



Contents lists available at ScienceDirect

Journal of Traditional and Complementary Medicine

journal homepage: <http://www.elsevier.com/locate/jtcm>

## Various stem cells in acupuncture meridians and points and their putative roles

Jeanne Adiwinata Pawitan

Department of Histology, Faculty of Medicine Universitas Indonesia, Jl. Salemba 6, Jakarta, 10430, Indonesia

### ARTICLE INFO

#### Article history:

Received 11 December 2016

Received in revised form

5 April 2017

Accepted 1 August 2017

Available online xxx

#### Keywords:

Stem cell

Bong-Han system

Primo vascular system

Primo microcell

Kyungrak system

Primo vessel

Primo node

### ABSTRACT

Traditional Chinese and Korean medicine uses various manipulations on acupuncture points/acupoints that are located along imaginary lines on the surface of a human body, which are called 'meridians'. Acupuncture has been used from the ancient time till now to cure various diseases, including for the purpose of regenerative medicine. In various studies, meridians are alternatively called as Bong-Han ducts, primo vessels, or hyaluronic-acid rich ducts, while acupoints are called Bong-Han corpuscles, primo nodes, or hyaluronic-acid rich nodes. Meridians and acupuncture points form a system that is now called primo vascular system (PVS), which is claimed to contain various kinds of stem cells. The stem cell size is between 1-5 microns. The smallest is the primo microcells that have a putative role in regeneration. Other stem cells are adult pluripotent and hematopoietic stem cells that play a role in extra bone marrow hematopoiesis. The presence of PVS has been reproduced by many studies. However, the various stem cells need further studies to prove their existence and function, and harvesting PVS to isolate the stem cells might harm the health of the donor.

© 2017 Center for Food and Biomolecules, National Taiwan University. Production and hosting by Elsevier Taiwan LLC. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

### 1. Introduction

Traditional Chinese and Korean medicine uses various manipulations on acupuncture points/acupoints that are located along imaginary lines on the surface of a human body, which are called 'meridians'. Acupuncture has been used from the ancient time till now to cure various diseases, including for the purpose of regenerative medicine. It is believed that there is a special structure under an acupoint, which responds to the manipulations that induces healing. Various findings showed that acupoints and meridians had special physical characteristics and structures that corresponded to interstitial connective tissue.<sup>1–4</sup> A study revealed that large intestine, liver and bladder meridians had lower electrical impedance due to the presence of subcutaneous collagen fibers, which could be visualized by ultrasound imaging as echogenic bands.<sup>1</sup> Another study showed the same phenomenon on pericardium and spleen meridians.<sup>2</sup> Moreover, a study on twelve subsets of pain trigger points showed that the resulting referred pain distributions were in accordance with their corresponding

acupuncture meridians.<sup>5</sup> Yoga is believed to exert beneficial effects on various disease symptoms, and a study showed that the health benefits were due to improvement in acumeridian energy balance, which was assessed by using electrodermal measures.<sup>6</sup> However, a systematic review on acupoints and meridians concluded that the presence of acupoints and meridians was not conclusively proven by electrically distinguishable areas.<sup>7</sup>

A Korean scientist, Bong-Han Kim, was the first to discover special structures, which were related to acupoints and meridians. He named the structures under the acupoints as Bong-Han corpuscles, while the meridians were named as Bong-Han ducts, and both were parts of a Kyungrak (Bong-Han) system.<sup>4,8–10</sup> There are various Bong-Han systems (BHSs) according to the locations, namely superficial and deep BHSs.<sup>9</sup> The Bong-Han corpuscles of superficial BHS can be found under the acupoint on the skin, while deep BHS can be found in various locations, namely intravascular, extra vascular, organ surface, intra organ, and nervous BHSs. The intravascular BHSs are found inside blood and lymphatic vessels and in the heart, while extravascular BHSs are located outside and run along blood and lymphatic vessels and nerves. Organ surface BHSs are found on the surfaces and freely floating on visceral organs, while intra organ BHSs are located inside visceral organs. Nervous BHSs are found floating in cerebrospinal fluid in central

E-mail address: [jeanneadiwip@gmail.com](mailto:jeanneadiwip@gmail.com).

Peer review under responsibility of The Center for Food and Biomolecules, National Taiwan University.

<https://doi.org/10.1016/j.jtcm.2017.08.004>

2225-4110/© 2017 Center for Food and Biomolecules, National Taiwan University. Production and hosting by Elsevier Taiwan LLC. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Please cite this article in press as: Pawitan JA, Various stem cells in acupuncture meridians and points and their putative roles, Journal of Traditional and Complementary Medicine (2018), <https://doi.org/10.1016/j.jtcm.2017.08.004>

and peripheral nerve system.<sup>10</sup> These findings were difficult to reproduce as the staining methods to show both Bong-Han corpuscles and ducts were not clearly described. Moreover, at about 1965, the institution where Bong-Han Kim worked was closed and his whereabouts are unknown, which caused his findings to be forgotten for a long time.<sup>9</sup> Therefore, other scientists, who tried to reproduce his findings, were only partly successful.<sup>4,10</sup>

Around 40 years later, a team of Korean scientists re-investigated the existence of Bong-Han corpuscles and ducts, and found that they were indeed present.<sup>11,12</sup> In 2002, Kwang-Sup Soh, a member of the team coined the name of primo vascular system (PVS) that consisted of primo nodes and vessels. The primo vascular system, primo nodes and vessels correspond to the Bong-Han system, Bong-Han corpuscles, and ducts, respectively.<sup>9</sup> In primo vascular system, various kinds of cells can be found, including very small stem-like cells,<sup>13</sup> which express pluripotency marker Oct-4, and Nanog.<sup>14</sup>

Therefore, this review addressed the various terms in acupuncture and PVS, methods to visualize the PVS, including primo nodes and vessels, macroscopic and microscopic appearance of the nodes and vessels, stem cells of the PVS, and their putative roles in physiological and pathological conditions.

