epithelium of two rats out of five.

These particles were observed within cytoplasmic vesicles surrounded by two membranes (Figs. 1 and 2). Several particles were frequently observed in one vesicle. They were circular in shape and 80-100 nm in diameter. They were surrounded by two membranes with surface projections and contained granular material with an electron lucent central halo (Fig. 2). Particles were also seen in the lumen (Figs. 1 and 3). It seems that the particles entered the lumen through occasional bursts of the apical cytoplasm (Fig. 3). Particles were found in only one region of the striated duct and none were found in the other regions of the duct systems.

These particles seemed to have morphological properties in common with those of the coronavirus group which cause a variety of diseases: hepatitis, encephalitis, chronic immunological mediated diseases and diarrhea in the mouse, and rhinitis, tracheitis, pneumonitis and sialodacryoadenitis in the rat. Doi et al. reported that sialodacryoadenitis (SDA virus) had two different surface projections as surface components. The particles in the present study also had similar surface projections. As the other characteristics of these particles were in general agreement with the properties of SDA virus as described previously, they may also be SDA viruses.

The preferential site of SDA virus in the major sublingual gland of naturally infected rats has not yet been reported. The particles observed in this study were located preferentially in the epithelial cells of the duct. It has been already pointed out that SDA virus have an affinity with ductal epithelial cells of the parotid and submandibular glands. It is also speculated that the cytoplasmic vesicles of the ductal epithelial cells in the sublingual gland may be the preferential mutation sites of these particles.
Fig. 1 Electron micrograph of the apical portion of ductal epithelial cells of the major sublingual gland. Virus-like particles are seen in the cytoplasmic vesicles and the lumen (arrows). Bar=1 μm.
Fig. 2  Virus-like particles in the cytoplasmic vesicles are surrounded by two membranes with surface projections (arrows). Bar=100 nm.

Fig. 3  The burst of apical cytoplasmic (double arrow). A number of virus-like particles are seen in the lumen. Bar=0.5 μm.
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References