

國家實驗研究院 國家生物模式中心
National Center for Biomodels (NCB)
National Institute of Applied Research (NIAR)

Yi-Je (Jay) Chen
陳怡杰

DVM, MS, Ph.D.

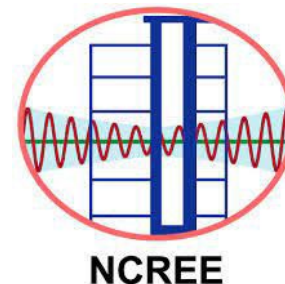
Researcher, *National Center for Biomodels,
National Institutes of Applied
Research*

Volunteer Clinical Professor, *Department of Pharmacology
School of Medicine
University of California, Davis*

Former Director, *Animal Model / MicroSurgery Core
Cardiovascular Research Institute
University of California, Davis*

Former Associate Professor, *Department of Pharmacology*

- **National Center for Biomodels (NCB)**
- **National Center for Research on Earthquake Engineering (NCREE)**
- **National Center for High-performance Computing (NCHC)**
- **Taiwan Semiconductor Research Institute (TSRI)**
- **Taiwan Instrument Research Institute (TIRI)**
- **Science & Technology Policy Research and Information Center (STPI)**
- **Taiwan Ocean Research Institute (TORI)**

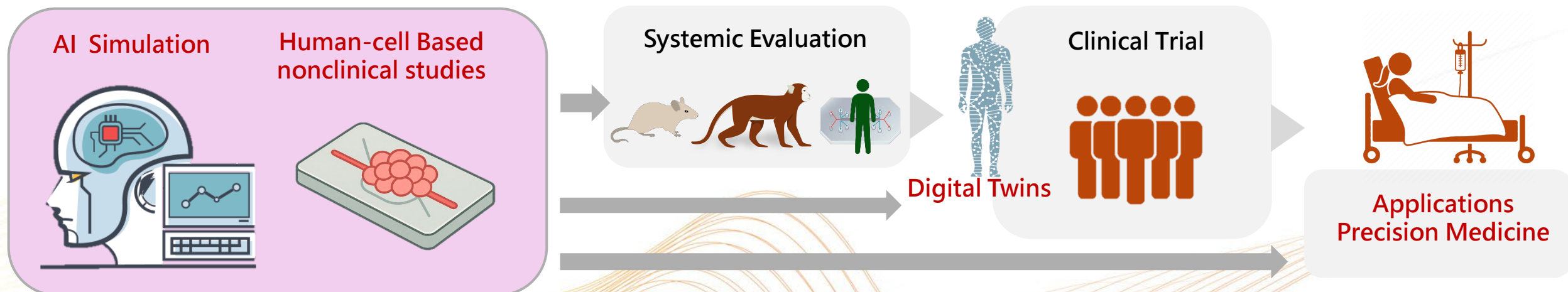


Vision of NCB, NIAR

Provide laboratory animal resources and testing services



Integrate novel alternative technologies with disease modeling



Renamed on 3/25/2025

Animal Model Resources



- Rodents and rabbits
- Genetic engineered models
- Rodent Model Resource Center (RMRC)

