TMU-Research Center of Urology and Kidney

Monthly Meeting

Times：**2023/5/26(Friday) 11:00-12:00**

Google meet link： https://meet.google.com/ruh-wchr-uab

Meeting Chairperson：Mai-Szu Wu

Participant：

【TMUH】Ming-Che Liu、Yao-Chou Tsai、Shauh-Der Yeh、Chien-Chih Wu、Hsiao-Yu Lin、Jeng-Cheng Wu、Ching-Hsin Chang、Wei-Chieh Chen、Fang-Yu Ku、Shih-Hsiu Lo、Te-Chao Fang、Hsi-Hsien Chen、Yen-Chung Lin、Yueh-Lin Wu、Chih-Chin Kao、Ching-Yi Chen、Shu-Ching Yeh、TING-EN TAI

【WFH】Yu-Ching Wen、Liang-Ming Lee、Ke-Hsun Lin、Yung-Wei Lin、Chi-Hao Hsiao、Syuan-Hao Syu、Chung-Howe Lai、Chih-Chen Hsu、Tso-Hsiao Chen、Yuh-Mou Sue、Chung-Yi Cheng、Chung-Te Liu、Yun-Hong Yang、Ming-Che Lee、Cho-Hsing Chung

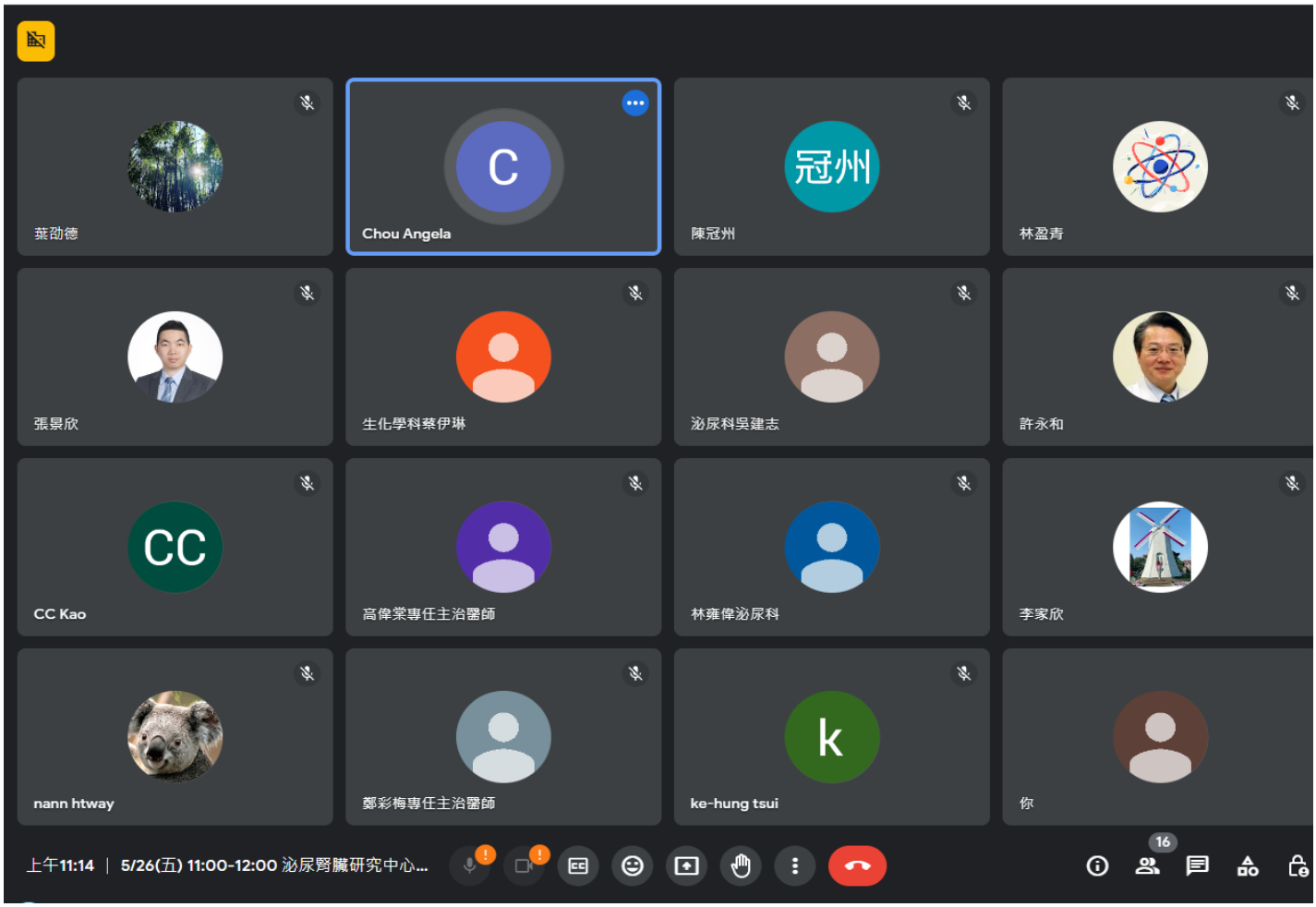
【SHH】Mai-Szu Wu、Chia-Chang Wu、Chia-Hung Liu、Yi-Te Chiang、Chia-Da Lin、Kai-Yi Tzou、Wei-Tang Kao、Su-Wei Hu、Wen-Ling Wu、Mei-Yi Wu、Lie-Yee Hung、Cai-Mei Zheng、I-Jen Chiu、Yu-Wei Chen、Chia-Te Liao、Cheng-Hsien Chen、Hui-Wen Chiu、Po-Han Yu

