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Abstract

A hard fibroma of the urinary bladder was found in an autopsy case of a 69 year-old female. The tumor, 10x9x6 cm, occurred in the superior wall of the bladder. Ultrastructurally, the principal cells of the tumor were myofibroblasts. Fibroblasts and fibrocytes were also present. Including our case, the number of reported cases of pure fibroma of the urinary bladder in Japan is 12. These are reviewed briefly.

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FIBROMA OF THE URINARY BLADDER: A LIGHT AND ULTRASTRUCTURAL STUDY OF A CASE WITH REVIEW OF THE LITERATURE IN JAPAN

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Abstract. A hard fibroma of the urinary bladder was found in an autopsy case of a 69 year-old female. The tumor, 10×9×6 cm, occurred in the superior wall of the bladder. Ultrastructurally, the principal cells of the tumor were myofibroblasts. Fibroblasts and fibrocytes were also present. Including our case, the number of reported cases of pure fibroma of the urinary bladder in Japan is 12. These are reviewed briefly.

Key words: fibroma, urinary bladder, ultrastructure, myofibroblast

Fibroma of the urinary bladder is rare. Although sporadic case reports have appeared in the literature, the ultrastructure of the tumor remains unknown. This paper pr sents a case of fibroma of the urinary bladder with emphasis on its ultrastructural features and briefly reviews all cases of pure fibroma of the urinary bladder reported in Japan.

CASE REPORT

A 62 year-old female was admitted to the Okayama City Hospital with a 13-month history of sensory and motor disturbances of the lower extremities. There was also loss of sensory function of the lower abdominal wall. She was diagnosed as subacute myelo-optico-neuropathy. Seven years after her first admission, she died of cerebral apoplexia at the age of 69. Autopsy was performed 4 h after death.

Main pathological findings were as follows: (a) Cerebral arteriosclerosis and infarction of the left frontal lobe. (b) Subacute myelo-optico-neuropathy. (c) A fibroma of the urinary bladder and a large retroperitoneal abscess caused by perforation of the urinary bladder. (d) Chronic pyelonephritis. (e) Cholelithiasis and pericholangitis of the liver.

PATHOLOGICAL FINDINGS OF THE URINARY BLADDER

Gross findings. A very firm mass 10×9×6 cm was present in the left supe-

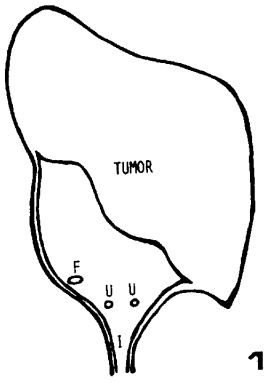
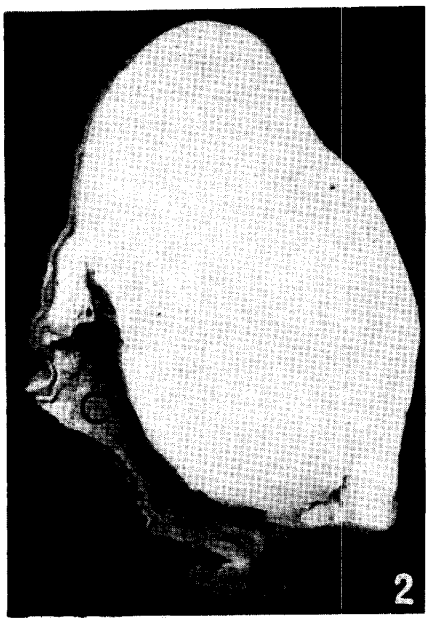


Fig. 1. Schematic representation of the site of tumor: U, orific of ureter; F, vesico-retroperitoneal fistula; I, internal urethral orifice.

rior wall of the urinary bladder (Fig. 1). The tumorous mass bulged out into the peritoneal cavity. The serosal surface of the tumorous mass was smooth and there were no adhesions. The urinary bladder contained yellowish turbid fluid. A small fistula measuring 1 cm in diameter had formed through the right wall of the bladder into the retroperitoneal connective tissue. A large volume of turbid fluid, the same as that in the bladder, was retained in the right retroperitoneal cavity. The inner surface of the bladder was reddish brown in color and was covered with necrotic friable tissue. The cut surface of the tumorous mass was grayish white and showed an irregular meshwork of glistening bundles (Fig. 2). Neither cystic nor myxoid change was seen. The tumorous mass was not encapsulated. It weighed 240 g. The vesico-retroperitoneal fistula was thought to be caused by an urethral catheter.