Animal Testing Services

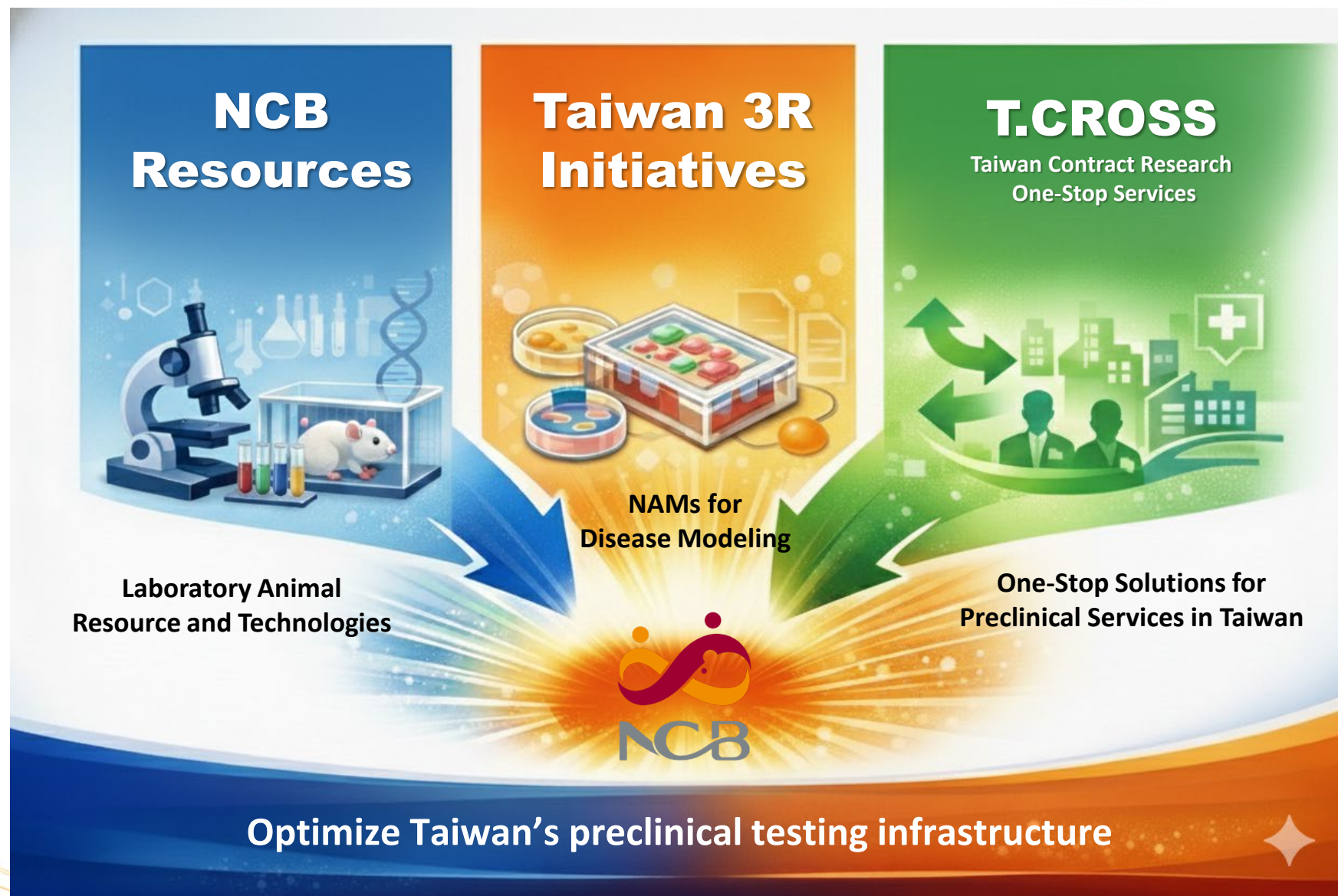


- Disease modeling
- Implantation surgery
- Drug testing
- Shared facility

Animal Facility Services



- Health monitoring
- Pathology
- Talent Cultivation
- Facility Management



Animal Models, Oncology, Vaccines



Taipei Facility
(2019 28,619m²)
Headquarter



Medical devices
Regenerative Medicine
Neuroscience



Preclinical Testing Laboratory
(2017 2,981 m²)



Hsinchu
Biomedical
Science Park

Southern
Taiwan Science
Park

Tainan Facility
(2008 15,954m²)



Animal Care and Surgery Facility
(2015 1,000 m²)



Surgical Facilities for MD/ Regenerative Medicine

➤ Animal Surgery Service

- Experienced surgical team
- Post-surgery care/ ICU
- GLP compliance
- AAALAC accredited

