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Gene Techno Science Co.,Ltd.
Code: 4584 (TSE Mothers)
President
Masanari Kawaminami

**Joint Patent Application with the National Cancer Center
~The Implication of Exosomes in the Breast Cancer Brain Metastasis Mechanism:
Toward Early Diagnosis and Treatment of Brain Metastases~**

Gene Techno Science Co.,Ltd., has jointly applied for a patent with the National Cancer Center in relation to the implication of microRNA^{*1} in the brain metastasis of cancer cells, discovered by Dr. Takahiro Ochiya, Chief, Division of Molecular and Cellular Medicine, National Cancer Center Research Institute, as outlined below.

1. Name of the invention

“Cancer brain metastasis diagnosis, prevention and treatment methods, and a drug delivery system for passing the blood-brain barrier”

2. Background of the invention

Brain metastasis refers to the metastasis of cancer cells from other organs to the brain, triggering brain tumors. This phenomenon is known to be related to a poor prognosis for cancer patients.

Research conducted to date has sought to prevent brain metastasis from occurring when cancer cells pass through a damaged section of the blood-brain barrier^{*2} (BBB) and form new tumors in the brain. Also, clarifying the detailed molecular mechanism for such brain metastasis should lead to the development of new diagnosis and treatment methods, thereby saving a greater number of cancer patients.

3. Overview of the invention

The Ochiya Laboratory seeks to clarify the molecular mechanism behind cancer metastasis by focusing on the exosomes^{*3} discharged by cancer cells and the microRNA present inside the exosomes. The current invention clarified an important part of the BBB damage mechanism present in brain metastasis.

The application of this invention is expected to enable new brain metastasis diagnosis, treatment and prevention methods, new methods for utilizing the BBB damage mechanism for delivering drugs to the brain, and related reagents, pharmaceuticals and diagnostic kits.

4. Outlook

Gene Techno Science expects this development to have little impact on the results of operations for the fiscal year ended March 31, 2015, or for the foreseeable future. However, the company aims to undertake further research on this theme with the Ochiya Laboratory for the purpose of expanding the company's new drug pipeline.

<<Related press release>>

Facility name: National Cancer Center

Title: Implication of exosomes in the breast cancer brain metastasis mechanism: Anticipated application to the early diagnosis of brain metastases

URL: http://www.ncc.go.jp/jp/pr_release.html (Japanese version only)

<<Announcing publication>>

Journal title: Nature Communications

Research paper title: Brain metastatic cancer cells release microRNA-181c-containing extracellular vesicles capable of destructing blood-brain barrier

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DOI: 10.1038/ncomms7716

URL: <http://www.nature.com/naturecommunications>

<<About Dr. Takahiro Ochiya (Ochiya Laboratory), Chief, Division of Molecular and Cellular Medicine, National Cancer Center Research Institute>>

The Ochiya Laboratory conducts globally leading-edge research in the areas of microRNA, exosomes and nucleic acid medicine. Having cancer treatment as its objective, the laboratory strives to clarify the mechanisms of carcinogenesis, metastasis and drug resistance, and conducts research and development of new therapeutic targets and therapeutic techniques using nucleic acid medicine. The laboratory is also taking up the challenges posed by new vital phenomena such as microRNA and exosomes as it seeks to clarify the essential nature of cancer. The laboratory has had the world's first success in creating model animals for cancer treatment, using knockout rats employing rat embryonic stem cells. To establish new treatments, the laboratory is conducting research using mesenchymal stem cells derived from human adipose tissue, performing engineering-based research, including tissue engineering.

URL: <http://mcm.ncc.go.jp/index-e.html>

<<Terminology>>

*1 MicroRNA: A small RNA molecule whose function is to control the expression of proteins. Various types of microRNA are present inside cells and adjust the degree of expression of various proteins.

*2 Blood-brain barrier: A structure that restricts physical interchange among central nervous system tissue fluids, such as blood and the brain.

*3 Exosome: A vesicle granule measuring approximately 100nm that is excreted by a cell.

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