Research Tools for Basic Medical Sciences

基礎醫學研究技術－113-1 [隔年開課]

Location: Medical College Building Classroom-R601
Time: Mondays AM 10:10-12:00

Coordinator:
Pu-Ste Liu (劉卜慈)
Tel: 5514
E-Mail: z11302014@ncku.edu.tw

Course goal

1. Master fundamental biomedical research principles and methodologies.

2. Acquire proficiency in essential laboratory techniques for basic medical sciences.

3. Apply experimental knowledge to design and conduct research projects.

Course Contents

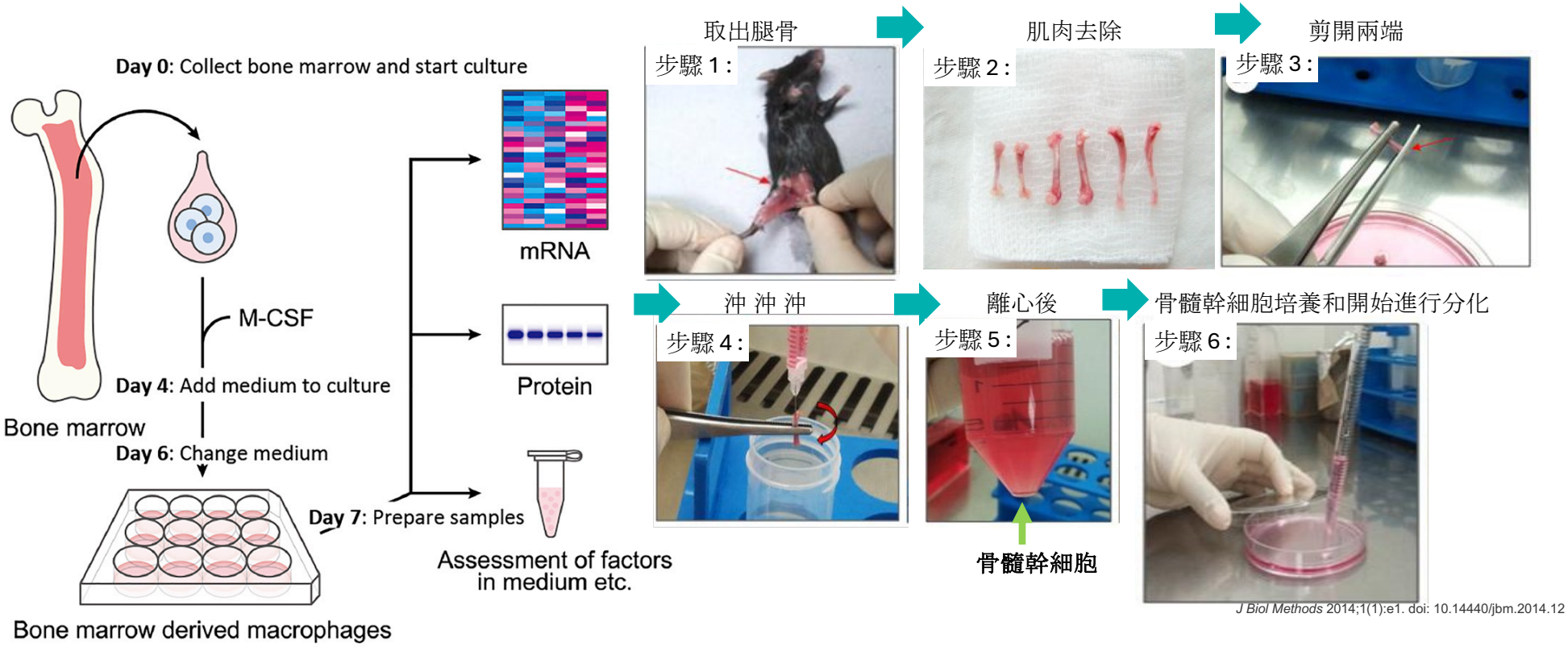
9/9	Introduction	Pu-Ste Liu
9/16	Transgenic animal	Shang-Hsun Yang
9/23	Virus-based techniques	Shang-Hsun Yang
9/30	Immunometabolism analysis	Pu-Ste Liu
10/7	Cell Metabolism analysis	Pu-Ste Liu
10/14	Measurement of glucose homeostasis in vivo	Hung-Tsung Wu
10/21	Nano-enhanced virotherapy or immunotherapy	S.-Ja Tseng
10/28	Mass spectrometry analysis and clinical applications	Wei-Ling Lin
11/4	Neural circuit-based techniques	Wei-Li Wu
11/11	Targeted Protein Modification: Lessons from PROTACs and PhosTACs.	Po-Han Chen
11/18	Analyze the RNA expression (Single gene level)	Chang-Shi Chen
11/25	Analyze RNA expression (Systematic analysis) & Demonstration	Chang-Shi Chen
12/2	Ion Channel technology	Ming-Wei Lin
12/9	Stem cell technology	Ming-Wei Lin
12/16	Biomedical application for nanomaterial	Tsung-Lin Tsai
12/23	Animal imaging, digital pathology, and the NCKU AAALAC	Ching-Hao Teng NCKU AAALAC
12/30	Final group presentation, frequently asked questions, and Course Feedback	Pu-Ste Liu

