

## The occurrence of small, intensely fluorescent (SIF) cells in human sympathetic ganglia

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**Summary.** Small, intensely fluorescent (SIF) cells were found histochemically in lumbar sympathetic ganglia (L2) obtained from sympathectomy of 3 patients suffering from chronic occlusive diseases of leg arteries. 3 types of SIF cells were distinguished. These cells will probably contain dopamine.

The histochemistry, electron microscopy and function of small, intensely fluorescent (SIF) cells have recently been widely studied<sup>1-3</sup>. Various authors have observed SIF cells in several mammalian species including human fetus<sup>4</sup> and showed species diversity in distribution and in number<sup>5</sup>. However, SIF cells have not yet been reported in adult human sympathetic ganglia. Therefore, in this work we investigated human lumbar sympathetic ganglia (L2) obtained from surgical operations.

**Material and methods.** 3 patients suffering from chronic occlusive diseases of leg arteries underwent operations. Lumbar sympathectomy (L2-L4) were performed to improve collateral blood flow. Immediately after removal, ganglia (L2) were immersed in isopentane precooled with

acetone-dryice solution, subsequently freeze-dried in vacuo for 5 days at  $-50^{\circ}\text{C}$ , warmed, and exposed to formaldehyde vapour at  $80^{\circ}\text{C}$  for 1 h<sup>6</sup>. The ganglia were then embedded in paraffin in vacuo and serially sectioned at 4-6  $\mu\text{m}$ , mounted in a mixture of entellan and xylene. All sections were examined in a Zeiss fluorescence microscope using a BP 385-440 nm filter for excitation and LP 475 nm filter for emission.

**Results and discussion.** SIF cells were revealed in all ganglia examined. The colour of the fluorescence was intensely yellow-green. 3 types of SIF cells were distinguished (figures 1-3). SIF cell in figure 1 has a varicose process which runs in close to principal ganglion cell. Figure 2 shows the cluster of SIF cells in the connective tissues of the ganglion. These cells were in contact with blood vessels. Moreover, a 3rd type of SIF cells was seen in the interstitial portions (figure 3). These findings were similar to those of animal sympathetic ganglia<sup>3,5</sup>. Also, to differentiate the monoamines contained in SIF cells, we used hydrochloric acid vapour by method according to Björklund et al.<sup>7</sup>. After treatment with HCl-vapour, SIF cells changed to an intensely green colour. This suggests that SIF cells contain dopamine but not noradrenaline. No exact quantitative evaluation of the number and the distribution of SIF cells was performed, but small number and scattered distribution of these cells were observed. In man, the physiological importance of SIF cells is unknown. Much less do we know whether SIF cells influence the development of arterial occlusive diseases of extremity. We are now investigating the relationship between sympathetic ganglia and the diseases mentioned above. The present study should offer a suggestion of this problem. A study along this line is in progress in our laboratory.

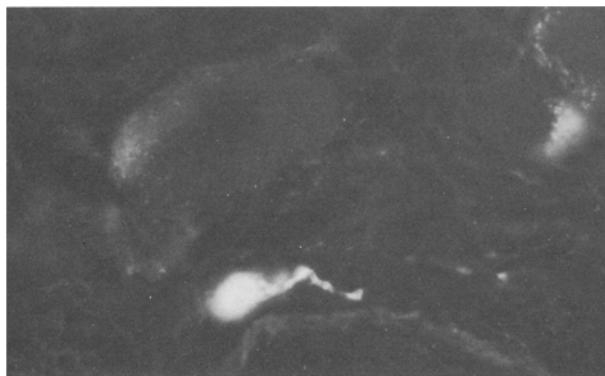


Fig. 1. A single small, intensely fluorescent (SIF) cell in human lumbar sympathetic ganglion (L2) has a varicose process. This cell is close to principal ganglion cell.  $\times 400$ .

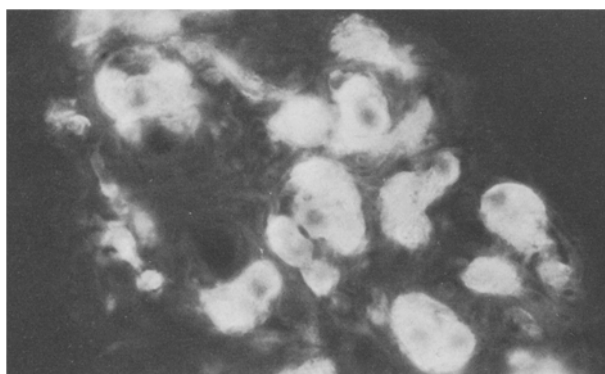


Fig. 2. A cluster of SIF cells in human lumbar sympathetic ganglion (L2) is located in the connective tissues and in contact with blood vessels.  $\times 400$ .

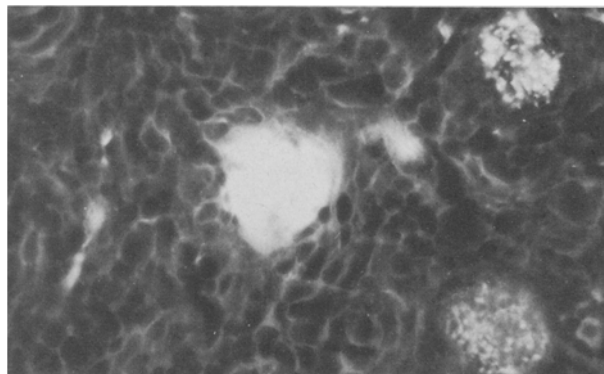


Fig. 3. SIF cells in human lumbar sympathetic ganglion (L2) are seen in the interstitial portions.  $\times 400$ .

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