➤ Biomedical Imaging

- Ultrasound/ X-ray/ C-arm
- **CT/ MRI/ Angiography**
- Endoscopy

➤ Tissue Compatibility Assessment

- Surgical implantation
- Histology and pathology evaluation
- Implantation sites:
Muscle/ Bone/ Subcutaneous/ Brain
Dermal/ Ocular/ Custom implants



Cardio / vascular



- Endovascular stenting
- Cardiac / vascular device implanting
- Cardiopulmonary bypass



Bone and joint



- Joint replacement
- Bone / spinal implants
- Tibial osteotomy
- Osteosynthesis material testing



Wound care



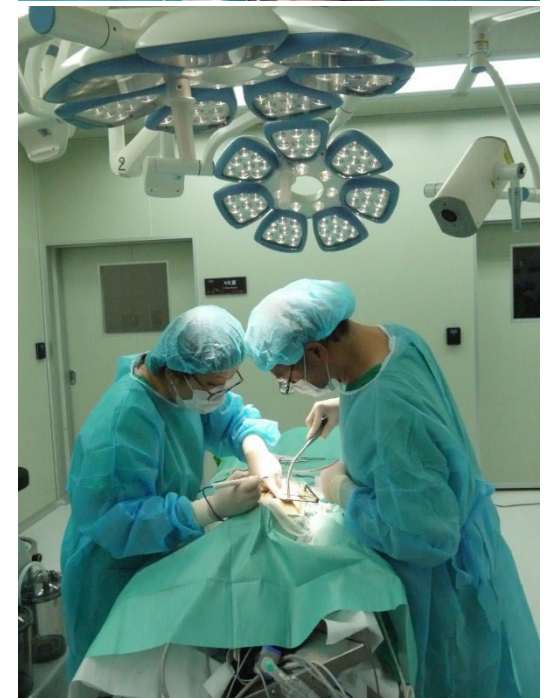
- Wound healing analysis
- Tissue engineered wound material testing
- Wound angiogenesis
- Pathological diagnosis



Implant dentistry



- Implant stability
- Fracture resistance testing
- Biocompatibility / efficacy analysis
- Pathological diagnosis



NCB Rodent Models

1994
Production

2010
GM resources

2019
Humanized models

2022
Neuro-engineering
Microsurgery

2020
Precision Oncology
Gut Microbiota



Inbred strains



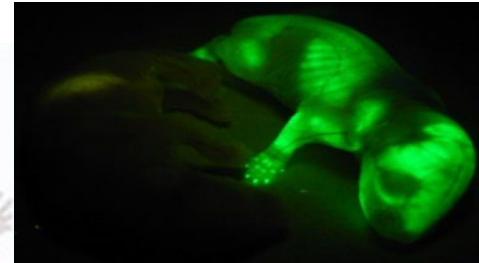
Spontaneous
Mutation



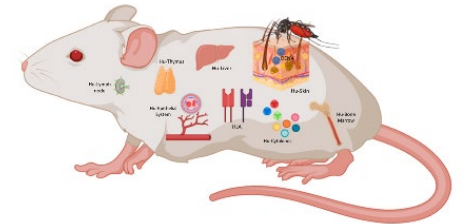
Outbred strains



Induced Models
Infectious disease
Microsurgery
Diet-induced
Chemical-induced



GM models
Gene vs Disease
Repository
Rare disease



Humanized models
PDX models
FMT models
Hu-immune models

Rodent Model Resource Center (RMRC)



Over 70% of strains in Taiwan
preserved in RMRC

4,400

Cryopreserved



406

Deposit



660

Distribute



177

by NCB



Autism

C57BL/6-Scn2a1^{tm1aNarl}/Narl

Genes Brain Behav. 2021 Apr;20(4):e12725.
Neurobiol Dis. 2022 Jun 15;168:105690.
Cell Rep. 2021 Aug 3;36(5):109495.
Res Sq. 2023 Sep 28;rs.3.rs-3270664.

Cognition

C57BL/6-Mir195^{tm1b(GEMMS)}Narl/Narl

Aging Cell. 2020 Nov;19(11):e13236.
Cell Commun Signal. 2023 Jun 14;21(1):140.