Grading Criteria

1. **Class discussion and participation (40%)**
2. **Final Presentation (60%)**

- **Select One Experiment**
  Choose an experiment from the course or your research.
- **Rationale**
  Explain why you chose this experiment and its significance.
- **Experimental Design**
  Outline how you designed and performed the experiment.
- **Results Interpretation**
  Discuss the results and their implications.

Preparation and culture of bone marrow-derived macrophages from mice for functional analysis



J Biol Methods 2014;1(1):e1. doi: 10.14440/jbm.2014.12

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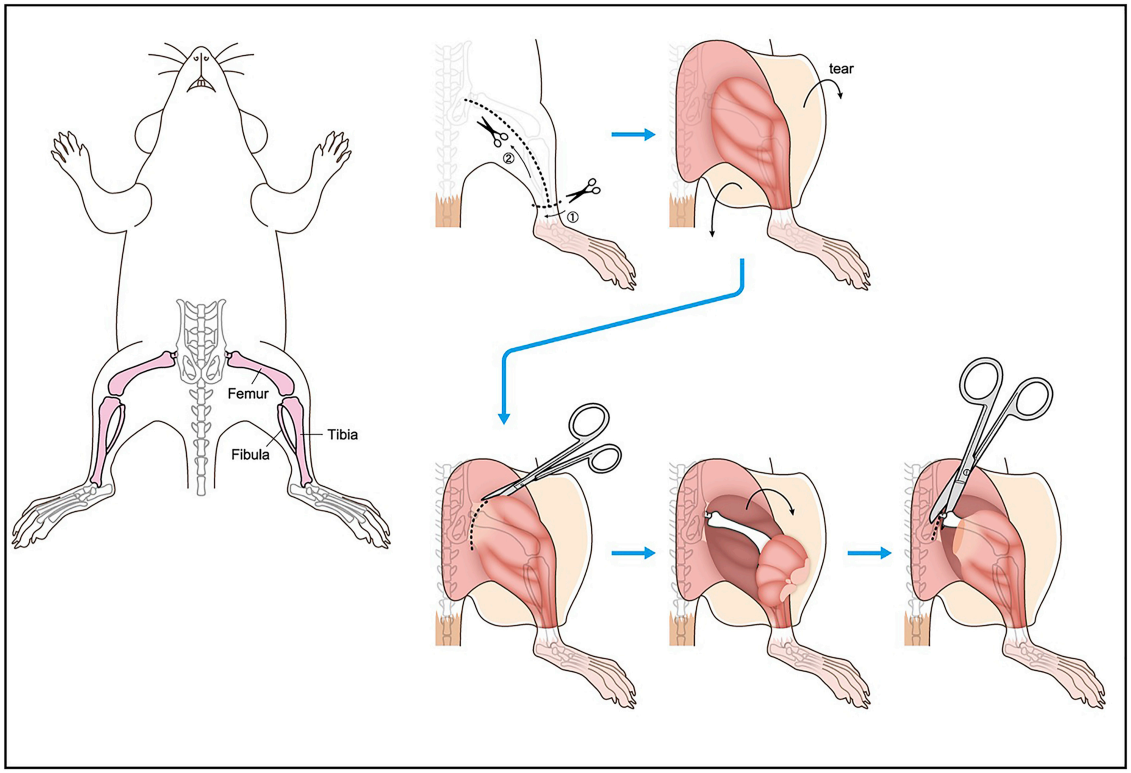
