

出國報告（出國類別：進修）

下肢肢體創傷之 超顯微高階重建手術研習

服務機關：國立臺灣大學醫學院附設醫院

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派赴國家：韓國

出國期間：113 年 3 月 4 日至 114 年 2 月 28 日

報告日期：114 年 3 月 20 日

摘要：

自 2024 年 3 月 4 日起，開始於南韓首屈一指、世界聞名的首爾峨山醫學中心(Seoul Asan Medical center, AMC)，為期一年進修。目的在向國際知名教授 Joon Pio Hong 及團隊，學習下肢創傷及淋巴重建的超顯微重建手術。

此次進修計畫，乃首次國人前往 AMC 整形外科擔任長期研修醫師。不料進修前夕，韓國醫界為了抵制政府以「填補超高齡化社會醫療缺口」為名強推的醫學院擴大招生政策，遂以年輕的住院醫師與醫學院學生為抗爭主力，以集體辭職、罷課、和休學等方式發動無限期罷工。身份因而轉變為”本土”實習、住院、總醫師和研修醫師！得以深入參與臨床工作和研究每個環節！同時臺韓醫療環境類似，故可參考比較兩國制度和臨床現況的第一手資料。

研修期間還遇到南韓政局動盪時刻，即前任總統尹錫悅宣布戒嚴(martial law)，又在數小時後解除與後續餘波，以及濟州航空空難事件。獨自在首爾生活，深感韓國民主制度深化與強韌。身為東亞僅三個民主國家(日本、韓國和臺灣)之一的臺灣國民，實在彌足珍貴。另一方面在韓國，因為政府強行增加醫學生名額，又無配套措施，無視生育率全世界最低的未來人口數減少，以及醫師人數是不均而非不足。明顯頭痛醫頭，腳痛醫腳。住院和實習醫師用罷工來提出訴求，而資深研修與主治醫師皆能團結同一陣線，主動”共體時艱”，已經撐過一年。雖說讓身為國際 fellow 的我有絕佳學習機會，得以一窺 AMC 整形外科名聞遐邇的要訣。但回到國內，看到護理師因為健保困境用腳投票，讓 COVID-19 疫情後的醫療崩壞雪上加霜。兩國各自有其難解課題需要面對，就看吾輩智慧與勇氣如何開拓新局。

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壹、本文

一、目的：

自 2024 年 3 月 4 日起，開始於南韓首屈一指的首爾峨山醫學中心(Seoul Asan Medical center, AMC)，為期一年進修。目的在向國際知名 Professor Joon Pio Hong 及其團隊，學習下肢創傷的超顯微重建手術，同時亦學習糖尿病足潰瘍、癌症切除後重、仿生義肢與機器人手臂輔助的顯微手術。

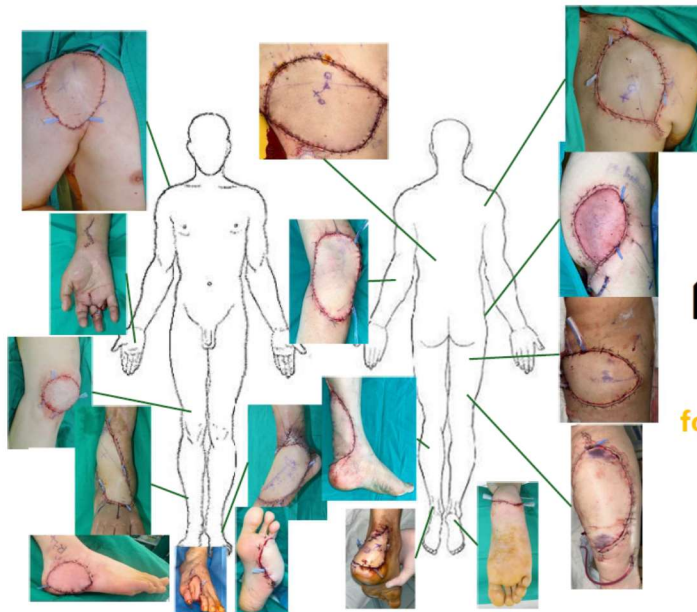
起緣深受 Jp Hong 教授在 2021 年外科醫學會年會的特別演講所激勵。主動連絡表達成為研修醫師意願後，於 2022 年 11 月前往 AMC 參與其舉辦的下肢重建工作坊，順利通過面試後。蒙科部內師長，包括胡瑞恆教授、吳毅暉教授、楊永健主任、戴浩志主任和鄭乃禎教授指導協助，取得教育部出國進修的資格與經費補助。

