

蟹足腫與皮膚遺傳團隊工作坊

Workshop of Keloid and Genodermatosis study

scRNA-seq 分析的實際演示和工作流程講解

Practical Demonstration and Workflow Explanation of scRNA-seq Analysis

時間(Date): 2025/8/1(五) 21:00 – 23:00; Aug 1, 2025 (Friday), 21:00–23:00

地點(Venue): 線上會議(Online Meeting)

講者(Speaker): 蘇柏嵐 Po-Lan Su、張嘉容 Chia-Jung Chang (Charlene)

時間 Time	主題 Topic
21:00-21:10	單細胞分析流程總覽及核心概念導讀 Overview of scRNA-seq Workflow with Key Concepts
21:10-21:15	scRNA-seq 資料下載與預處理策略 Strategies for Downloading and Pre-processing scRNA-seq Data
21:15-21:30	R 語言基礎導論 Foundations of R Programming
21:30-21:45	品質控制方法、前處理與跨樣本資料整合 Quality Control, Preprocessing, and Cross-Sample Integration
21:45-22:00	細胞類型註解與分群 Cell Type Annotation and Clustering
22:00-22:15	差異基因表現與功能富集分析 Differential Gene Expression and Functional Enrichment Analysis
22:15-22:25	細胞間通訊分析 Cell-Cell Communication Analysis
22:25-22:35	細胞軌跡與擬時序分析方法 Trajectory Inference and Pseudotime Analysis
22:35-22:50	結果評估與 Loupe Browser 視覺化互動 Results Evaluation and Loupe Browser Interactive Visualization
22:50-23:00	如何根據研究目標選擇並導入合適的資料分析工具與方法 How to Select and Implement Appropriate Data Analysis Tools and Methods Based on Research Objectives

實作事前準備 Pre-Workshop Preparation

1. 電腦與軟體 Computer and Software

規格項目 Spec	最低配備 Minimum	建議配備 Recommended
作業系統 OS	Windows 10 (64-bit) / macOS 12 / Ubuntu 20.04	Windows 11 (64-bit) / macOS 14 / Ubuntu 22.04
處理器 CPU	6 cores (Intel / AMD / Apple Silicon)	8 – 12 cores, multithreaded / high clock speed
記憶體 RAM	16 GB	32 GB (≥ 64 GB for large multi-sample projects)
儲存空間 Disk	SSD, ≥ 50 GB free	NVMe SSD, ≥ 200 GB free
GPU (可選 Optional)	—	CUDA-capable GPU / Apple M-series for accelerated visualization & deep learning
網路 Internet	Stable connection ≥ 10 Mbps	≥ 30 Mbps for faster data & package downloads
額外選項 Extras	—	Docker / Singularity and HPC / Cloud accounts for reproducibility & large-scale computing

- 請安裝 $R \geq 4.1.3$ (實驗室慣用 4.1.3)、RStudio。
- Please ensure that R (version $\geq 4.1.3$; version 4.1.3 is preferred in our lab) and RStudio are installed in advance.

<https://posit.co/download/rstudio-desktop/>

2. 範例資料與程式碼 Example Data and Scripts

- 範例資料下載 Example data : <https://reurl.cc/NYzGM9>

- GitHub 倉庫 GitHub repository :

https://github.com/KGDLab/KGD_Workshop_2025_Summer

*請於課程前完成所需套件安裝 (可選擇最新版或指定版本):

* Please install the required packages before the workshop. You may choose:

- 最新版本 Latest versions : `source("Install_required_packages.R")`
- 實驗室版本 Lab-specific versions : `source("Install_required_packages_KGD_Lab.R")`

若遇安裝或其他問題請聯絡 Charlene (p88071020@gs.ncku.edu.tw)

If you encounter installation or technical issues, please contact Charlene at

p88071020@gs.ncku.edu.tw .

3. GitHub

- 建立個人帳號並提供使用者名稱，以加入 **KGD_Lab** 組織。
- Create a personal GitHub account and provide your username to be added to the **KGD_Lab** organization.

KGD_Lab GitHub: <https://github.com/KGDLab>