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NEWS

Training for Investigating Primo-vessels (Bonghan Ducts)

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Recent successful attempts by Professor K.S. Soh and his research team at Seoul National University to observe the primo-vessels (Bonghan ducts) [1] have led Professor W.B. Zhang at the China Academy of Chinese Medical Sciences to build bilateral scientific collaborations with Professor Soh in order to expand meridian studies in both China and Korea.

From November 28 to December 3, 2008, Dr B.C. Lee from Seoul National University visited Professor Zhang's laboratory in Beijing and demonstrated primo-vessels [1]. After this visit, the existence of primo-vessels and their relation to the acupuncture meridians became of even greater interest and importance for the major meridian research teams in China. Professor Zhang has put great efforts to investigate and introduce these recent research improvements on primo-vessels to the relevant Chinese scientific societies.

A 1-month visiting studentship was offered to learn the surgical, microsurgical and immunohistochemical procedures for the identification of primo-vessels. Three specific goals were set: (1) to differentiate organ surface primo-vessels from lymphatic vessels; (2) to find relationship between primo-vessels and cancerous tumors; and (3) to learn muscular channels [2], which seem to have a relation to Professor Zhang's discovery of a low hydraulic resistance channel [3].

Experiments were carried out on 15 female athymic nude mice who received subcutaneous or intraperitoneal inoculation of human lung cancer cells 6–8 weeks previously. After staining with 0.1% trypan blue solution, elastic threadlike stained structures could be seen, using a surgical microscope (SZX12, Olympus, Japan), on the tumor surface and in the peritoneum of internal organ surfaces, such as the large and small intestines, but were not attached to the internal organ surfaces. Trypan blue solution did not stain any other structures including nerves, blood vessels and lymph vessels.

Primo-vessels and primo-nodes, as well as lymph vessels and lymph nodes, were sampled, cross-sectioned and examined by hematoxylin and eosin, Masson trichrome and Verhoff-von Giesson staining. Immunohistochemical staining, using LYVE-1 which is specific for lymphatic endothelial cells, and DAPI which is specific for nuclei, was also done.

Results including anatomical, histological and immunohistochemical observations provided clear evidence that primo-vessels and primo-nodes are novel structures and different from lymph vessels and lymph nodes.

It was also revealed that in many cases, primo-vessels are connected to the tumor, evidence that is in accordance with a hypothesis that considers primo-vessels to be possible pathways for cancer metastasis [4]. The amount of primo-vessels around the tumor is more than that around normal tissue, which needs further investigation to be quantitative.

References

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