此次計畫，是首次國人前往 AMC 整形外科擔任長期研修醫師。不料去年 2 月 20 日起，韓國醫師界為了抵制政府以「填補超高齡化社會醫療缺口」為名強推的醫學院擴大招生政策，遂以年輕的住院醫師與醫學院學生為抗爭主力，以集體辭職、罷課、和休學等方式發動無限期罷工。我的身份因此轉變成本土實習、住院、總醫師和研修醫師！得以參與臨床工作和研究每個環節。

二、過程

AMC 為韓國頂尖的醫學中心，於 World's Best Hospital 2025(共 250 間醫院)排名 25。而臺灣唯一上榜的臺北榮民總醫院為 208 名。AMC 整形外科最為知名的教授為 Jp Hong 和 JW Choi，分別在下肢重建(A part)及顱顏重建(C part)各領風騷。A part 裡有 3 位 faculties，由 Jp Hong、Peter Suh 與 John Pak 帶領，堅強的 domestic fellows(TH Kim、JG Kwon)，和實驗團隊(包括臨床、動物實驗和 wet lab)。我主要參與 A part 所有活動。再於週末學習 C part 特有手術，並參加會議和論文寫作。

臨床部份，由於韓國醫師罷工事件持續中，直到回國當月，整年沒有任何住院和實習醫師，故我和他們 domestic fellow(1~2 名)，有半年以上時間相濡以沫。凌晨 5:30 或週末到病房幫忙病人傷口換敷料，也需以助手身份 scrub in 參與每場重要手術，三更半夜仍於討論室電腦中，收集韓文記載為主的電子病歷是家常便飯。去年 10 月起才有其他國外 fellows 來自 Belgium、Israel、France 和 Malaysia 加入。由最資深的我，來統合分配完成臨床和研究事項。同時亦為其他多國短期 visitors 的資訊窗口，包括通知事項和知識分享。自豪成就最佳”臺灣”國民外交！手術學習如 superficial circumflex iliac artery (SCIA)、Superthin anterolateral thigh (ALT)、Thoracodorsal artery perforator (TDAP)等皮瓣，venous arterialization 後再做自由皮瓣，淋巴水腫的檢查與治療。如下圖所示。



UNLEASH MY IMAGINATION!

FTT could be
EVERYWHERE

for oncological, trauma, DFU
and ischemic limb recon
Functionally and
Aesthetically

12

PUSH THE BOUNDARIES FTT on arterialized vein

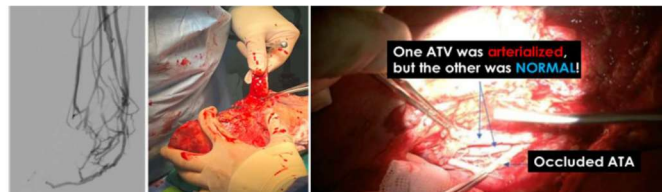
Popl. A-GSV graft-PTV
(popl-pedal vein bypass)

Acute ischemia post-
procedure 8h & 25d
Ballon angioplasty and
mechanical thrombectomy

Recanalization but...



1A: d-LCFA-arterialized PTV br. (E-E)
1V: Vena comitans-normal ATV (E-E)

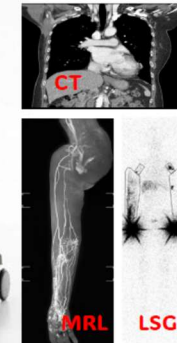
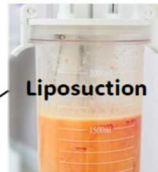
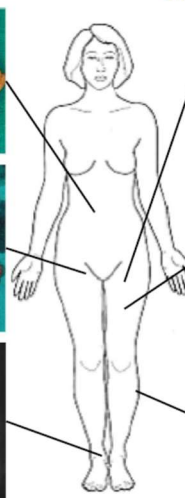
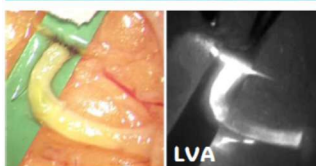


One ATV was arterialized,
but the other was NORMAL!