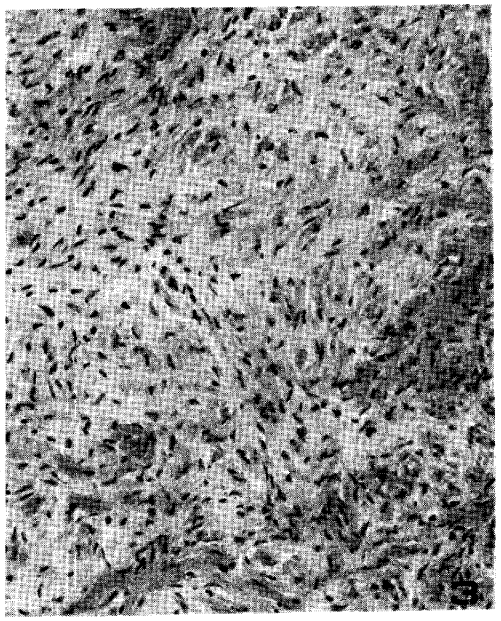


Fig. 2. Cut surface of the tumor showing interlacing arrangement of greyish-white fascicles. C; cavity of the urinary bladder.

Fig. 3. Hypercellular area of the tumor. Tumor cells with elongated nuclei were scattered throughout the dense collagenous stroma. H-E stain, ×170.

Light microscopic findings. The tumor was composed of interlacing fascicles and sheets of dense collagenous tissue. Tumor cells with elongated nuclei were seen parallel to the long axis of collagen bands. The cells were sparse in most areas and relatively hypercellular regions were only infrequently seen (Fig. 3). Nuclei were hyperchromatic and mitotic figures were not present. Capillaries were sparse and a few lymphocytes and histiocytes had infiltrated around them. Scattered small necrotic foci were seen near clusters of karyorrhexic cells. Diffuse leukocytic infiltration, hemorrhage and necrosis were present at the mucosal margin of the tumor. Both phosphotungstic acid hematoxylin stain for smooth muscle and Weigert's stain for elastic fibers were negative within the tumor.

Electron microscopic findings. Tissues for electron microscopy were cut into small pieces and fixed for 3 h with 3% glutaraldehyde in phosphate buffer at pH 7.3. The tissues were postfixed in 1% osmium tetroxide, dehydrated, and embedded in Epon 812. Thin sections were double stained with uranyl acetate (UA) and lead citrate (LC), or with phosphotungstic acid (PTA) and LC, and examined in a JEM 100S electron microscope.