【SKMH】Yung-Ho Hsu、Chu-Lin Chou

Chief：Chien-Huang Lin (President, TMU)、Yen-Hua Huang (Dean, Research and Development, TMU)、Chih-Cheng Hsu (Professor, NHRI)、Ke-Hung Tsui (Vice President, SHH)

Agenda：1. Urology Innovation Technology and Surgical Team

2. Severe kidney disease team



臺北醫學大學
TAIPEI MEDICAL UNIVERSITY

泌尿創新技術與手術團隊

主題 Rezūm
Water Vapor Therapy

報告人：周安琪醫師

112.05.26

Prostatic Urethral Lift (PUL)

33. PUL should be considered as a treatment option for patients with LUTS/BPH provided prostate volume 30-80cc and verified absence of an obstructive middle lobe. (Moderate Recommendation; Evidence Level: Grade C)

34. PUL may be offered as a treatment option to eligible patients who desire preservation of erectile and ejaculatory function. (Conditional Recommendation; Evidence Level: Grade C)

Transurethral Microwave Therapy (TUMT)

35. TUMT may be offered as a treatment option to patients with LUTS/BPH. (Conditional Recommendation; Evidence Level: Grade C)

Water Vapor Thermal Therapy (WVTT)

36. WVTT should be considered as a treatment option for patients with LUTS/BPH provided prostate volume 30-80cc. (Moderate Recommendation; Evidence Level: Grade C)

37. WVTT may be offered as a treatment option to eligible patients who desire preservation of erectile and ejaculatory function. (Conditional Recommendation; Evidence Level: Grade C)

Transurethral Needle Ablation (TUNA)

38. TUNA is not recommended for the treatment of LUTS/BPH. (Expert Opinion)

What Makes Rezūm™ Water Vapor Therapy Unique?

Boston Scientific

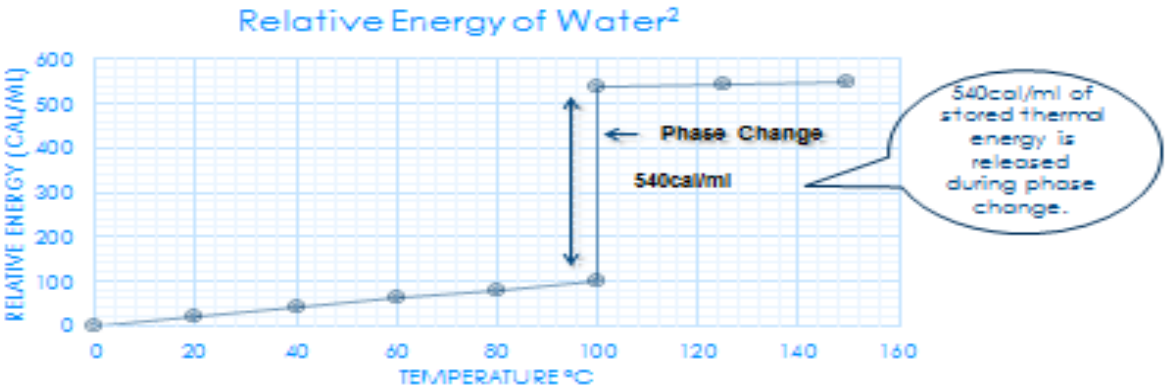
Powered by Convective Water Vapor Energy, Rezūm energy to effectively treat lower urinary tract symptoms secondary is a fundamentally different way of applying thermal energy to benign prostatic hyperplasia (BPH).