Addiction

C57BL/6-Ankk1^{tm1aNarl}/Narl

Biol Psychiatry. 2023 Sep 1;94(5):424-436.

Neurodegeneration

C57BL/6-Sp1^{tm1c(GEMMS)}Narl/Narl

Tourette's Syndrome

C57BL/6-Slitrk1^{tm1b(GEMMS)}Narl/Narl

Mol Neurobiol. 2020 Jan;57(1):261-277.
Neuroscience 2023 (D.C., USA) PST315

Liver cancer

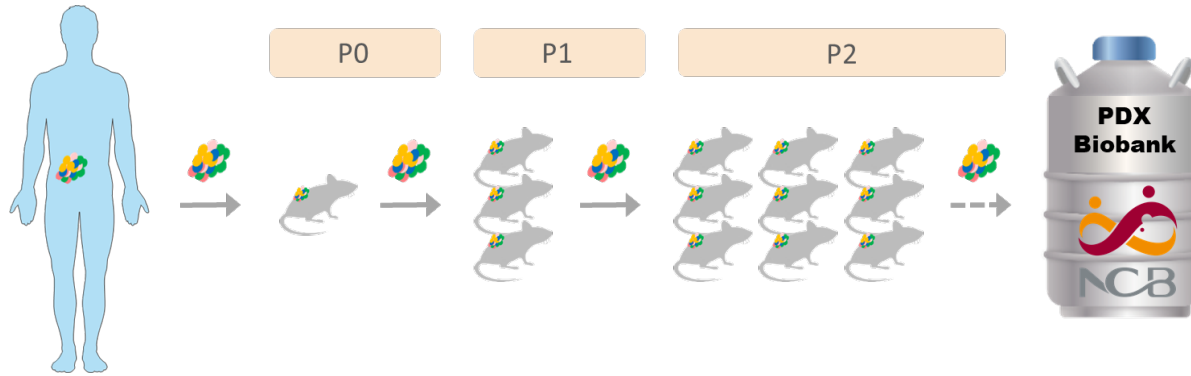
C57BL/6-Mir122^{tm1b(GEMMS)}Narl/Narl

36th IMGC (Tsukuba, Japan) 2023 P94

PKD

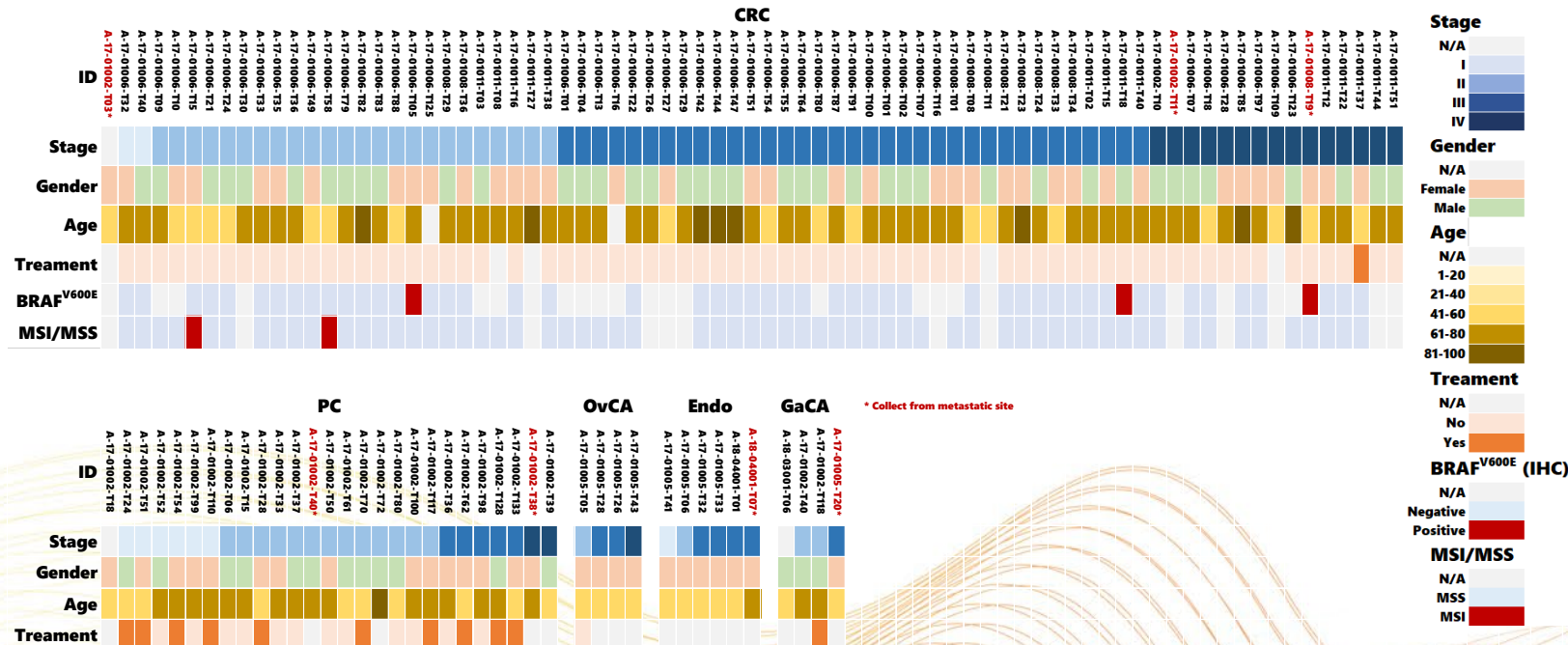
C57BL/6-Wdr19^{tm1cNarl}/Narl

Patient Derived Xenograft/ Organoid Bank



77 Colorectal cancer
27 Pancreatic cancer
4 Ovarian cancer
6 Endometrial cancer
4 Gastric cancer

- Taiwan PDX and PDXO bank
- PDX drug screening
- PDXO drug screening
- Cancer Vaccine
- Tumor Exosome Biomarker



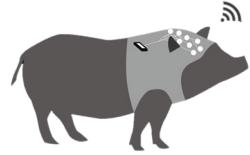
Paired resources
for drug screening

Research Focus



Precision Oncology

- PDX/ PDXO Bank
- PDX models
- PDXO drug screening
- Immune humanized
- CART screening



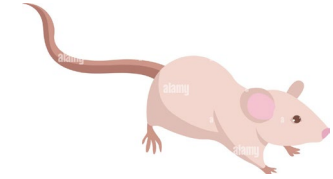
Neuroscience

