

# Development of an injectable microstimulator system for neuromodulatory electrical stimulation and functional electrical stimulation

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## 【 Outline of survey 】

Electrical stimulation has been applied to the patient with stroke, spinal cord injury, Parkinson disease, epilepsy, bronchial asthma, urinary incontinence etc for therapeutic purpose and functional restoration. In this research project supported by Grant-in-Aid of the Ministry of Education and Science, we are going to develop a very tiny electrical stimulator ( microstimulator ) which can be implanted by an injection syringe or endoscopes. Its length and diameter will be less than 10mm and 1mm, respectively. Stimulation sequence and patterns are transmitted electromagnetically from the controller through the coils placed between inside and outside of the skin. We will develop a prototype stimulation system and examine the reliability, controllability and safety of the system through an electromagnetical standpoint and animal experiments for the development of a practically available microstimulator system in the patient.

## 【 Expected results 】

The microstimulator which we are going to develop is a versatile system applied commonly to the diseases and disabilities where electrical stimulation is effective. This system is applied with minimum invasion for implantation and minimum pain due to stimulation. Long-term stimulation can be achieved with high reliability and almost no side effect. Thus, electrical stimulation using the microstimulator will realize high-rate of therapeutic effects and restoration of the impaired body function. Creation of new big industry in medical field will be expected by this microstimulator.

## 【 References by the principal researcher 】

- 1) Y.Handa, R.Yagi, N.Hoshimiya : “ Application of Functional Stimulation to the Paralysed Extremities ” Neurologia Medico-Chirurgica, Vol.38, No.11, pp.784-788, 1998.
- 2) Y.Handa : “ Current Topics in Clinical Functional Electrical Stimulation in Japan ” Journal of Electromyography and Kinesiology, Vol.7, No.4, pp.267-274, 1997.

【 Term of project 】 F Y 2004 - 2008

【 Budget allocation 】 68,000,000 yen

【 Homepage address 】

<http://www.fes.med.tohoku.ac.jp>