The THREE key features that make Rezūm different from all other BPH therapies currently available are:

1. **Unique Heat Source** – Water Vapor Energy
2. **Unique Heat Transfer Mechanism** – Convection
3. **Uniquely Uses Prostate Anatomy** – Contained

Unique Heat Source - Water Vapor Energy[1,2]

Boston Scientific



Rezūm™ uses the stored thermal energy in water vapor as the unique heat source to ablate prostate tissue.

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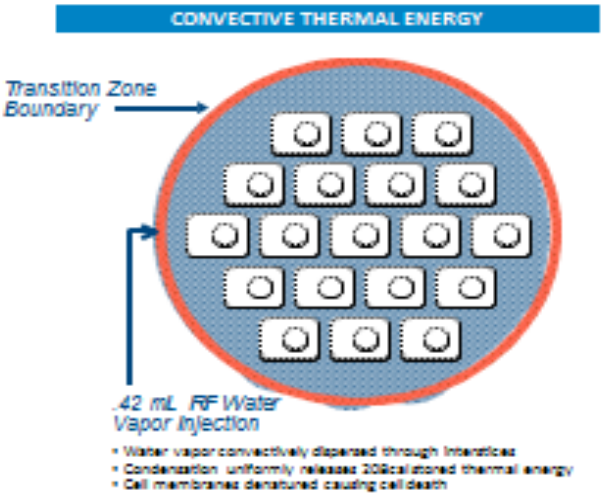
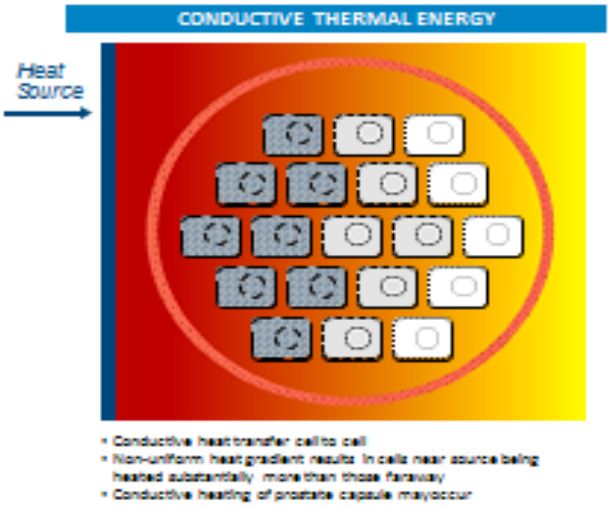
Unique Heat Transfer – Convection vs. Conduction[1-4]

Boston Scientific





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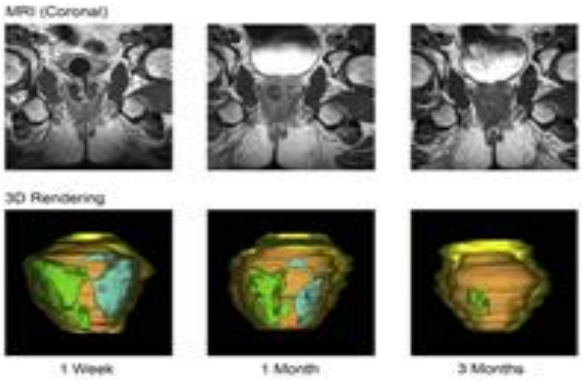
Significant resolution and volume reduction[12]

