大阪市立大学
OSAKA CITY UNIVERSITY

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Press release

Osaka City University Public University Corporation

Avoiding amputations – development of nano-scaffold significantly increases effectiveness of angiogenesis treatment

The research group of Shinya Fukumoto, lecturer at Osaka City University Graduate School of Medicine, successfully developed a nano-scaffold that can be injected together with cells into muscle tissue. The method contributes greatly to the effectiveness and growth of collateral vessels in peripheral arterial disease treatment, and is expected to be widely applied in other related treatments in the future. The research results will be published on 19 April 2012 in the on-line American scientific journal PLoS ONE.

Press embargo until: 19 April 2012 06:00 AM (Japanese time)

＜Publication＞

Publication name:	PLoS ONE
Title of article:	Enhancement of Cell-Based Therapeutic Angiogenesis using a Novel Type of Injectable Scaffold of Hydroxyapatite-Polymer Nanocomposite Microspheres
URL of article:	http://dx.plos.org/10.1371/journal.pone.0035199

＜Research Background＞

Already only in Japan an estimated 1,000,000 patients suffer from peripheral arterial disease caused by lifestyle-related diseases such as diabetes or atherosclerosis. About 200,000 patients are at high risk for amputations of lower limbs.

To treat them it is possible to stimulate the growth of new vessels by implanting bone marrow or peripheral mononuclear cells (cell-based therapeutic angiogenesis). However, this method is not yet sufficiently effective, especially in the case of diabetes and dialysis patients, because the implanted cells are easily diffused. Two days after implantation, only less than 30% of cells remain in place.

＜Research Summary＞

Through this research, for the first time, a nano-scaffold (illustration 1) has been developed that can be injected together with the cells into muscle tissue. The nano-scaffolds have been created using nanotechnology to coat poly-microspheres with HAp (nano-hydroxyapatite). HAp works well as a cell adhesive. When the scaffold is injected into muscle tissue together with cells it keeps the cells in place for a prolonged

time. The research results show a 7-fold increase in the effectiveness of the collateral vessels formation and a 4-fold increase in preventing limb necrosis. The research result is expected to contribute significantly to better treatment of peripheral arterial disease. The method is safe because the material is biodegradable inside the body after the therapeutic function finishes and there is also no danger of unknown infections because the material does not contain biological materials such as gelatin or collagen.

＜Future＞

Until 2013 pre-clinical trials will be conducted and a manufacturing method will be established. Clinical trials will take place from 2015.

＜Support＞

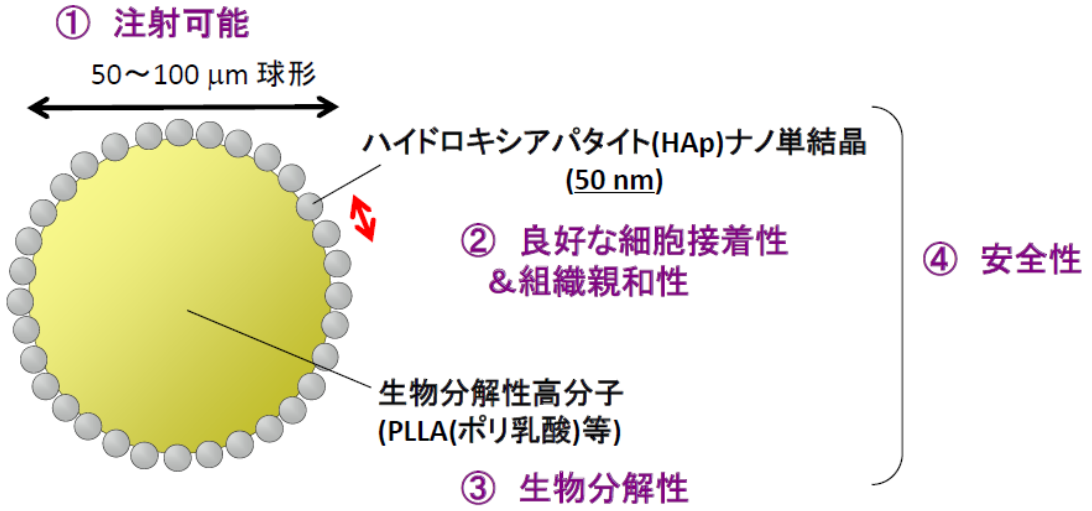
The research received support from NEDO and JST. The applied research and pre-clinical trials are being carried out as joint-research between Osaka City University, Kinki University, Osaka Institute of Technology, GUNZE LIMITED and SofSera Corporation. The results reported have been obtained from joint research between Osaka City University and Kinki University.

＜Bio Shinya Fukumoto, MD, PhD＞

Shinya Fukumoto, MD, PhD teaches at the Osaka City University Graduate School of Medicine - Metabolism, Endocrinology and Molecular Medicine Department.

He graduated from Osaka City University (OCU) as a licensed medical doctor in 1991 and obtained his PhD in Medicine from OCU in 1997. He became a lecturer at OCU in 2001 after several years carrying out research as a post-doc researcher at Harvard University.

Illustration 1　Nano-scaffold



Reference materials (in Japanese)

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