

Thesis Title	Microvascularization in Superior Cervical Ganglion of the Common Tree Shrew ( <i>Tupaia glis</i> ) as Revealed by TEM, Corrosion Cast/SEM and Modified Enzymatic Digestion/SEM
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### ABSTRACT

The present study deals with the three-dimensional investigation of the microvascularization in SCG of the tree shrew as revealed by vascular corrosion cast technique in conjunction with SEM. It is found that the tree shrew SCG is a highly vascularized organ with the arteries supplying the ganglion, giving rise to a subcapsular capillary plexus before branching off to form a densely-packed intraganglionic capillaries (IC). The IC course tortuously in parallel with the long axis of the ganglion and anastomoses with each other. The IC also anastomoses with a subcapsular capillary plexus. In addition, a pattern of blood vessels resembling portal-like intraganglionic microcirculation could not be demonstrated in the SCG of both rat and tree shrew. Moreover, TEM study of the tree shrew SCG revealed that the postganglionic sympathetic neurons, small granule-containing cells and intraganglionic mast cells are located adjacent to the IC. Most of the capillaries are with flat continuous endothelial cells which contain a large number of micropinocytotic vesicles on both luminal and abluminal surfaces.

In order to achieve the simultaneous viewing of cytoarchitecture and angioarchitecture, the enzymatic digestion technique has been modified. It is the combination of vascular cast technique with collagenase-hyaluronidase/HCl digestion method. The submandibular gland, extraocular muscles and SCG of the tree shrew have been used as tissues of representatives. It is found that the specimens are in excellent condition for the three-dimensional and

simultaneous observation of both parenchymal cells and blood vessels. The polymerized plastic replacing the lumen of blood vessels becomes the framework which effectively supports the cellular component in place. In addition, it is found that the optimal duration for the digestion of SCG is longer than those of salivary gland and striated muscle. This modified method also provides the possibility to investigate the relationship between cytoarchitecture and angioarchitecture in various organs under SEM. In the tree shrew's SCG, the main cellular constituents are multipolar neurons densely arranged throughout the ganglion. These neurons are covered with smooth cytoplasmic sheath of the satellite cells. After the removal of this sheath by increasing duration of the digestion, blebs or knobs on the neuronal surface are evident. Meshwork of nerve fibers coursing on the surface of neurons is also shown. Preganglionic sympathetic nerve fibers giving rise of fine branches running toward the postganglionic sympathetic neurons before synapsing are demonstrated. Moreover, groups of neurons surrounded by capillary loops are frequently observed.