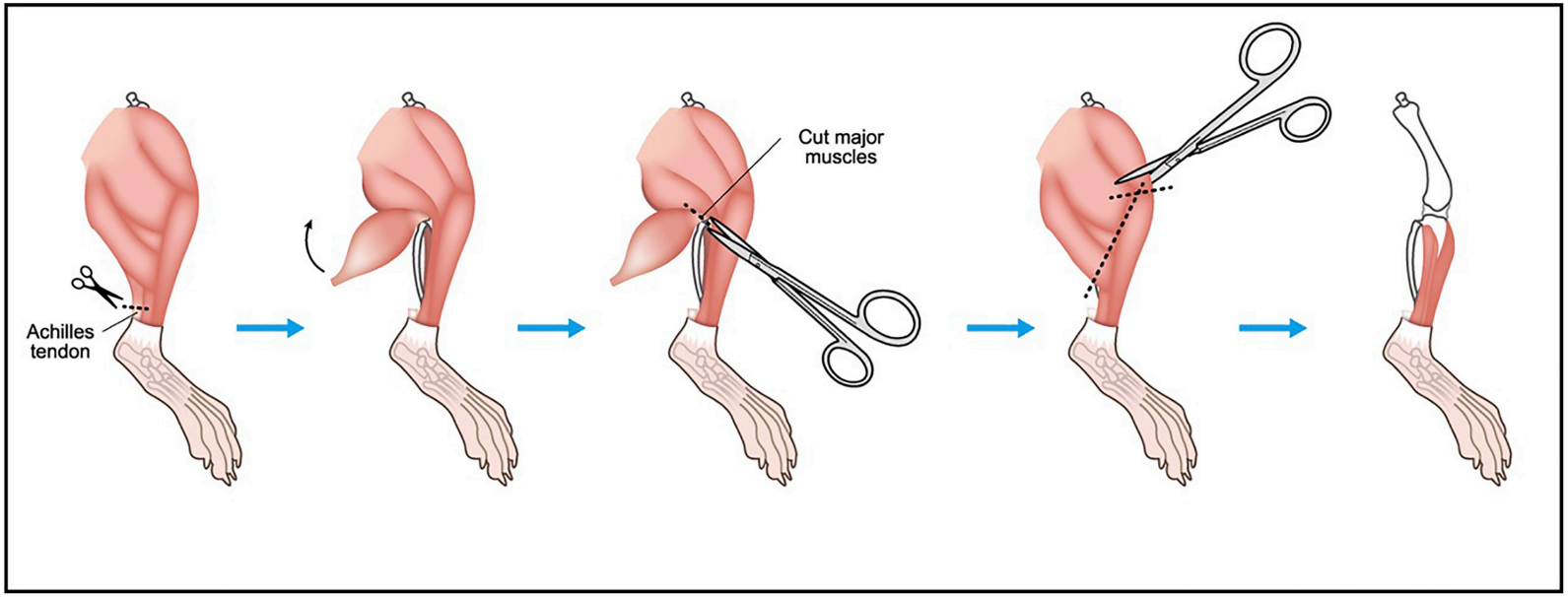
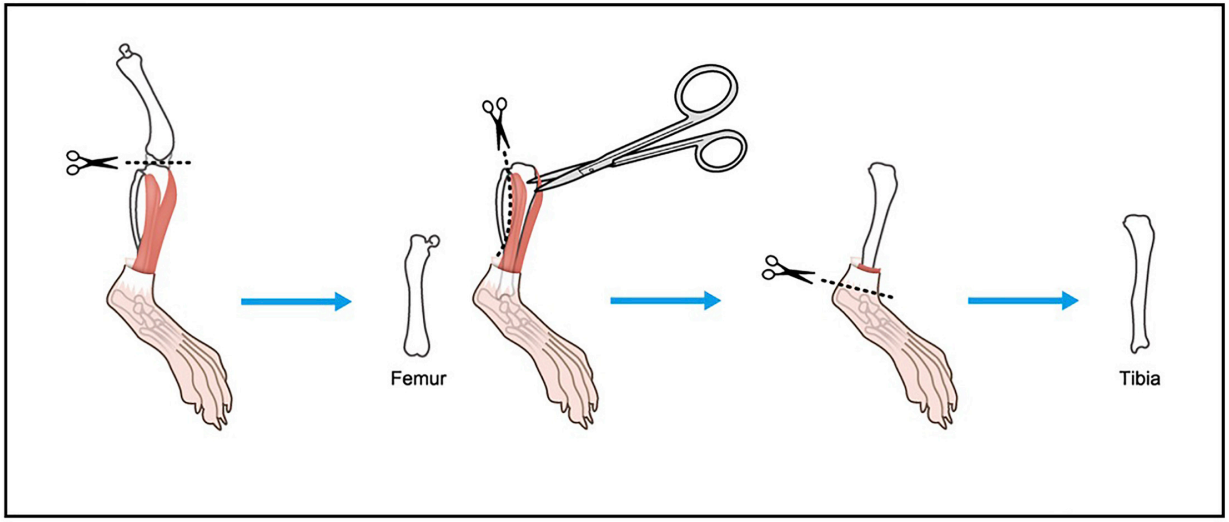
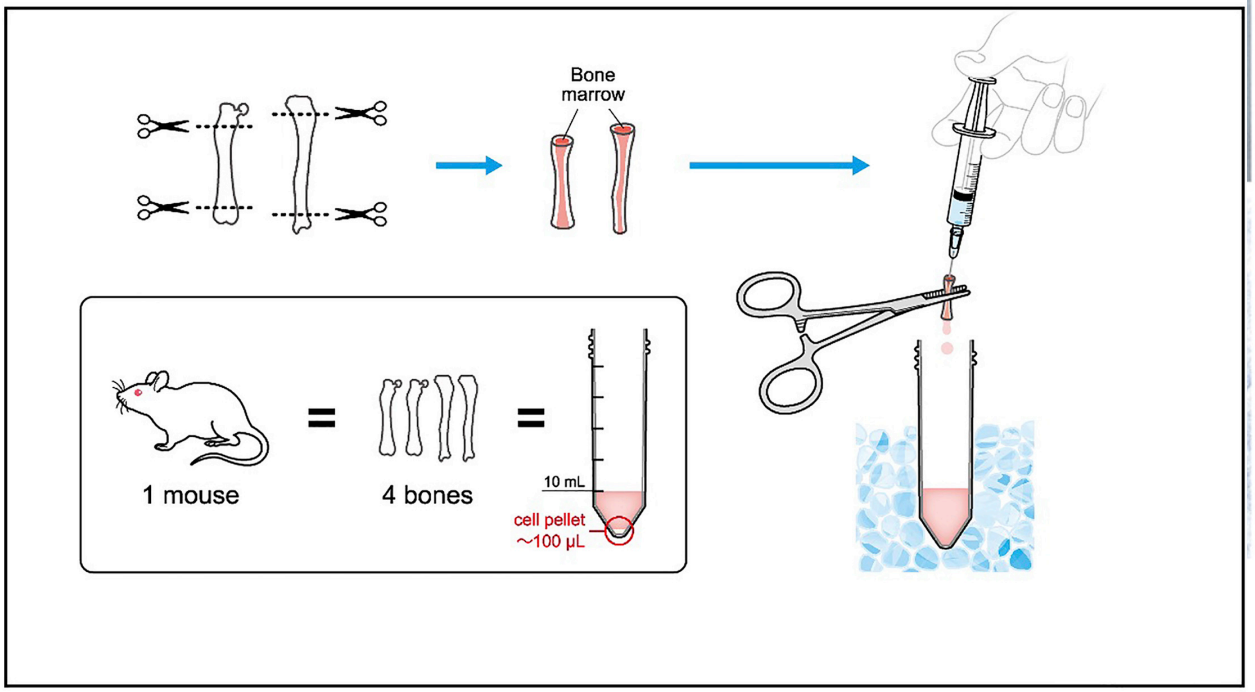
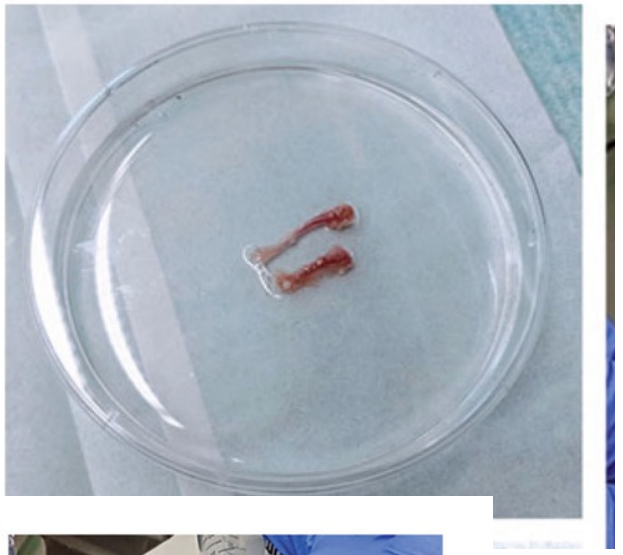
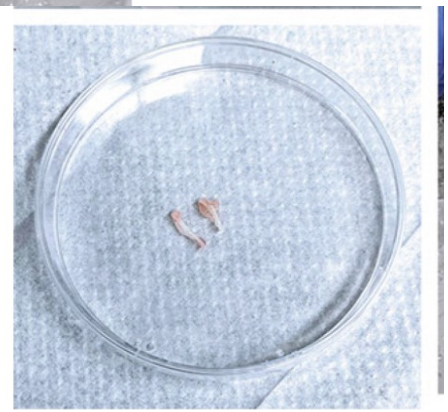