Boston Scientific

Thermal lesion caused by convective water vapor energy in a 39-cm³



Outcome after convective water vapor therapy

Variable	Time	N	Mean (Range)	Mean (Range) Δ	Mean % Δ
Whole prostate volume (cm^3)	1 wk	44	61.3 (20.4-133.2)		
	1 mo	42	52.7 (15.4-118.8)	−8.5	−13.9
	3 mo	41	47.0 (15.3-115.4)	−14.2	−23.2
	6 mo	40	43.5 (16.0-110.8)	−17.7	−28.9
Transition zone volume (cm^3)	1 wk	44	36.3 (9.1-87.8)		
	1 mo	42	29.8 (8.4-80.3)	−6.5	−17.9
	3 mo	41	25.1 (6.8-79.4)	−11.2	−30.9
	6 mo	40	22.9 (6.4-76.3)	−13.4	−36.0
Gadolinium defect lesion volume (cm^3)	1 wk	44	8.2 (0.5-24.0)		
	1 mo	42	3.4 (0.3-11.3)	−4.8	−58.5
	3 mo	41	0.7 (0.0-2.8)	−7.5	−91.5
	6 mo	40	0.4 (0.0-3.7)	−7.8	−95.1

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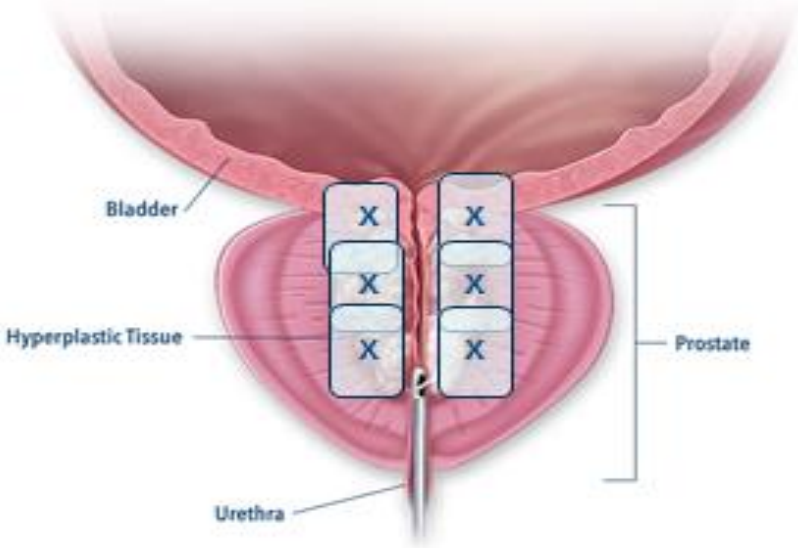
Objective of the Rezūm Procedure[10]

Boston Scientific

Create a thermal lesion the length of the prostatic urethra, along each lateral lobe.

Accomplished by:

- **Creating contiguous, overlapping lesions** between the bladder neck and proximal to verumontanum, ~1 cm apart.
- **Targeting the bulk** of the adenoma.
- **Following the natural slope** of the urethra.



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3/3 Rezum

ID	y/o	TRS	Anes	OP time	
06764834	79	52.45ml	spine	6 min	3/10 RU 22.49ml, 5/19 RU 5.21ml
19413862,	77	62.8ml	mask	5 min	3/3 Qmax 8.3ml/s, 3/14 RU 82.69ml
08224804	53	52.5ml	IVG	3 min	3/2 Qmax 19.7ml/s, 3/9 RU 17.07ml, 3/14 Qmax 18ml/s, 3/14 RU 16.76ml

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Rezūm System Pivotal Study[7]

Boston Scientific

Objective: To evaluate the safety and efficacy of the Rezūm System and assess its effect on urinary symptoms secondary to benign prostatic hyperplasia (BPH). Primary Endpoint: safety and efficacy.

Study Design: Level I - RCT 2:1 thermal therapy vs. control (rigid cysto); 15 U.S. sites; 197 subjects enrolled (136 thermal therapy, 61 control)

Main Outcome Measures: IPSS, QoL, Qmax, IIEF-EF, MSHQ-Function, MSHQ-Bother, Minimal Clinically Important Difference (MCID) in ED

Study Protocol: Subjects ≥ 50 yrs old; 30-80 cm^3 prostate; IPSS ≥ 13; Qmax 5 ≤ 15mL/s; daily dose of LUTS or ED meds prohibited; median lobes not excluded