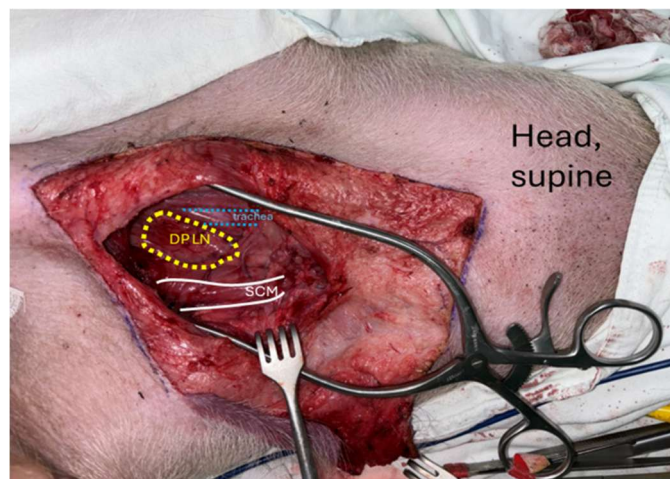
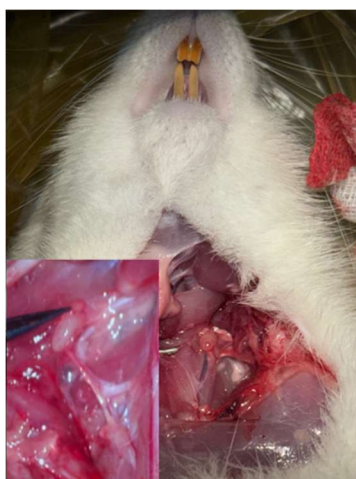
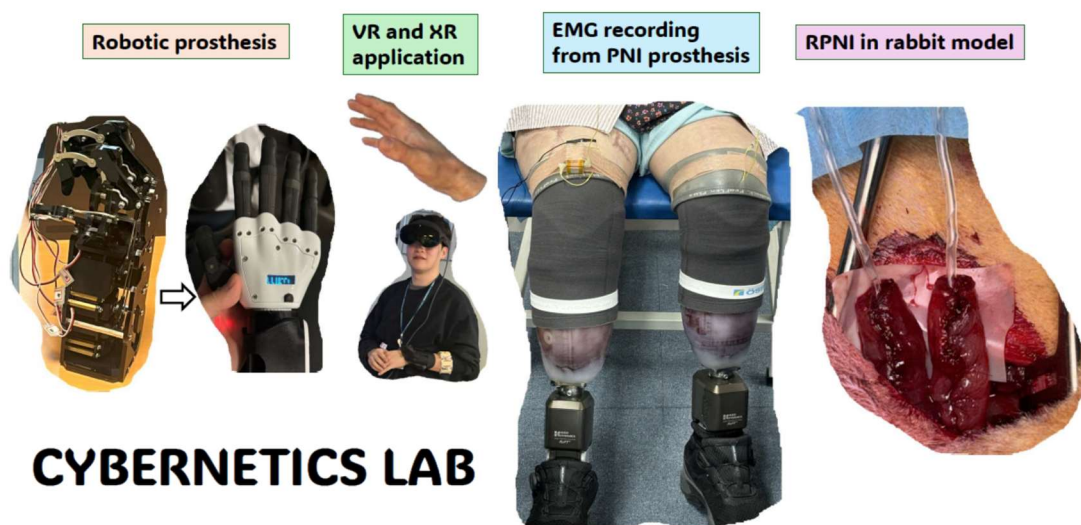
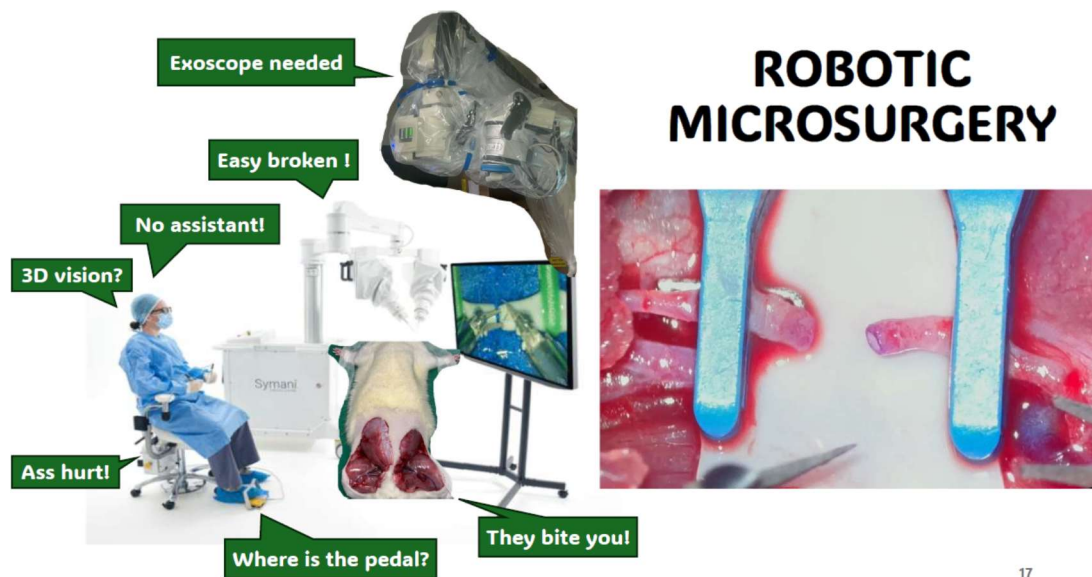
Occluded ATA