- Aging model
- Microsurgery
- Deep brain implant
- Multi-species study
- AI behavior analysis



Microbiota

- Germ free mice
- Fecal transplantation
- Gut-brain axis
- Gut-heart axis
- Gut-liver axis



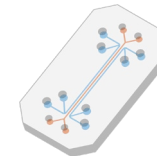
Immunology

- Auto-immune
- Infectious disease
- Fatty liver disease
- Metabolic disease



Gene Engineering

- Rodent Model Resources
- BAC+ Cas9 gene modify
- Transgenic models
- Breeding and genotyping



Organ-on-Chip

- Organ-on-chip models
- Model validation
- Device validation
- Drug screening

Comprehensive Solutions for Microsurgery-Induced Disease Models

顯微手術疾病模式全方面服務方案

● Surgically Induced Animal Disease Models

手術誘導動物疾病模式

● Customized Surgery Development

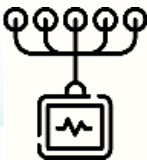
客製化技術開發

● On-Site Surgical Services

到府手術

● Training & Workshop

教育訓練

	手術誘發疾病模式
 神經	➤ 短暫性大腦中動脈栓塞 (tMCAO) ➤ 永久性大腦中動脈栓塞 (pMCAO)
 心血管	➤ 短暫性左冠狀動脈結紮術 (tLAD) ➤ 永久性左冠狀動脈結紮術 (pLAD) ➤ 橫向主動脈縮窄術 (TAC)
 其他	➤ 客製化操作(ex. CSF collection, blood collection, Nephrectomy)