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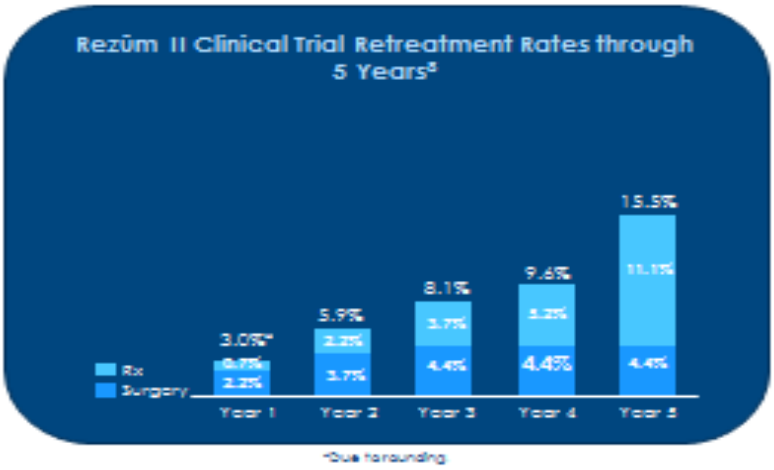
Rezūm™ Treatment Remains Durable Through 5 Years



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Key Takeaways[8]

- Proven durability for treatment of BPH
  - 4.4% surgical retreatment rate through 5 years
  - 11.1% medical retreatment rate through 5 years
- Significant, sustained improvement of lower urinary tract symptoms (LUTS) and quality of life for patients with BPH from baseline
  - IPSS 48% improvement through 5 years
  - Qmax 44% improvement through 5 years
  - IPSS QOL 45% improvement through 5 years
- Able to treat prostates with hyperplasia of the lateral lobes, central zone and/or a middle lobe
- Positive safety profile
- Preserves sexual function

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Indications & Contraindications[10]

Boston Scientific

Indications:

- The Rezūm System is intended to relieve symptoms, obstructions, and reduce prostate tissue associated with benign prostatic hyperplasia (BPH)
- Prostate volume ≥ 30 cm^3
- Prostate with hyperplasia of the central zone and/or a median lobe

Contraindications:

- Urinary sphincter implant
- Penile prosthesis
- Active urinary tract infection

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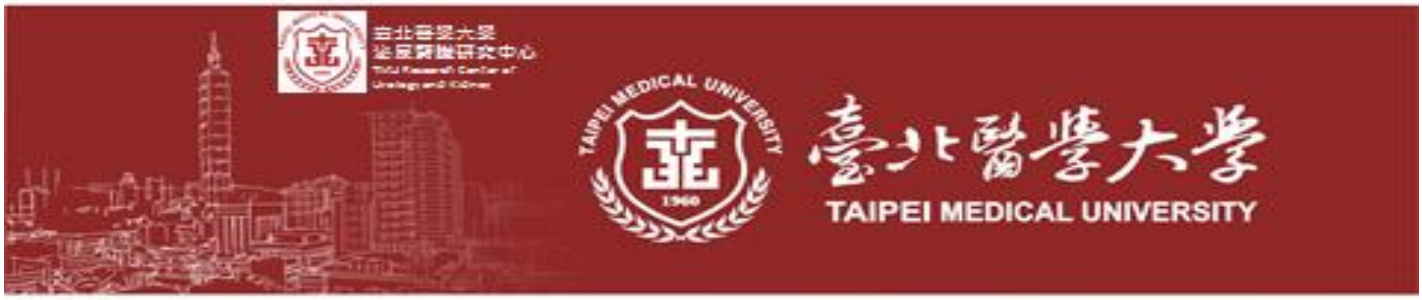