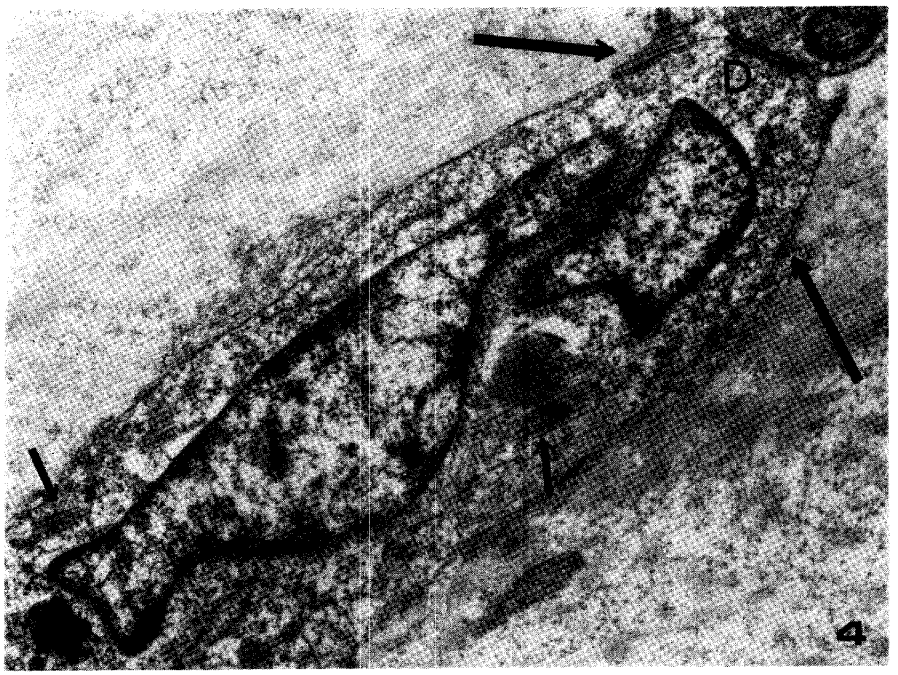


Fig. 4. Electron micrograph of a neoplastic cell showing an undulated nucleus, bundles of microfilaments with electron dense bodies (small arrows), a desmosome-like structure (D), and an incomplete basal lamina (large arrows). UA and LC stain, ×14500.

The principal cells of the tumor resembled myofibroblasts (1, 2). These elongatated cells had undulated nuclei and were interspersed throughout the collagen matrix. The cytoplasm contained bundles of fine filaments, often with electron dense bodies (Fig. 4). Rarely, microtubules were identified which were oriented parallel to the long axis of the cell. Lysosomes and mitochondria were not numerous. The cisternae of the endoplasmic reticulum and the cristae of mitochondria were not clearly discernible because of postmortem degeneration. Desmosome-like structures were frequent between adjacent cells (Figs. 4, 5). A

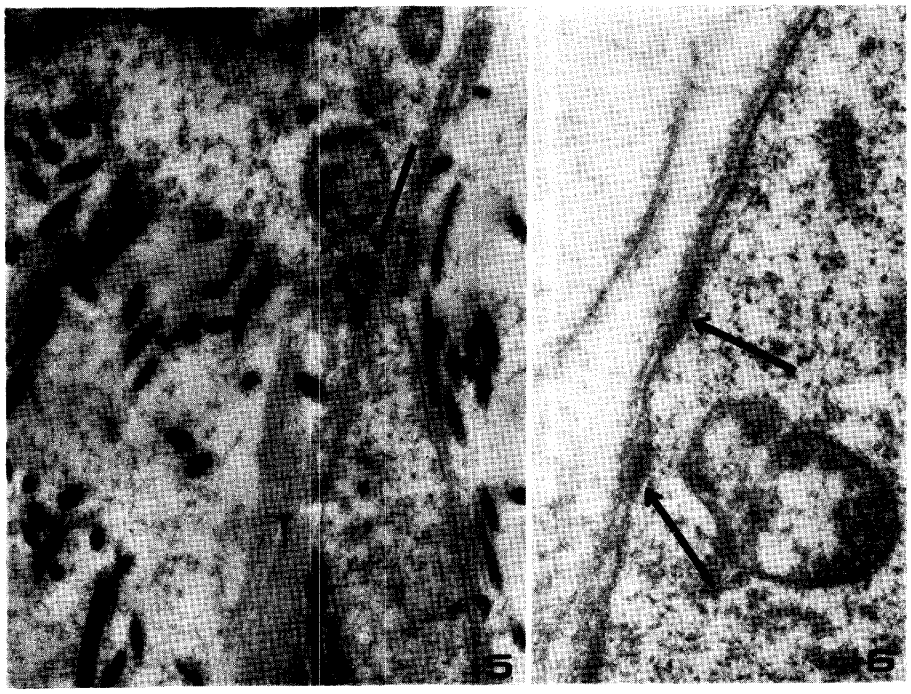


Fig. 5. Electron micrograph of a neoplastic cell showing numerous pinocytotic vesicles, a desmosome-like structure (arrow), and tropocollagen (T). PTA and LC stain, ×18800.

Fig. 6. Electron micrograph of a neoplastic cell showing the basal lamina and hemidesmosome-like structures (arrows). UA and LC stain, ×33500.

basal lamina-like material was present in some areas where electron dense zones resembling half-desmosomes were observed beneath the plasma membrane (Fig. 6). Numerous small vesicles were seen along the cell border where the plasma membrane was indistinct (Fig. 5). Classical fibroblasts and fibrocytes were also present. Secretory vesicles discharging amorphous or filamentous materials were seen. Intracytoplasmic filaments frequently seemed to be continuous with extracellular filaments. Rarely, intracytoplasmic collagen fibers were noticed (Fig.