LYMPHEDEMA

Peripheral: 2nd UE/LE;
Primary
Central & Brain lymphatics

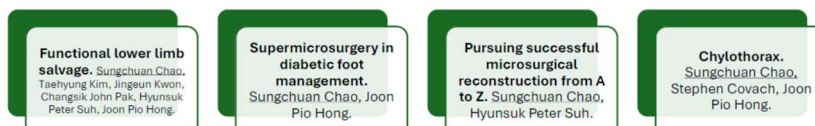


研究方面參與許多動物(大鼠、兔子和豬隻)實驗，包括機器人手臂輔助超顯微手術、周邊神經-義肢介面、豬腦部淋巴循環至深頸淋巴結的確認、皮瓣血循變化 RGB 分析與 AI 學習，擴增實境應用，和仿生義肢進展。如下圖。



寫作除了發表自己醫院整形外科論文四篇，其中 SCI 有兩篇(皆為第一作者，其一兼通訊作者)，兩篇通訊作者。同時在 AMC 教授們指導與協力合作，撰寫 Plastic and Reconstructive Surgery 一篇 CME，兩個 Book Chapters、一篇 original paper(第一作者)，兩篇 original paper(共同作者)，和一篇 original paper(通訊作者)。這些主題和見識到的研究能量，促成許多新的研究創意與構想，在返國短時間內已著手進行。如下圖所示。

BOOK CHAPTER & REVIEW ARTICLES



PUBLISHED

1. **Chao SC***, Kuan CH, Huang CH, Lin YS, Huang HF, Hsieh JS, Horng SY, Tai HC, Cheng NC. The Association between Cervical Lymph Node Dissection and Dementia: A Retrospective Analysis. *J Plast Reconstr Aesthet Surg.* 2024 Dec;99:584-591.
2. Lee HY, **Chao SC***. Salvage of elbow function and forearm length using pedicled flaps – Case report and literature review. *International Microsurgery Journal.* 2024;8(2):2
3. **Chao SC**, Kuan CH, Lin YS, Tai HC, Cheng NC. Lymphovenous Bypass (LVB) as an Alternative Strategy for Managing Phleboedema and Venous Leg Ulcers: Preliminary Results. *Plast Reconstr Surg Glob Open.* 2024 Aug 15;12(8):e6064.
4. Kao YS, **Chao SC***. Intraoperative Near-Infrared Fluorescence Guided Surgery Using Indocyanine Green (ICG) for the Surgical Margin Assessment in Scalp Angiosarcoma Resection Followed by Artificial Dermal Substitute Reconstruction – A Case Report and Literature Review. *J Taiwan Soc of Plast Surg.* 2024;33(4):447-460.

