was reported that local pH around the osteoclasts showed a lower degree in the case of cell culture. From these findings it could be thought that in the mechanism of bone resorption by osteoclasts, the demineralizing action occupies more important part than the proteolytic action. Localization of succinic dehydrogenase activity coincided with the mitochondrial distribution, that is, functional side, which is adjacent to bone and rich in mitochondria, show a high enzymatic activity. These patterns indicated histochemically that there is the differences in mechanism and function of these cells.

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The Enzyme Histochemical Study on the Trigeminal Ganglions of Cows, Dogs, Cats and Rabbits

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Recently histochemical studies on the ganglions of mammals have been made, centering around the hydrolytic enzymes. In the present study, it is attempted to clarify the distribution patterns for oxidative enzymes and hydrolytic enzymes in the trigeminal ganglions of cows, dogs, cats and rabbits.

Materials and Methods

The trigeminal ganglions were removed immediately after the animals were clashed to death. Fresh specimens were frozen and cut, 12-18 microns thick in a cryostat at -20°C. Oxidative enzymes (succinate, lactate, malate, glutamate, alpha-glycerophosphate, beta-hydroxybutyrate, glucose-6-phosphate, isocitrate, dehydrogenases and monoamine oxidase) and aldolase were demon-

strated with the method of Nitro-BT. The hydrolytic enzymes examined were alkaline and acid phosphatases, beta-glucuronidase (azo dye methods), glucose-6-phosphatase, acetylcholinesterase (metal salt methods).

Results

The trigeminal ganglion is generally composed of ganglion cells, polynuclear mantel cells and nerve fibers. The trigeminal ganglion cells of the animals used were classified morphologically into the following three types, (1) oval shaped large cells, (2) oval shaped small cells, and (3) intermediately sized and irregularly shaped (round, oval, or multiangular) cells. A similar classification has been reported by Scharf (*Acta histochemica* Bd. 5, s. 129-145).

All the large cells of the four animals examined showed a homogeneous presence of slight reactions for the oxidative enzymes and aldolase.

In over a half number of intermediate cells, succinate dehydrogenase reactions of either homogenous distribution or perinuclear concentration was observed. However, in all the intermediate cells the reactions of glutamate, beta-hydroxybutyrate dehydrogenases, aldolase and monoamine oxidase were all homogeneously distributed without revealing perinuclear concentration of the enzymes. Succinate dehydrogenase of some intermediate cells in cows showed a moderate or high reaction concentrated in the middle region between the nucleus and the peripheral part of the cytoplasm (middle ring). Lactate dehydrogenase in the trigeminal ganglion cells was characterized by the following two distribution patterns, i. e., (1) more intense stainability in peripheral parts of the cytoplasm than in perinuclear regions which showed a moderate activity, (2) a highly positive stainability in the central part corresponding to the presence of nuclei. The latter distribution pattern was also observed in malate dehydrogenase staining in the case of dogs and cows.

The oxidative enzymatic reactions of small cells were varying in intensity and diffusely distributed in the cytoplasm. The mantel cells of the trigeminal ganglions studied were positive for the oxidative enzymes. The Schwann cells showed a positive reaction for succinate and malate dehydrogenases. The nerve fibers were also faintly positive for the oxidative enzymes.

An intense alkaline phosphatase was confined to mantel cells and capillary vessels. A slight to moderate reaction of acid phosphatase occurred in the cytoplasm of ganglion cells, while some of bovine large cells were devoid of the enzymatic activity. The concentration pattern of the enzyme of "middle ring" like that observed in succinate dehydrogenase staining was present in some intermediate cells. Glucose-6-phosphatase and acetylcholinesterase in all the large cells and some intermediate cells of cows exhibited enzymatic reactions of varying intensities. Other intermediate cells provided the reactions of perinuclear concentration and "middle ring". In acetylcholinesterase staining, some intermediate cells showed the enzymatic activity more markedly in the peripheral part of the cytoplasm than the central region of ganglion cells. Glucose-6-phosphatase activity was also presented in the Schwann cells. Acetylcholine-

esterase activity in nerve fibers was detected from the axon hillock to the periphery. Beta-glucuronidase reaction was confined to nerve fibers and was negligible in ganglion cells and mantle cells.

Summary

Dehydrogenases participated in the citric acid cycle, isocitrate, succinate and malate dehydrogenases, were homogenously distributed in the cytoplasm or concentrated surrounding the nucleus. Glutamate dehydrogenase was also homogenously distributed in the cytoplasm of ganglion cells.

As it has been reported that sensory nerves are cholinergic in function, a varying degrees of acetylcholinesterase activity were observed in the trigeminal ganglions in the present experiment.

Histochemische und radioautographische Untersuchungen von Zink im Zentralnervensystem

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Mit Hilfe von Dithizon konnte MASKE (1955) die Ammonsformation bei verschiedenen Säugetieren intensiv rot anfärben. Er sicherte die Spezifität für das Zink durch spektrophotometrische und emissionsspektrophotometrische Untersuchungen.

In der vorliegenden Studie soll über die Lokalisation von Zink im Zentralnervensystem mit Hilfe der Dithizoninjektion und Autoradiographie von Zn^{65} berichtet werden.

Material und Methode

Histochemische Untersuchung :

Es wurden die Gehirne folgender Tiere untersucht : 5 Mäuse, 5 Ratten, 5 Meerschweinchen, 4 Kaninchen, 5 Katzen, 5 Hunde.

Die Tiere erhielten 100 mg Dithizon/kg Körpergewicht in einer nach OKAMOTO wie folgt hergestellten Lösung : 100 mg Dithizon werden mit 10 ml 0.2%ige Ammoniaklösung vermischt. Die dem Gewicht der Tiere entsprechend hergestellte Lösung wird sehr langsam durch eine Vene oder in die Peritonealhöhle injiziert. Etwa 15-30 min nach Beendigung der Injektion werden die Tiere durch Dekapitation getötet und die Gehirne sofort herausgenommen.

Autoradiographische Untersuchung :

Zur Untersuchung gelangten die Gehirne von 20 Mäusen beiderlei Gesch-