7). The stroma was composed of collagen and electron lucent amorphous material. Collagen fibers were about 130 nm in diameter and showed periodical striations at intervals of 60 nm. Precollagen fibrils measured about 40 nm in width and cross bandings were present at intervals of 45 nm. Precollagen and tropocollagen fibrils were mainly located near the cells (Fig. 5).

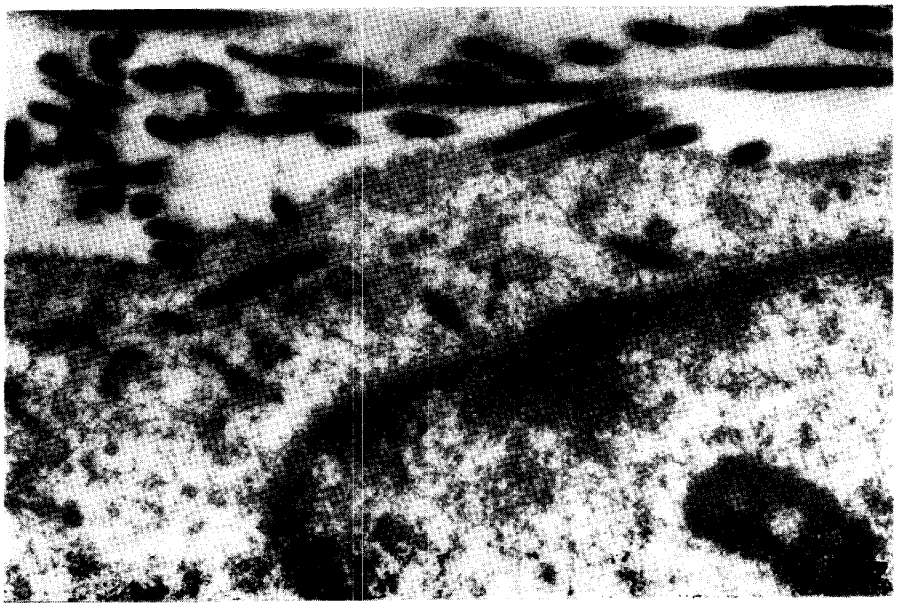


Fig. 7. Electron micrograph of a neoplastic cell of the fibroblast-type showing intracytoplasmic collagen fibers. PTA and LC stain, ×26500.

DISCUSSION

The incidence of benign mesenchymal tumors of the bladder is low. Melicow reported that 15 cases (1.6%) out of 954 primary bladder tumors were benign stromal tumors (3). Campbell and Gislason reviewed the literature and collected 193 cases of benign mesenchymal tumors of the bladder, sixteen (8.3%) of which were fibromas (4). Ushiyama *et al.* reviewed the Japanese literature on benign mesenchymal tumors and found 111 cases to which they added 3 cases, bringing the total to 114 (5). Seventeen out of the 114 cases were grouped as fibromas. Of 17 cases, however, 4 were myxofibroma and 2 were probably fibrosarcoma. Therefore, there were only 11 authentic cases of pure fibroma (5–15). These plus the present case bring the total to 12 reported cases of pure fibroma (Table 1). The age of the patients ranged from 11 to 75 years and there was no sex difference in the incidence of the tumor.

TABLE 1. FIBROMA OF THE URINARY BLLADDER IN JAPAN

Author year	Age	Sex	Size and weight of tumor	Site of tumor	Histology of tumor
Hirata (6) (1936)	34	F	A small child head -sized	Inner surface of anterior wall	Fibroma
Nakamura (7) (1949)	68	F	A goose egg-sized	Outer surface of superior wall	Fibroma durum
Ishida (8) (1952)	55	F	15.5×14.5×7.4 cm 900 g	Inner surface of fundus. Pedunculated mass	Fibroma
Iida & Matsushita (9) (1953)	63	M	2.0×0.7×0.7× cm 0.6 g	Inner surface of fundus. Pedunculated	Fibroma durum
Watanabe (10) (1955)	11	M	23×16×9.5 cm 405 g	Inner surface of fundus. Pedunculated	Fibroma
Sakamoto & Wada (11) (1956)	74	M	4.0×2.5×2.4 cm 27 g	Inner surface of lateral wall. Pedunculated	Fibroma mole
Sugimura & Shinkai (12) (1959)	75	M	2.8×2.5×1.8 cm 3.6 g	Inner surface of neck. Pedunculated	Fibroma durum
Hiruma & Saito (13) (1966)	23	F	5.2×3.8×3.2 cm 95 g	Inner surface of superior wall. Pedunculated	Fibroma
Mizumoto *et al.* (1968) (14)	62	M	20 g	Inner surface of fundus. Pedunculated	Fibroma mole
Tajiri & Tokutake (1968) (15)	50	F	7×6×5 cm	Inner surface of neck. Pedunculated	Fibroma
Ushiyama *et al.* (1975) (5)	62	M	2.0×2.0×1.4 cm	Inner surface of superior wall. Bulged mass	Fibroma durum
Present case	69	F	10×9×6 cm 240 g	Inner surface of superior wall. Bulged mass	Fibroma durum