Femur
Tibia
Fibula
②
①
tear


Achilles tendon
Cut major muscles



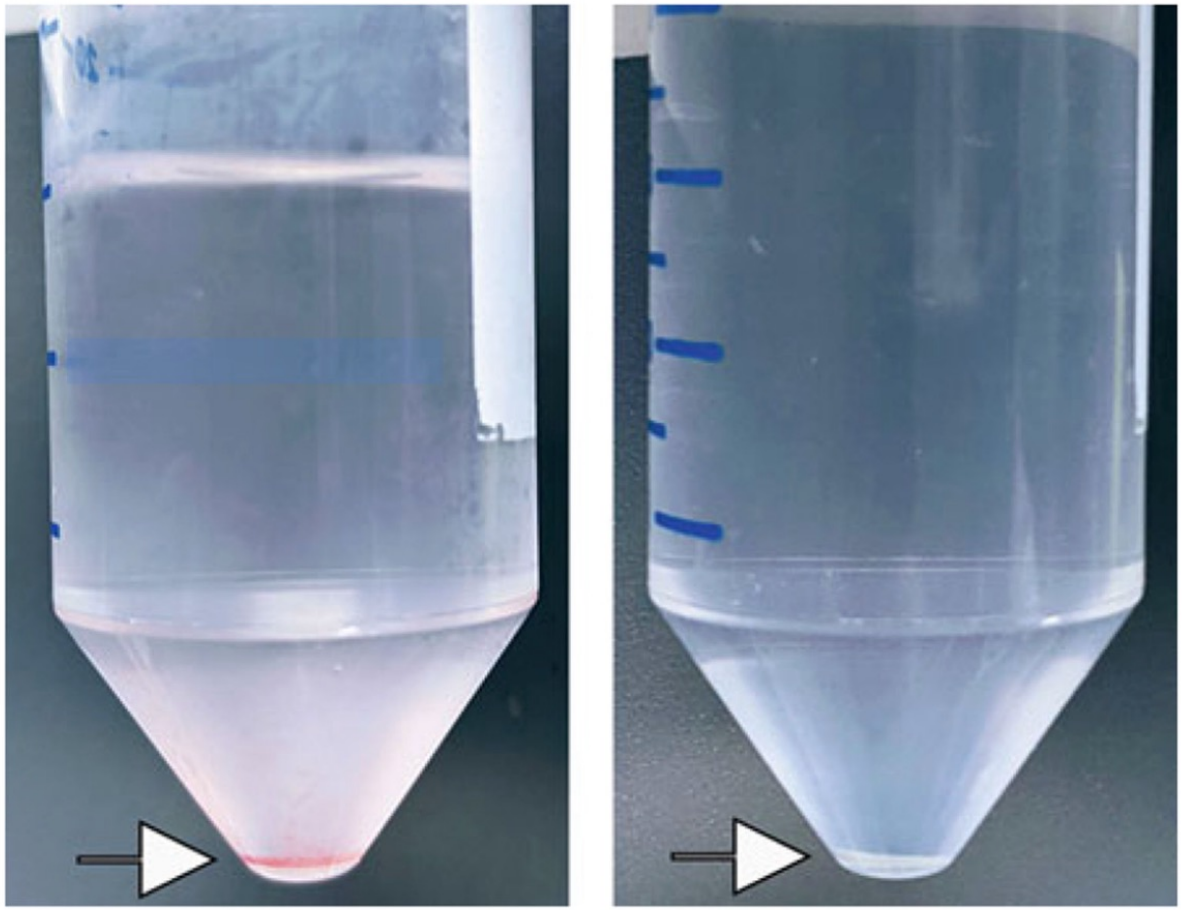


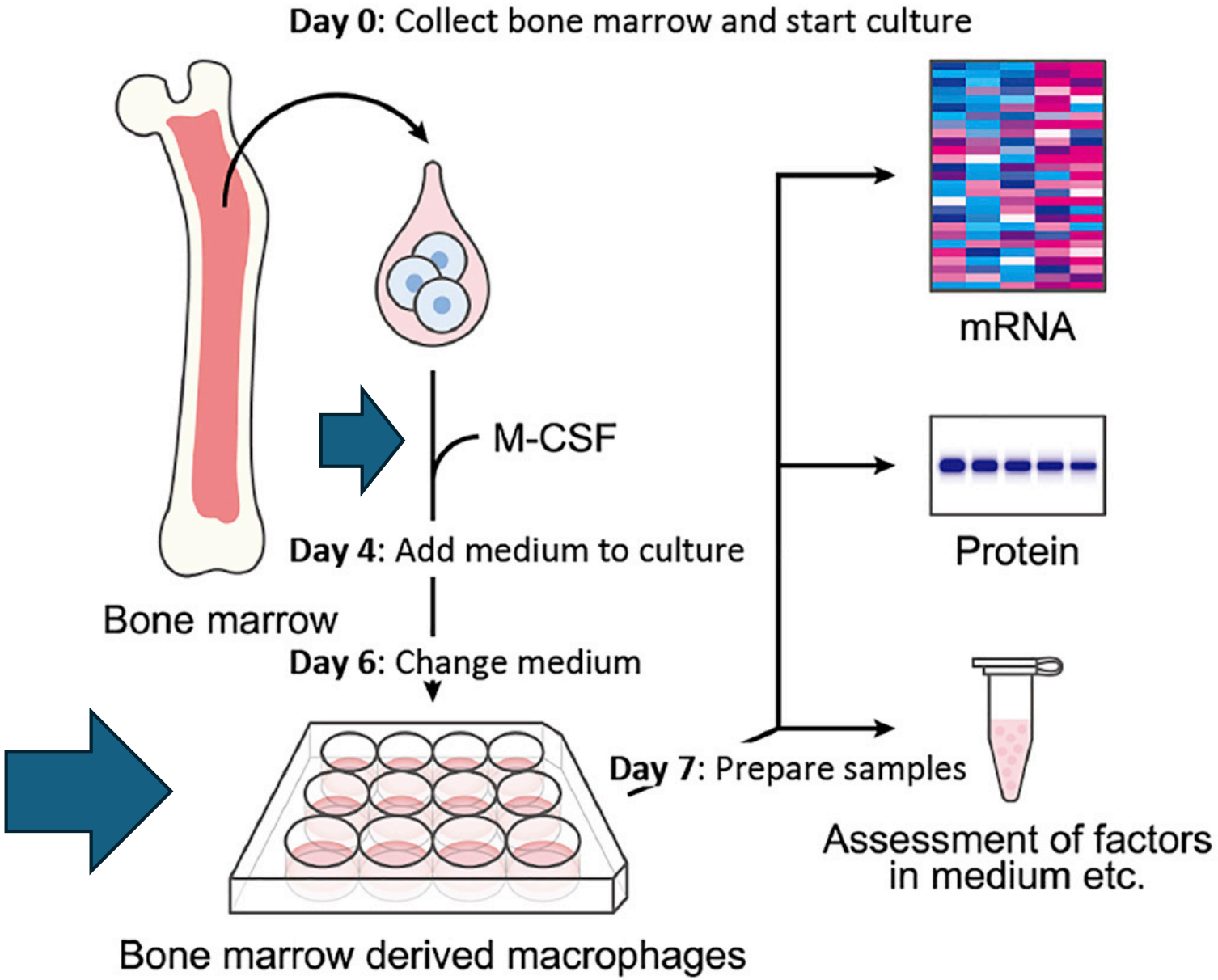




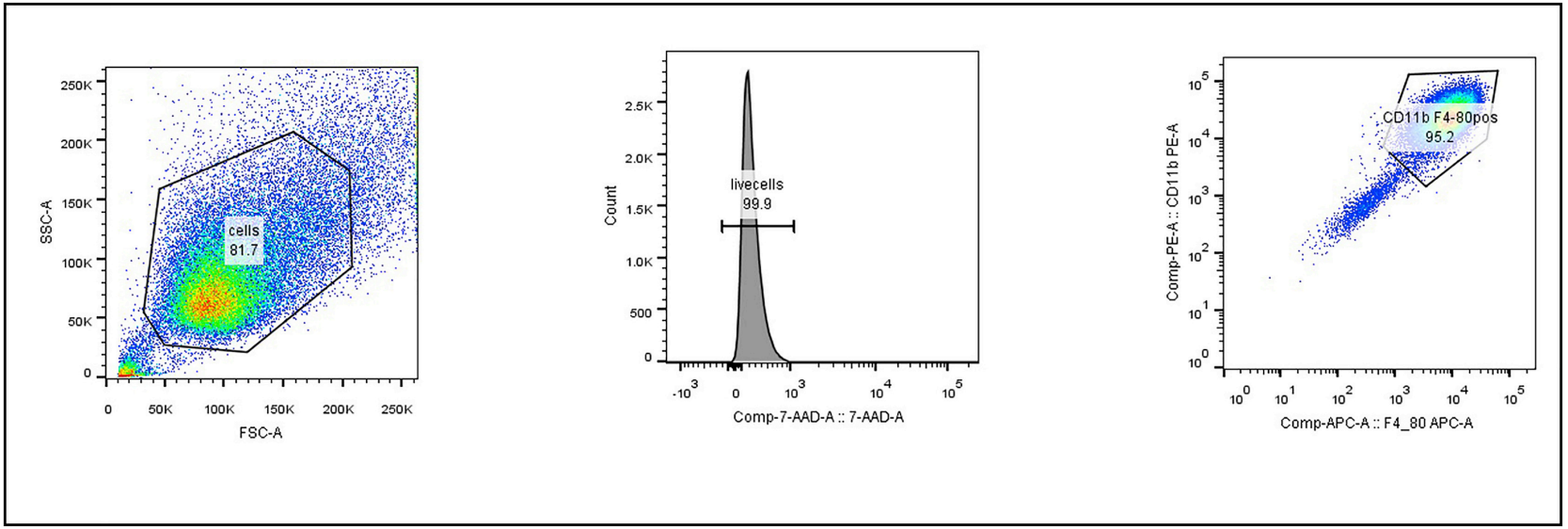
Methods Mol Biol. 2022; 2455: 85–91.