顯微手術教學基地

MicroSurgery Training Center

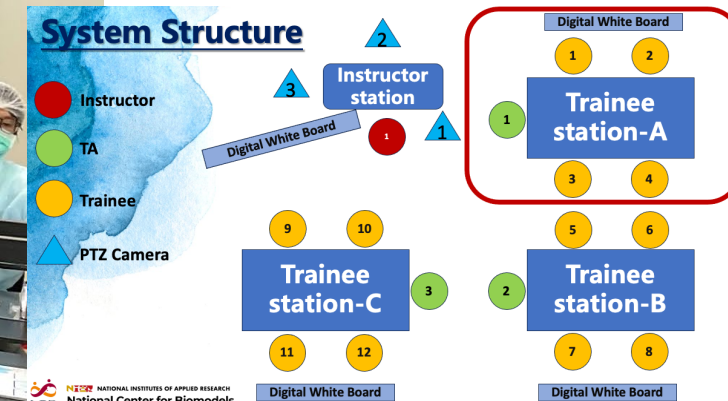


NIAR NATIONAL INSTITUTES OF APPLIED RESEARCH
National Center for Biomodels



教室配置(12人)

- 一人一機
- 大中小螢幕



高齡共病 Comorbidity

疾病模式動物

自然老化
三高
腫瘤
腎臟病
神經退化

共病模式

高階顯微手術

缺血性中風(MCAO)
慢性心衰竭(TAC)
心肌梗塞(LAD)
其他客製化手術

Wild type



ApoE^{em1Narl}



一般
飲食



高
脂
飲食



圖1 C57BL/6 *ApoE^{em1Narl}/Narl* 基因剔除高脂動物模式，與 wt 比較，冠狀動脈可見明顯堵塞，以及血清中充滿脂肪微粒。

⊕ 共病模式 ⊕

高
血
脂

+

中
風

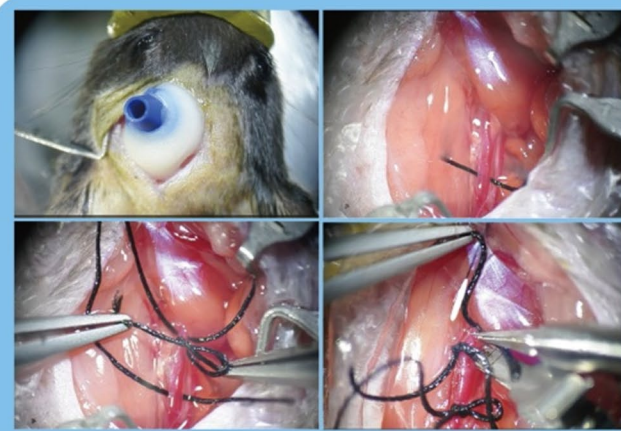


圖2 小鼠中腦動脈栓塞模式-Middle Cerebral Artery Occlusion (MCAO)。在血管內以線栓堵塞中腦動脈，造成可再灌流之腦組織局部梗塞，來模擬人類缺血性中風之病程。

i New Approach Methodologies (NAMs)

新穎測試方法 取代動物實驗

利用體外試驗(in vitro)、電腦建模(in silico)、化學測試(in chemico)等方法，整合與取代動物試驗(in vivo)，提升預測準確性、減少動物使用。