Gabbiani *et al.* reported the presence of modified fibroblasts in granulation tissue (1). As these cells showed structural and functional features of smooth muscle cells, they proposed the term "myofibroblast" (2). Ultrastructural characteristics of myofibroblasts are (a) thick bundles of intracytoplasmic microfilaments with electron dense areas, (b) nuclear indentations and folds, and (c) surface differentiations such as cell-to-cell and cell-to-stroma junctions (16, 17). Myofibroblasts have been observed in Dupuytren's contracture, Ledderhose's disease (16), aortic intima (18), rat ovary (19), fibrosarcoma (20, 21), ganglion (22), colonic polyp (23), cirrhotic liver (24), post-irradiation sarcoma (25), desmoid fibromatosis (21, 26), dermatofibrosarcoma protuberans (27), and dermatofibroma (28). It is evident from the present case that hard fibroma of the urinary bladder and desmoid (fibromatosis) of the abdominal wall have the same light and electron microscopic appearance.

The origin of myofibroblasts is uncertain. Ryan *et al.* proposed a fibroblastic

origin since fibroblasts cultivated *in vitro* develop extensive intracytoplasmic fibrillar systems and intercellular connections (29, 30, 31). In our case, small arteries scattered in the tumor tissue were considered to be normal and no smooth muscle cells were noticed except in the vascular wall. Intracytoplasmic filaments of tumor cells were not as numerous as smooth muscle cells; moreover, classical fibroblasts and fibrocytes were frequently seen. These findings suggest an origin from fibroblast or immature mesenchymal cells. A smooth muscle cell origin is unlikely.

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REFERENCES

1. Gabbiani, G., Ryan, G. B. and Majno, G.: Presence of modified fibroblasts in granulation tissue and their possible role in wound contraction. *Experientia* **27**, 549-550, 1971.
2. Majno, G., Gabbiani, G., Hirschel, B. J., Ryan, G. B. and Statkov, P. R.: Contraction of granulation tissue *in vitro*: Similarity to smooth muscle. *Science* **173**, 548-550, 1971.
3. Melicow, M. M.: Tumors of the urinary bladder: A clinicopathological analysis of over 2500 specimens and biopsies. *J. Urol.* **74**, 498-521, 1955.
4. Campbell, E. W. and Gislason, G. J.: Benign mesothelial tumors of the urinary bladder: Review of literature and a report of a case of leiomyoma. *J. Urol.* **70**, 733-742, 1953.
5. Ushiyama, T., Horiuchi, S., Miura, M., Nakagawa, K., Oyamatsu, T., Nakajima, M. and Tsuchiya, F.: Benign mesothelial bladder tumor. *Rinsho Hinyokika* **29**, 43-47, 1975 (in Japanese with English abstract).
6. Hirata, Y.: A case of fibroma of the urinary bladder. *Okayama Igakkai Zasshi* **48**, 2938-2942 1936 (in Japanese with English abstract).
7. Nakamura, T.: A case of fibroma developed on the outer surface of the urinary bladder. *Sanka Fujinka* **16**, 577-579, 1949 (in Japanese).
8. Ishida, K.: A case of large fibroma of the urinary bladder misdiagnosed as uterine myoma. *Sanka Fujinka* **19**, 46-47, 1952 (in Japanese).
9. Iida, S. and Matsushita, M.: Fibroma of the vesical neck. *Jpn. J. Urol.* **44**, 436, 1953 (in Japanese).
10. Watanabe, S.: A case of fibroma of the posterior vesical wall. *Rinsho Hifu-hinyokika* **9**, 144-146, 1955 (in Japanese).
11. Sakamoto, K. and Wada, T.: A case of fibroma of the urinary bladder. *Rinsho Hifu-hinyokika* **10**, 121-123, 1956 (in Japanese).
12. Sugimura, T. and Shinkai, K.: Benign nonepithelial tumors of bladder. *Acta Urol. Jpn.* **5**, 45-48, 1959 (in Japanese with English abstract).
13. Hiruma, A. and Saito, T.: A case of fibroma of the urinary bladder. *Jpn. J. Urol.* **57**, 643, 1966 (in Japanese).
14. Mizumoto, R., Miyoshi, T., Suzuki, H. and Akasaka, T.: Fibroma of the urinary bladder: Report of a case. *Rinsho Hinyokika* **22**, 899-902, 1968 (in Japanese with English abstract).
15. Tajiri, S. and Tokutake, F.: A case of fibroma of the urinary bladder. *Jpn. J. Urol.* **59**, 172, 1968 (in Japanese).
16. Gabbiani, G. and Majno, G.: Dupuytren's contracture: Fibroblast contraction? An ultrastructural study. *Am. J. Pathol.* **66**, 131-146, 1972.

