

### Gastric cancer in rats after chronic intraperitoneal application of sap of green parts of potatoes (*Solanum tuberosum* L.)

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**Summary.** Chronic i.p. application of the sap of green potato plants (potato-tops) induced carcinomas of the stomach in 4 out of 12 treated rats.

As part of our investigations on the carcinogenic effect of certain plants and natural substances, we applied fresh sap of the green parts of potatoes (*Solanum tuberosum* L.) chronically, i.p. to BD IX rats. In a 1st experimental arrangement described here we investigated the effect of the sap of green potato tops. The sap of potato tubers was administered in a 2nd experiment. These results will be later published in separate paper.

The green potato tops were gathered in August 1974 and thoroughly pressed through gauze. The resulting sap was centrifuged roughly and the supernatant filtered until it was free of bacteria. It was then stored in small portions at  $-35^{\circ}\text{C}$ . Once a week, 12 BD IX rats were given an i.p. injection of 0.25 ml per animal. After an induction period of about 850 days, we found carcinomas of the stomach in 4 rats which had survived for the longest time. In 2 cases, the original carcinomas were located in the glandular stomach and had metastasised into the liver. Pathohistologically, the carcinomas were little differentiated adenocarcinomas. The cells were polymorphous with ample cytoplasm and with nuclei, mostly contain a nucleolus. The cells had

gland-like formations. 2 other animals died of papillomas and squamous cell carcinomas of the forestomach. The remaining 8 rats of the test group died of pneumonia without any having tumors after the median induction time of  $850 \pm 20$  days.

As a control, we used 20 rats of the same strain. They were given 0.25 ml 0.9% NaCl solution per animal i.p. once a week. The solution was filtered and then stored at  $-35^{\circ}\text{C}$ , as described above. All 20 rats of the control group died after a medium age of  $880 \pm 30$  days, without developing tumors.

Carcinomas of the forestomach and of the glandular stomach are practically unknown 'spontaneous tumors' in BD-rats. The chemical analysis of the sap of green potato tops, which we had used for the experiment, carried out in our institute (Kann et al., unpublished), showed the presence of several volatile N-nitroso-compounds. We cannot yet decide whether the described carcinogenic effect is due to these N-nitroso-compounds. We have already begun to study the effects of chronic administration, in order to show whether carcinomas of the stomach in rats are also caused after oral application of this potato sap.

### Chlorpromazine causes vesicle population changes in the monoaminergic synapse of the rat caudate nucleus

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**Summary.** The population of monoaminergic synaptic vesicles in the rat caudate nucleus remained unchanged or slightly decreased 3 h after chlorpromazine (CP) administration, and clearly increased after 24 h. The diameter of synaptic vesicles became smaller when the vesicles increased. These findings suggest that CP causes presynaptic blocking in part of its actions and leads to a condition in which neural transmission is inactive. In the control animals, population of the vesicles tended to fluctuate following the circadian rhythm.

In order to shed more light on the action mechanism of chlorpromazine (CP), synaptic vesicles in the caudate monoaminergic bouton were morphometrically studied.

**Material and methods.** 9 male albino rats (Wister strain), weighing 180–200 g, were kept in natural light and divided into 3 groups of 3 animals each. For adaptation to experimental manipulation, i.p. injection of physiological saline solution was performed for 1 week at 11.00 h. Then each group was administered i.p., 5 ml/kg physiological saline solution, 5 mg/kg CP solution (1 mg/ml) and 25 mg/kg CP solution (5 mg/ml) at 11.00 h, respectively. After 3, 12 and 24 h, all animals in the respective groups were decapitated under ether anesthesia and frontal slices were fixed in ice-cold Dalton's solution for 1 h, and processed for EM. Block stain of uranium acetate was done. About 75 nm ultrathin sections, doubly contrasted with lead citrate, were examined with JEM T7. 3 investigators, each of whom had examined 3 experimental animals from 1 of 3 groups of rats decapitated at the same time, photographed 100 pictures per rat at a final magnification of 40,000. In another study<sup>1</sup> we identified 2 kinds of monoaminergic vesicles, which take up  $\alpha$ -methylnoradrenaline and show granular vesicles by potassium permanga-

nate fixation by the method initiated by Hökfelt<sup>2</sup>. The A type bouton seems to have an asymmetric synaptic contact and is composed of a relatively large axon terminal and a dendritic spine (figure 1, a). The presynaptic area has 1 or 2 small mitochondria and scattered, pleomorphic vesicles. The B type has a smaller presynaptic site than a postsynaptic dendrite, and is characterized by a symmetrical membranous contact and pleomorphic vesicles with a diameter of 40–80 nm. Although there are some differences in the synaptic features, depending on fixation by potassium permanganate or osmium, we chose these synapses from the tissues fixed by Dalton's solution and subjected them to morphometrical study. The B type synapse was further classified into B<sub>1</sub> and B<sub>2</sub> in the photos. The B<sub>1</sub> type has a more prominent enlargement of the synaptic cleft than B<sub>2</sub>, and its synaptic complex sometimes has rather constricted parts. Cisternal structures are often seen in the vicinity of the postsynaptic membrane (figure 2, a). The B<sub>2</sub> synapse has a discrete synaptic contact and no cisternal structure in the postsynaptic dendrite (figure 3, a). The population of vesicles in these synapses was measured in 2 ways: first, all vesicles in a bouton were counted. The area of the bouton was measured with a planimeter and the