重症腎病團隊

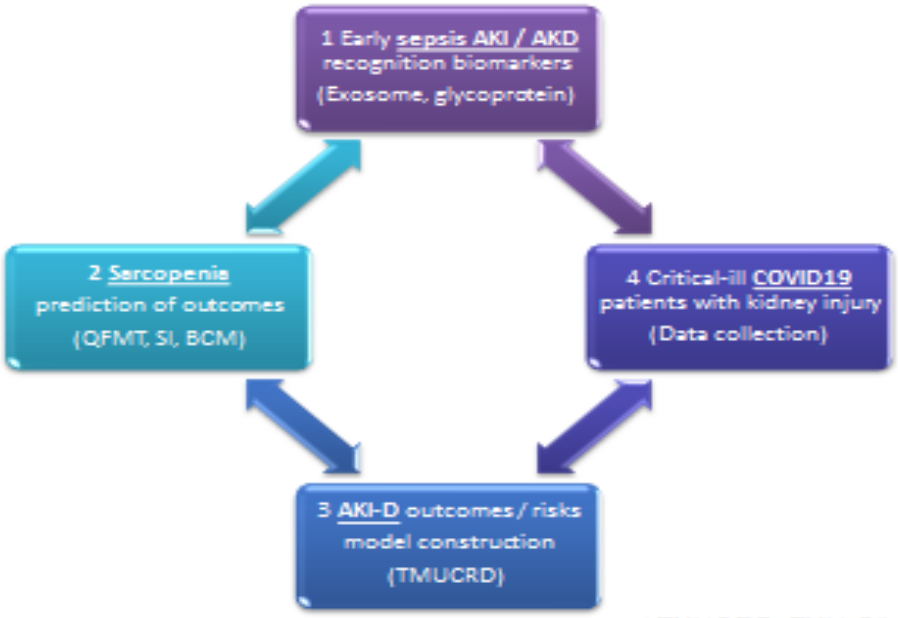
報告人：高治圻

112.05.26

組織架構

醫院	姓名	個人經歷	專長
北醫	高治圻 	腎臟內科主治醫師 急重症透析	Clinical nephrology、Critical care
	陳靜怡 	加護病房專責主治醫師 腎臟內科主治醫師	Clinical nephrology、Critical care
萬芳	劉崇德 	腎臟內科主治醫師	Clinical nephrology、Hemodialysis、Vascular access
	楊韻紅 	腎臟內科主治醫師 急重症透析	Critical-care nephrology
雙和	洪麗玉 	腎臟內科主治醫師 急重症透析	Clinical nephrology、Critical care
	邱怡仁 	腎臟內科主治醫師 加護病房專責主治醫師 美國BWH研修醫師	Critical-care dialysis, Multiple organ support dialysis

Critical-ill patients



* TMUCRD: TMU-Clinical Research Database

Project 1 ongoing

Early AKI / AKD recognition biomarker

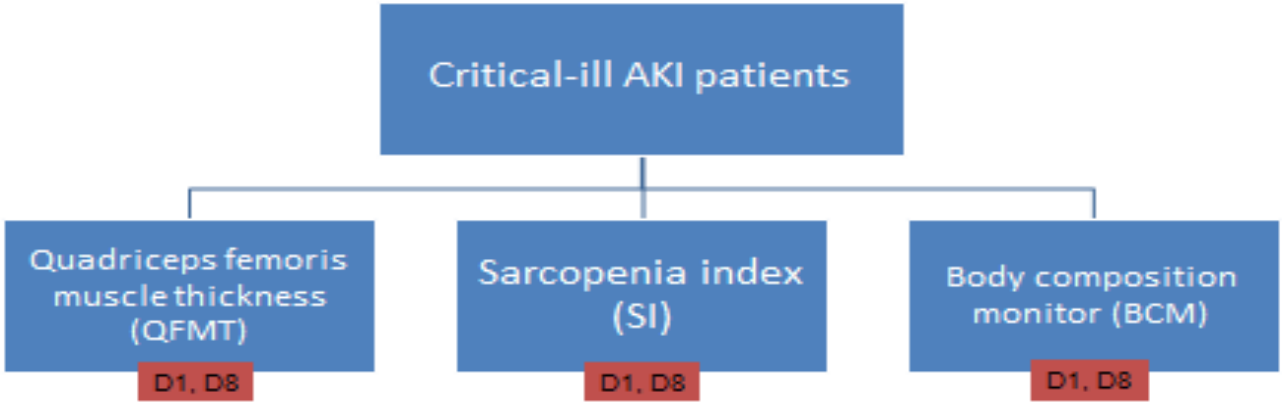
Patient enrollment IRB 110/8/20已通過→到112/05/25為止、已收案54個病人

We enroll critical-ill patients aged 20-80 years with the diagnosis of sepsis, without a history of malignancy, ESRD and organ transplantation. Sepsis is defined by 1. microbiological proof (cultures) or 2. suspicion of sepsis + >2 SOFA score. Patients will be divided into 2 groups, 1: septic AKI (n=100), 2: septic non-AKI (n=100)

Plasma and **Urine** samples are collected on Day 1, Day 4, and Day 8.