17. Gabbiani, G., Hirschel, B. J., Ryan, G. B., Statkov, P. R. and Majno, G.: Granulation tissue as a contractile organ: A study of structure and function. *J. Exp. Med.* **135**, 719-734, 1972.
18. Geer, J. C.: Fine structure of human aortic intimal thickening and fatty streaks. *Lab. Invest.* **14**, 1764-1783, 1965.
19. O'Shea, J. D.: An ultrastructural study of smooth muscle-like cells in the theca externa of ovarian follicles in the rat. *Anat. Rec.* **167**, 127-131, 1970.
20. Crocker, D. J. and Murad, J. M.: Ultrastructure of fibrosarcoma in a male breast. *Cancer* **23**, 891-899, 1969.
21. Stiller, D. and Katenkamp, D.: Cellular features in desmoid fibromatosis and well-differentiated fibrosarcomas. An electron microscopic study. *Virchows Arch. A Pathol. Anat. Histol.* **369**, 155-164, 1975.
22. Ghadially, F. N. and Mehta, P. N.: Multifunctional mesenchymal cells resembling smooth muscle cells in ganglia of the wrist. *Ann. rheum. Dis.* **30**, 31-42, 1971.
23. Kaye, G. I., Pascal, R. R. and Lane, N.: The colonic pericryptal fibroblast sheath: Replication, migration, and cytodifferentiation of a mesenchymal cell system in adult tissue. *Gastroenterology* **60**, 515-536, 1971.
24. Bhathal, P. S.: Presence of modified fibroblasts in cirrhotic liver in man. *Pathology* **4**, 139-144, 1972.
25. Woyke, S., Domagala, W., Olszewski, W. and Korabiec, M.: Pseudosarcoma of the skin. An electron microscopic study and comparison with the fine structure of the spindle-cell variant of squamous cell carcinoma. *Cancer* **33**, 970-980, 1974.
26. Feiner, H. and Kayte, G. I.: Ultrastructural evidence of myofibroblasts in circumscribed fibromatosis. *Arch. Pathol. Lab. Med.* **100**, 265-268, 1976.
27. Hashimoto, K., Brownstein, M. H. and Jakobiec, F. A.: Dermatofibrosarcoma protuberans. A tumor with perineural and endoneural cell features. *Arch. Dermatol.* **110**, 874-885, 1974.
28. Katenkamp, D. and Stiller, D.: Cellular composition of the so-called dermatofibroma (histiocytoma cutis)., *Virchows Arch. A Pathol. Anat. Histol.* **367**, 325-336, 1975.
29. Ryan, G. B., Cliff, W. J., Gabbiani, G., Irle, C., Montandon, D., Statkov, P. R. and Majno, G.: Myofibroblasts in human granulation tissue. *Human Pathol.* **5**, 55-67, 1974.
30. Goldberg, B. and Green, H.: An analysis of collagen secretion by established mouse fibroblast lines. *J. Cell Biol.* **22**, 227-258, 1964.
31. Devis, R. and James, D. W.: Close association between adult guinea-pig fibroblasts in tissue culture, studied with the electron microscope. *J. Anat.* **98**, 63-68, 1964.