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Anat Physiol 2016, 6:4 (Suppl)
http://dx.doi.org/10.4172/2161-0940.C1.003

International Conference on
ANATOMY AND PHYSIOLOGY
August 11-13, 2016 Birmingham, UK

## The discovery of a new structural system and a new type of horizontal signal transmission in skin for vibrating regulation of acupuncture and homeostasis of organs

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Using whole body macro-autoradiography, the distribution of catecholamine in rat skin was localized, which are various pairs of symmetrical linear arrays running from the head through the back and to the hind limbs of the animal that we termed sympathetic substance lines (SSLs). By SPG method, concentrated clusters of noradrenergic nerve fibers innervated arrector pili (AP) muscles formed the SSLs. After shaving hairs of rats, the first wave of hair re-growth did not distribute everywhere, but along specific craniocaudally-oriented lines and merged to form loops, named hair-loop-lines (HLLs). When acupuncture was operated or phenylephrine was injected into the dermis at an acupoint of rats, a pilomotor line occurred. The course of HLL, SSL and pilomotor line correspond with each other and also with the "Meridians" described in Chinese traditional medicine. When the skin was incised or regitin was injected into the dermis along the SSL, the pilomotor line did not cross the site of incision or injection and acupuncture effect produced by stimulating the acupoint was blocked. When phenylephrine was injected into an acupoint, acupuncture analgesia was strongly simulated. These evidences suggest that the acupuncture signals are transmitted along certain skin pathways that are the SSLs, the HLLs, the pilomotor lines, or the Meridian lines and the transmission depends on α-receptor in the AP muscles or contraction of AP muscles. All these findings suggest a new structural and functional system in skin and a new type of horizontal signal transmission for regulation of body function. Other studies suggest that acupuncture is a technique of auto-regulation, bi-directional regulation and vibrating regulation.

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## Physiological researches in the interest of preparation and implementation of the first manned space flight

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The successful flight into space was provided by the titanic work of scientists in the field of space physiology. In Russia, V I Yazdovsky was the leader of physiological research for the preparation of manned spaceflight. Under his leadership specialists were involved in the preparation of dogs for orbital flight. The hermetic cabin of the satellite was equipped for monitoring the physiological status of the animal by registering electrocardiogram, blood pressure, respiratory rate and motor activity. Animal research was an important stage of physiological sensing the future routes of spaceflights and checking the reliability of all the systems of the spacecraft. In State Scientific-Research and Testing Institute of Aviation and Space Medicine a series of special studies for manned flight safety and substantiation of physiological and technical requirements to hermetically sealed cabin of the spacecraft, were conducted. The program of cosmonauts training for spaceflights included theoretical preparation, covering most important aspects of space physiology and a complex of special tests and exercises, during which it was a question of selection of a cosmonaut for the first spaceflight. For monitoring Yuri Gagarin's status in flight and the collection of scientific information, physiological equipment "Vega-A" was used, as well as radio communication, radio telemetry and television systems. Furthermore, there was a sound transmission of pulse by radio. The flight of Yuri Gagarin lasted only 108 minutes, but gave reason to hope for the success of space missions of longer duration. "Vostok" space-ship flight marked the beginning of conducting physiological experiments in space with cosmonauts.

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