Project 2 IRB審查中

Sarcopenia change in Critical-ill AKI patients

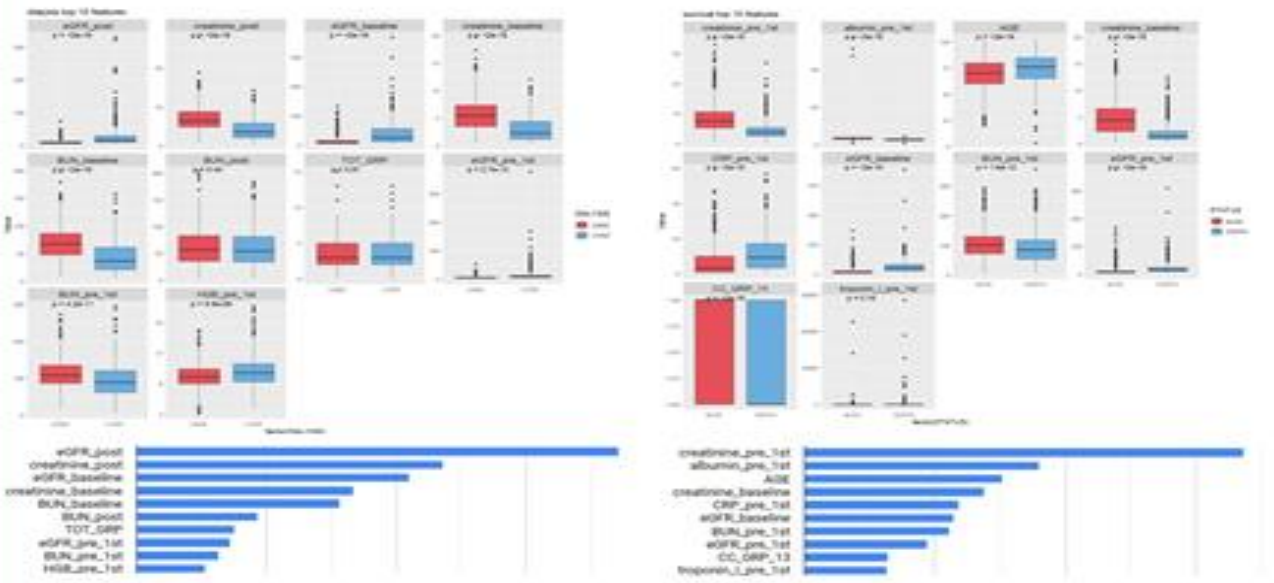


* Gold standard for muscle mass: paraspinal muscle surface area at L4 (CTMSA)

Construct sarcopenia model to predict patients' outcomes

Project 3 Analysis

Machine learning model to predict outcomes of AKI-requiring dialysis patients



Project 4 idea

Outcomes of severe COVID19 infection with renal failure

Collect data in 3 hospitals

- P: severe COVID19 infection with renal failure
- I: CVVH
- C: SLEDD
- O: all-cause mortality, renal outcomes

生化學科蔡伊琳老師

- 學歷：
  - 台灣大學藥學系
  - 台灣大學藥學研究所博士
  - 台灣大學基因體醫學研究中心博士後研究員
  - 中研院基因體研究中心博士後研究員
- **現職：台北醫學大學醫學系生化學科副教授**
- **專長：藥物分析，分析化學，代謝體學，蛋白質體學**
- 得獎：107年度科技部研究創作獎，110年度校級優良教師
- **每年獲得國科會計畫，已發表約50篇SCI paper**

10

臺北醫學大學
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Mass spectrometry-based methods and Clinical application
質譜分析與臨床疾病應用