ONGOING PROJECTS

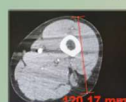
Efficacy of Color Doppler Ultrasound Perforator Mapping for Anterolateral thigh Flap - Refining Surgical Precision

Temporary marginal mandibulectomy for precise segmental mandible reconstruction

Neck lymph node variations in ultrasound findings between dementia and healthy individuals

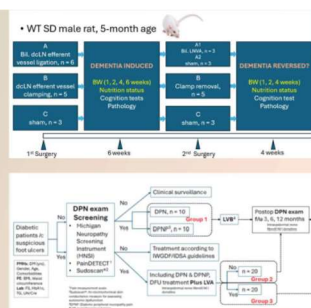
Utilizing Lymphovenous Bypass to Attenuate Alzheimer's Disease: Proof of Principle in Brain Rewiring

- **Deep cervical lymphatics blockade reversal in rodent model**
- **Using lymphovenous bypass (LVB) to alleviate diabetic peripheral neuropathy_clinical trial**
- **Prophylactic LNVA for GYN/Uro cancer_clinical trial**



• **Postero-lateral thigh (PLT) flap_anatomical study**

• **TMR/RPNI vs. Nerve endings to skin/fascia**



MANY IDEAS

三、心得

韓國醫療保險制度和臺灣現行健保很類似，但給付較高為 2~3 倍。同時韓國有許多本土廠牌，無論是美容產業或是生技商品，不但蓬勃發展，還能引進新的醫材(病人需要自費)。雖然韓國人口是臺灣兩倍多一些，市場較大。但比不像臺灣健保包山包海。幾乎所有病人，都需要額外付費部份負擔，即使是重大傷病，也要 5% 左右。另外 AMC 國際醫療服務這塊做的很好，世界各地都有，特別來自中東富有國家患者，這對醫院營收和醫療團隊的薪資大有助益。手術室和門診的配置與利用效率佳，病人分流、流程簡化與空間規畫，都讓醫療步驟有條不紊。病房和加護病房開設，依科別需求彈性調整，這對罷工非常時期的運作非常重要。

我認為是韓國的民族性，常年積弱的歷史情結，團結的國族主義心態，形塑成現今的醫療和社會現況。階級制度與硬頸不服輸的倔強，讓韓國人十分拚命，即使壓力特大，筋疲力竭，還是要使命必達。既有漢江經濟奇蹟，那麼醫師罷工一年未解、總統宣布戒嚴，如火車對撞現場的事件就不令人意外。在臺灣，醫師不符合勞基法，連在醫院組工會都難，更不可能罷工，主張自己專業的權利。但韓國人在跨年晚會現場，為濟州般空空難靜默和克制、在總統被彈劾後的社會氛圍依然活絡、轉型正義和撫慰人心的影視創作連發，讓人不禁感動其傳統文化與民主素養的深厚。

此外個人非常喜歡和享受韓國四季分明的氣候，及首爾首都圈規畫良善自行車道和 hiking trails。還造訪釜山、慶州、水原、束草等城市。當然傳統韓食、韓式 BBQ/seafood、Soju 混 Beer、辣而不膩的辛奇，返國十分懷念的美食。最後感謝這趟研修之路，讓我能認識許多韓國朋友、不同國家醫師，就像環遊世界，也將臺灣宣傳給世界。



四、建議事項

在韓國，因為政府強行增加醫學生名額，又無配套措施，無視韓國生育率全世界最低的未來人口數減少，以及醫師人數是不均而非不足。明顯頭痛醫頭，腳痛醫腳。住院和實習醫師用罷工來提出訴求，而資深研修與主治醫師皆能團結同一陣線，主動”共體時艱”，已經撐過一年。雖說讓身為國際 fellow 的我有絕佳學習機會，得以一窺 AMC 整形外科名聞遐邇的要訣。但回到國內，看到護理師因為健保困境用腳投票，讓 COVID-19 疫情後的醫療崩壞雪上加霜。兩國各自有其難解課題需要面對，就看吾輩智慧與勇氣如何開拓新局。

臨床建議如下

- (一)門診：增加醫佐人員，在門診診間外先完成報到，病人分流及資料準備，包括身高、體重、血壓和該專科門診所需項目(如淋巴水腫，先測肢體圍長和身體組成分析檢查 Bioelectrical Impedance Analysis(BIA)等)。以減輕護理人員負擔。準備足夠看診空間、時段及限制人數，讓醫療團隊提供高品質門診服務。
- (二)手術：提升手術室服務量能，與滾動式討論提昇使用效率。
- (三)住院：改善電梯運載效能。增設主治醫師專梯。
- (四)其他：調整薪資提成比例。增加國際醫療服務。

