

Form B-5

Date (日付) 13 January, 2012 (Date/Month/Year: 日/月/年)

**Activity Report -Science Dialogue Program-**

(サイエンス・ダイアログ事業 実施報告書)

- Fellow's name (講師氏名): Long Guang (龙光) (ID No. P10738 )
- Participating school (学校名): Ishikawa Prefectural Nanao High School
- Date (実施日時): 13 January, 2012 (Date/Month/Year: 日/月/年)
- Lecture title (講演題目): (in English) **Transplantation of Stem Cells for Spinal Cord Repair**

(in Japanese) 脊髄の修復のための幹細胞の移植

- Lecture summary (講演概要): Please summary your lecture 200-500 words.

Most of spinal cord injuries are caused by high-energy injury. There is no good way to treat it now, and the only way is to use high-dose corticosteroid in acute phase to reduce further damage. Given this complex nature of spinal cord injury, many new ways to help recovery have been studied. eople have tried to improve recovery after spinal cord injury by transplanting cells or tissue for many years, and several ways have been taken to clinical trials. Transplantation of autologous or fetal tissue is often impractical for large-scale clinical use. Stem cells offer an attractive ways because of their potential unlimited supply.

A large number of studies have studied the effect of transplantation of a variety of stem cells in spinal cord injury models. Many studies using different ways have found good effects. It is difficult for us to directly compare studies, because many factor will affect the result of studies, such as the varying degree of characterization of the transplanted cells, different injury models, and transplantation at different time points after the injury.

In spite of many studies suggesting a good role of stem cell transplantation in spinal cord injury, there is still limited knowledge why stem cell transplantation have good effect. This is probably an important factor, mainly where lost nerve cells are replaced by graft cells, have been proved. However, in other situations, functional benefits have been reported without any obvious replacement of nerve cells. It appears to be indirect, such as providing nutrient, or providing a substrate for nerve growth.

Because of the pluripotency and unlimited expansion, embryonic stem cells (ESCs) have been transplanted into the injured spinal cord. ESCs are well suited to produce nerve cells. Nerve cells can be efficiently produced by mice and human ESCs. More recently, human ESC-derived nerve

cells which were transplanted into the rat were shown to similarly result in producing nerve cells, and improvement of sports ability.

There are many studies that study transplantation of other cells, with varying degree of characterization of stem cell features, such as bone marrow, blood, and skin to the injured spinal cord

The initial transplantation of bone marrow-derived stem cells to the injured spinal cord was based on several reports suggesting that bone marrow-derived stem cells had the potential to produce nerve cells. However, a large number of following studies failed to reproduce the initial results. However, although bone marrow-derived stem cells do not produce nerve cells, there are many studies which report functional improvement after transplantation of bone marrow-derived stem cells to the injured spinal cord. Rather than being a replacement therapy, transplanted bone marrow-derived stem cells appear to affect spinal cord repair indirectly, which include production of growth factors, promotion of growth of other stem cells; and the production of substrate for nerve cells growth or effects on the blood vessel.

The transplanted neural stem cells typically lead to scar cells in spinal cord and more limited numbers of nerve cells. Scar cells in spinal cord produce several nutrition factors, and one likely reason is by supporting the living of host cells.

- Language used (使用言語): English

- Lecture format (講演形式):

◆Lecture time (講演時間) 90 min (分), Q&A time (質疑応答時間) 30 min (分)

◆Lecture style (ex.: used projector, conducted experiments)

(講演方法 (例: プロジェクター使用による講演、実験・実習の有無など))

use projector

◆Interpretation (ex.: assistance by accompanied person, provided Japanese explanation by yourself) (通訳 (例: 同行者によるサポート、講師本人による日本語説明))

Accompanied person have provided soem Japanese explanation \_\_\_\_\_

◆Name and title of accompanied person (同行者 職・氏名)

Tang Yin

◆Other note worthy information (その他特筆すべき事項):

- Impressions and opinions from accompanied person (同行者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。):