3R 學習履歷平台

3R Portfolio

On-line Training Courses Certifications

進入 3R 學習履歷平台註冊、閱讀緒論並完成個人設定, 開始累積學習履歷

- 動物實驗歷史、演進與新趨勢
- 動物實驗繼續教育課程模組
- 動物實驗專業職能證照考試

※ 點選瞭解各主題之核心課綱



法規倫理



替代科技



動物照護



試驗操作技術



動物實驗管理



動物設施運作



教學替代



專科獸醫



動物照護
生物 & 生理學

鳥禽類生物及生理學

動物實驗 3R 科學埕

免費

詳細資訊



專科獸醫
實驗動物醫學

實驗兔、天竺鼠與倉鼠常見疾病

動物實驗 3R 科學埕

免費

詳細資訊



動物照護
生物 & 生理學

實驗兔生物、生理及行為學

動物實驗 3R 科學埕

免費

詳細資訊



動物照護
生物 & 生理學

實驗倉鼠與天竺鼠之生物、生理及行為學

動物實驗 3R 科學埕

免費

詳細資訊



專科獸醫
獸醫照護
人道介入

啮齒類實驗動物之麻醉與疼痛管理

動物實驗 3R 科學埕

免費

詳細資訊



專科獸醫
實驗動物醫學

啮齒類實驗動物常見疾病與人畜共通傳染病

動物實驗 3R 科學埕

免費

詳細資訊



專科獸醫
實驗動物醫學

實驗大小鼠常見疾病

動物實驗 3R 科學埕



動物照護
生物 & 生理學

實驗大小鼠解剖生理與研究應用

動物實驗 3R 科學埕



動物照護
生物 & 生理學

實驗大小鼠生物、生理及行為學

動物實驗 3R 科學埕

臺灣臨床前試驗聯盟 T.CROSS

Taiwan Contract Research One-Stop Service · T.CROSS



Bridging Preclinical Excellence in Taiwan

Connecting global innovation with Taiwan's world-class research capabilities.



One-Stop Solutions for Preclinical Services

Streamlining drug development journey through a single, integrated entry point.

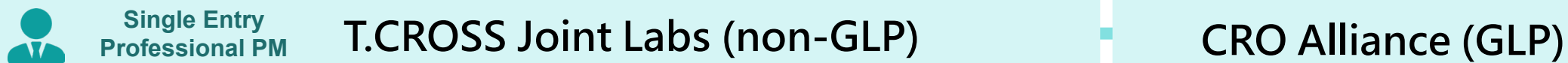
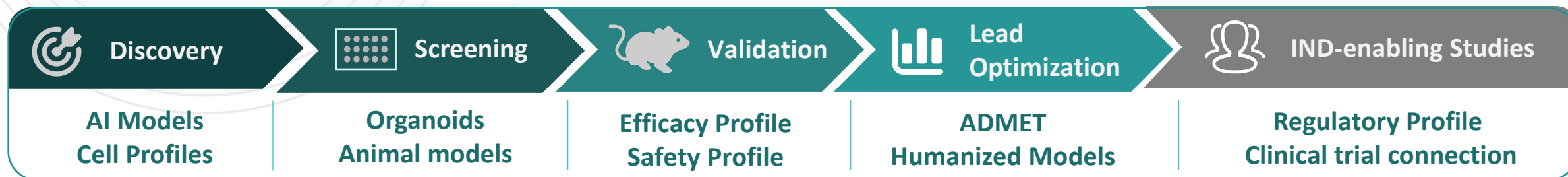


Multimodality Disease Modeling Technologies

Leveraging diverse, cutting-edge platforms to simulate complex human pathologies accurately

T.CROSS Services

Streamlining drug development journey through a single, integrated entry point



Resources

- Genetic Engineered Models
- Patient-derived Xenograft
- Patient-derived Organoids



In vitro Platforms

- Cell-line based drug screening
- Organoid based drug screening
- Organ-on-chip models for drug-induced toxicity
- Organ-on-chip models for gene therapy



Animal Models

- Humanized models (tumor, microbiota, immune)
- Disease models (cancer, auto-immune, MASH, and others)
- Large animal models for cell therapy

國家生物模式中心

生醫研究的造夢者



業務專案經理 林孟鋒

✉ : mflin@niar.org.tw

☎ : 06-507-6142



Thank You