教學建議：韓國人上對下階級的習慣根深蒂固。資深醫師在任務分配上有絕對的權力同時，下級醫師更是全力以赴。在臺灣這套已經行不通。但是 AMC 整形外科的團隊討論氣氛熱絡，可能常與國際學者交流也有關係。劍及履及的驚人行動力，容易做出成果並共享之，讓團隊凝聚力更強，是我所學習到的。

五、附錄 (在韓國醫師罷工近一年時，該國記者為訪問國外醫師有關各國醫療現況的問卷調查)

#Hospital Accessibility

Question 1. Accessibility of Primary Care Facilities

Are there enough primary care facilities to easily visit for conditions like a cold, muscle pain, or benign tumors? Does it take a long time to access these facilities? Can diagnostic tests such as biopsies or ultrasounds be performed at primary care facilities for quick diagnosis and treatment?

Question 2. Does a national insurance system exist?

Question 3. Does private insurance exist?

Question 4. Roles of National and Private Insurance

What are the respective roles of national insurance and private insurance? Is there a

difference in the quality of care provided under these systems? Is there a difference in waiting times for consultations or surgeries between the two systems?

Question 5. Operation of Public and Private Hospitals

How are public and private hospitals operated? Is special insurance required to access private hospitals? What percentage of people have private insurance, and how much does it typically cost?

#Number of Doctors and Regional Healthcare

Question 1. Number of New Doctors Annually

How many medical students become doctors each year?

Question 2. Availability of Public Hospitals in Rural Areas

Are there enough public hospitals (operated under national insurance) in rural areas with smaller populations?

Question 3. Reasons for Insufficient Public Hospitals

If there are not enough public hospitals, why do you think this is the case?

Question 4. Presence of Private Hospitals in Rural Areas

Are there many private hospitals in rural areas?

Question 5. Reasons for Presence of Private Hospitals

What do you think are the reasons for the number of private hospitals in rural areas?

Question 6. Popularity of Certain Specialties

In South Korea, specialties like pediatrics, obstetrics and gynecology, and surgery are unpopular due to low patient numbers and high risk of medical malpractice. What is the situation in your country?

Question 7. Increasing Medical Student Numbers

South Korea plans to nearly double the number of medical students to address the above issues. Do you think this is an effective way to increase the number of residents in unpopular specialties?

Question 8. Solutions for Increasing Residents in Unpopular Specialties. What are the solutions to increase the number of residents in unpopular specialties? Has your country addressed this problem?

#Healthcare Delivery System

-What role does primary care play in the healthcare delivery system in your country, and what policies are being implemented to strengthen it?

-What systems are in place in your country to ensure patients are appropriately referred from primary care facilities to secondary and tertiary care facilities? In other words, what policies are being implemented to reduce unnecessary use of large hospitals and to promote local medical institutions?

- Could you share any successful or failed policies related to the improvement of the healthcare delivery system in your country?
- In Korea, there is an initiative called the "Tertiary Hospital Structural Transition Project," which aims to create an environment where tertiary hospitals can focus on severe, emergency, and rare diseases. Does your country have a system in place to enable a focus on such diseases?
- Are there any specific licenses or qualification requirements for practicing as an independent physician in your country? If so, what are the reasons for implementing such requirements?
- In Korea, there is a noticeable trend of medical professionals gravitating towards the cosmetic and private healthcare markets. Does your country experience a similar trend?
- There are ongoing concerns about the lack of public healthcare services in Korea. How well is public healthcare secured in your country? In particular, Korea faces an imbalance between public and private healthcare. How does your country adjust the roles of public and private sectors in healthcare?

#Resident Training System

- In Korea, there are frequent criticisms regarding long working hours and excessive workloads for medical residents. How are residents' working hours and training conditions managed in your country? How is the balance between appropriate working hours and patient safety achieved?
- What structure does the resident training program follow in your country? (e.g., specialization selection, proportion of research and practice)
- What policy efforts do you think are necessary for Korea to establish an appropriate training system for medical residents?