## 2. Various terms in acupuncture and primo vascular system

The meridians and acupuncture points/acupoints were described approximately 2,000 years ago in an ancient medical text that is known as 'Huangdi Neijing' (Yellow Emperor's Classic on Internal Medicine).<sup>15</sup> In the meridians flows the 'Qi' that is believed to be a live-giving fluid,<sup>15</sup> which was described as Bong-Han liquor by Kim,<sup>9</sup> and as primo vascular fluid or primo fluid (P-fluid) by Soh.<sup>16</sup> According to Bong-Han Kim, Bong-Han system contains granules, or some sort of small cells that are called 'sanals', Bong Han microcells, or primo microcells.<sup>4,16,17</sup> The terms concerning various structures, which are related to acupuncture meridians and point in medical literature according to various scientists, are shown in Table 1.

Primo fluid flows with a speed range of 0.1–0.8 mm/s, and is supposed to function as an optical channel for biophoton emission that might generate electromagnetic signal, which plays a role in various biological processes.<sup>8</sup>

The term primo vascular refers to the fact that PVS develops in vitelline membrane in eggs within 16–24 h after incubation, before the development of extra and intra embryonic vessels. It is suggested that the PVS is a primordial circulatory system that serves as a blueprint for the development of blood vessels.<sup>8</sup>

## 3. Methods to visualize the primo vascular system

Bong-Han Kim studies were not published in International journals and were written in Korean, except one study that was translated into English. Moreover, the methods were not explained in detail, except the use of 'blue dye' to visualize Kim's Kyungrak system (PVS).<sup>10</sup> The early attempts to reproduce the PVS study were done by groups of German, Japanese and Chinese scientists. However, the German study was unsuccessful due to the method, which was histological study, without first isolating the PVS. The Japanese study was published in a local journal in Japanese, while the other from China was unpublished, so soon the results were forgotten.<sup>19</sup>

Later on, a follow up study of the Japanese study was published in a book, which described that their method did not use any dye to visualize the PVS. Instead, they relied on gross anatomy to find and isolate the PVS on organ surfaces using a loupe and a stereomicroscope. After isolation, they made smashed tissue, spreading or paraffin sectioned samples to be stained using various histological staining methods. By this method they were able to show the superficial primo nodes on skin membrane, and deep PVS on organ surfaces, which partially correspond to the Bong-Han system.<sup>20</sup> In addition, a historical review of the study in China was published, which did not explain clearly the methods, except that they did perfusion to show PVS in blood vessels, and got no result. Furthermore, from the only picture showing a superficial Bong-Han corpuscle-like structure in young rabbit umbilical cord can be concluded that they used paraffin sectioned samples, which were stained by routine histological staining method.<sup>21</sup>

### 3.1. Various methods to isolate primo vascular system

Other attempts that clearly described the methods to isolate the PVS were a method using dextrose without using dye,<sup>22</sup> or contrast enhancing optical method,<sup>23</sup> followed by the use of various kinds of dyes and staining methods, including acridine orange,<sup>24</sup> combination of Mayer's hematoxylin and Feulgen,<sup>12</sup> alcian blue,<sup>18</sup> trypan blue,<sup>25</sup> and Janus green.<sup>26</sup>

Methods to visualize the PVS are important as they make the isolation easier, and isolation is important for further studies. Successful isolation and microscopic descriptive studies on PVS mostly involved deep PVS,<sup>12,18,22–26</sup> while for superficial PVS, especially for primo nodes, only a part of Bong-Han Kim study was reproducible.<sup>21,27</sup>

Without staining, PVS resemble fibrin threads and clots, and therefore can be distinguished from fibrin threads and clots by using heparin containing solution to perfuse the blood vessels or blood covered organ surfaces to dissolve the fibrin.<sup>21</sup> For intravascular PVS, which is found in lymphatic vessel, the transparent wall

**Table 1**  
Various terms in relation with meridians and acupoints.

Traditional name	Bong-Han Kim group <sup>9</sup>	Kwang-Sup Soh group <sup>4,16</sup>	Others <sup>18</sup>
Kyungrak <sup>a</sup> system	Bong-Han system	Primo vascular system (PVS)	hyaluronic-acid rich node and duct system (HAR-NDS)
Meridian = Jingluo (in Chinese) <sup>15</sup> Kyungrak (in Korean) <sup>9</sup>	Bong-Han duct	Primo vessel	hyaluronic-acid rich duct (HAR-D)
Acupuncture point (acupoint) = Xuéwèi (in Chinese), <sup>15</sup> Kyunghyul (in Korean) <sup>9</sup> Qi <sup>15</sup>	Bong-Han corpuscle Bong-Han liquor 'Sanal' <sup>b</sup>	Primo node Primo vascular fluid, primo fluid, P-fluid Bong Han microcell, Primo microcell, P-cell	hyaluronic-acid rich node (HAR-N)

<sup>a</sup> Kyungrak = meridians and collaterals.

<sup>b</sup> 'Sanal' = 'live egg' (in Korean).<sup>10</sup>

Download English Version:

<https://daneshyari.com/en/article/11010333>

Download Persian Version:

<https://daneshyari.com/article/11010333>

[Daneshyari.com](https://daneshyari.com)