

行政院及所屬各機關出國報告
(出國類別：進 修)

幹細胞及其動物模式

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出國地區：美 國
出國期間：91. 5. 1. — 91. 7. 31.
報告日期：91. 年 9. 月 4. 日

J3/
C09101613

系統識別號:C09101613

公務出國報告提要

頁數: 6 含附件: 是

報告名稱:

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出國類別: 進修

出國地區: 美國

出國期間: 民國 91 年 05 月 01 日 -民國 91 年 07 月 31 日

報告日期: 民國 91 年 09 月 04 日

分類號/目: J3/醫療 J3/醫療

關鍵詞: 幹細胞及其動物模式

內容摘要: 摘要 From May 2002 to July 2002, I have the opportunity of visiting the laboratory led by Dr. Shih-Chu-Cheh at the City of Hope National Medical Center in California, USA to learn some basics of stem cells. Since the main focus was the investigation of the potential of human neurostem cells, I was working on concentration of pseudotyped virus and their production; the ability of human neurostem cells developed into pancreas-like cells and in vivo model of human pancreas/liver transplantation. Through these work, I felt that in vivo model might be a quick way before large scale of clinical trials to estimate the risk and benefit of potent stem cells. Identify certain genes and molecular levels in the potent stem cells might be critical to the gene shift responsible for the transdifferentiation. Gene transfer might also be helpful in stem cell research in tracing its frequency. Finally, cooperation is also important among each team and is probably the only key element to successful research in a limited period of time.

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摘要

From May 2002 to July 2002, I have the opportunity of visiting the laboratory led by Dr. Shih Chu-Cheh at the City of Hope National Medical Center in California, USA to learn some basics of stem cells. Since the main focus was the investigation of the potential of human neurostem cells, I was working on concentration of pseudotyped virus and their production; the ability of human neurostem cells developed into pancreas-like cells and in vivo model of human pancreas/liver transplantation. Through these work, I felt that in vivo model might be a quick way before large scale of clinical trials to estimate the risk and benefit of potent stem cells. Identify certain genes and molecular levels in the potent stem cells might be critical to the gene shift responsible for the transdifferentiation. Gene transfer might also be helpful in stem cell research in tracing its frequency. Finally, cooperation is also important among each team and is probably the only key element to successful research in a limited period of time.

1. **目標:** To learn some basic concept of stem cell.
2. **過程:** I visited Dr. Shih Chu-Chueh 's laboratory (史竹枝博士) at the City of Hope National Medical Center in California, USA from May, 2002 to July, 2002 to learn some basic aspects of stem cells. At that time, his research projects mainly focused on the neurostem cells and looked into the potential of the human neurostem cells, and also developed an in gene transfer in vivo model on the SCID mice. The plan was to develop a way of tracing the neurostem cells if derived into any cells other than the brain. I have being involved in the followings while I was there:

- a. Preparation of pseudotyped virus carrying the green fluorescent protein (GFP).

The pseudotyped virus carrying the GFP would be used to transduce the neurostem cells. Two kinds of pseudotyped viruses were used; one with or without internal ribosomal binding site as an internal promoter and both are driven by cytomegalovirus promoters. The results showed higher gene transfer efficiency if used the one with the IRES internal promoter. This would be tested on the neurostem cells and used in vivo model.

- b. Isolated neurostem cells and managed to become pancreas-like cells: the fresh human fetal brain tissue was used to isolate the neurostem cells. The neurostem cells required only minimal growth factors. Using various

culture conditions, the neurostem cells could become pancreas-like cells.

- c. Transplantation: the human fetal pancreas and liver were co-transplanted into SCID mice. I had the opportunities of doing SCID mice experiments. The course was long and took months to know if the transplantation worked. The pancreas/liver xenograft appeared healthy and preserved their individual functions. Since neurostem cells would be injected into the xenograft in SCID mice, its function in vivo needed to be examined. I had the opportunities of injecting the neurostem cells into the eyeball of SCID mice. After many times of failure, finally the xenograft of neurostem cells were successful and showed that the xenograft of human brain cells preserved the blood-brain-barrier function as seen in human.

3. 心得:

I learned a lot from this short-time visit to Dr. Shih's laboratory, not only in basic concept about stem cells, but more importantly the concept of cooperation among different teams. Individually, none of the laboratory has all the facilities or huge fundings for doing a big project, however, they can work together and exchange the idea and discuss the recent laboratory results of each laboratory. That's why they can accomplish many projects in short period of time. Also, gene transfer and in vivo model might also be useful in evaluating the various potentials of stem cells.

4. 建議:

- a. In vivo model might be very important before large scale of clinical trials could be done. SCID mice model (humanized) might provide a quick way to estimate the potentials of stem cells in certain organs.
- b. Gene transfer might be useful in tracing the stem cells that developed into cells of other organs.
- c. Teamwork is important. It might be difficult for a single laboratory alone to complete a good project without sharing the idea and cooperation with other groups. I found that there was a good corporation among their laboratories when I was there and these facilitated the generation of good laboratory results. Therefore, cooperation between each related departments might be the key to successful research.