Cell pellets (arrows) before (left) and after (right) RBC lysis




Day 0: Collect bone marrow and start culture
M-CSF
Day 4: Add medium to culture
Bone marrow
Day 6: Change medium
Bone marrow derived macrophages
mRNA
Protein
Day 7: Prepare samples
Assessment of factors in medium etc.

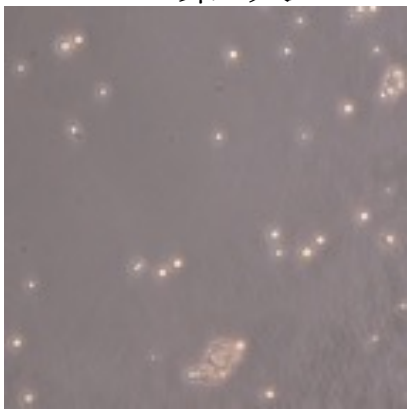
FACS analysis of BMDM cell suspension



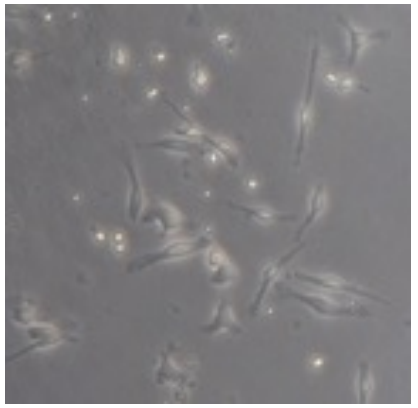
骨髓幹細胞和分化成巨噬細胞的細胞型態

第0天 分離骨髓幹細胞

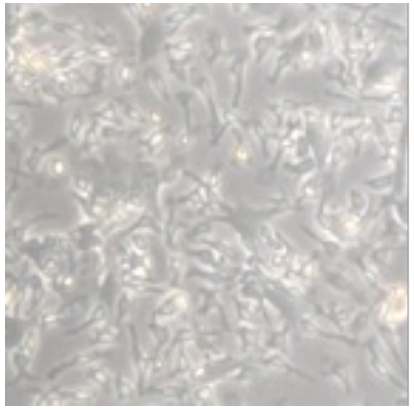
第1天



第3天



第7天 分化成巨噬細胞



巨噬細胞活化