生物化學暨細胞分子生物學科
醫學科學研究所
Dr. Isabel I-Lin Tsai 蔡伊琳

1

Outline

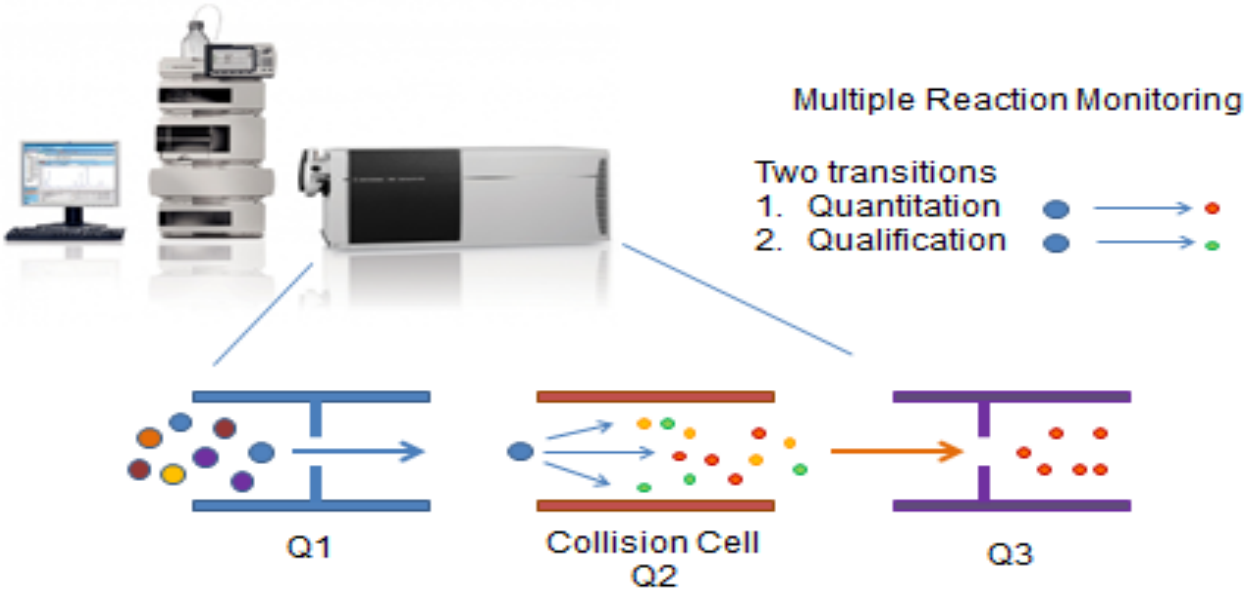
- **Mass spectrometry-based methods**
- **Acute kidney Injury (AKI):**

  Dissect the components of extracellular vesicles for biomarker discovery
- **Systems Serology:**

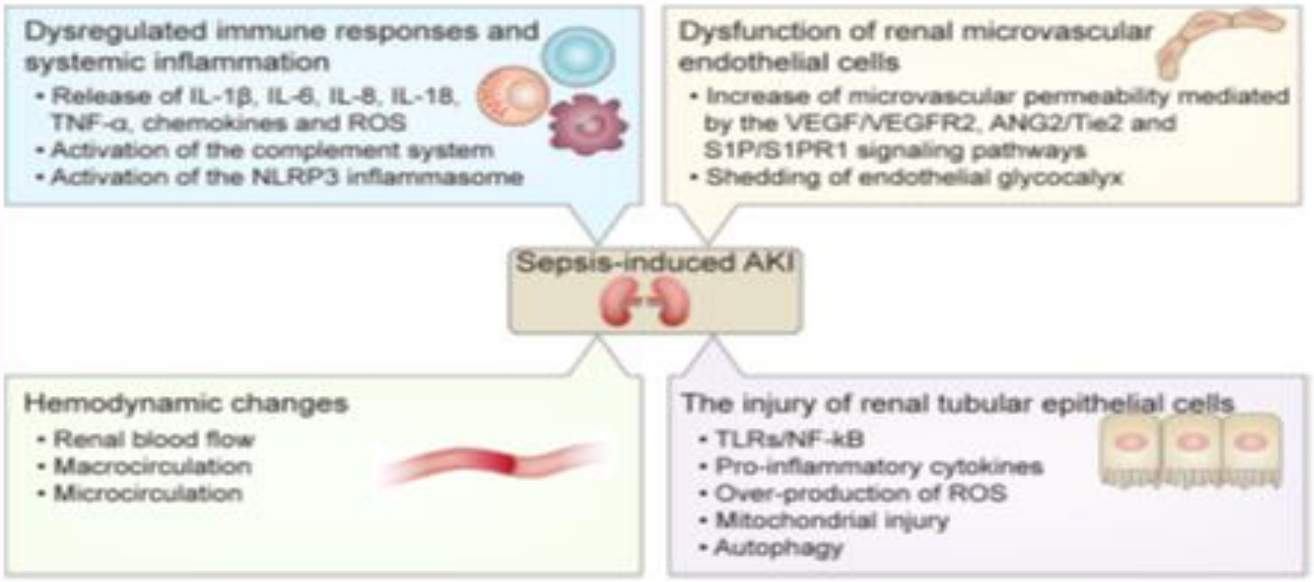
  Discover the biophysical properties and biological functions of antibody

UHPLC-MS/MS:

Triple Quadruple and Multiple Reaction Monitoring (MRM)

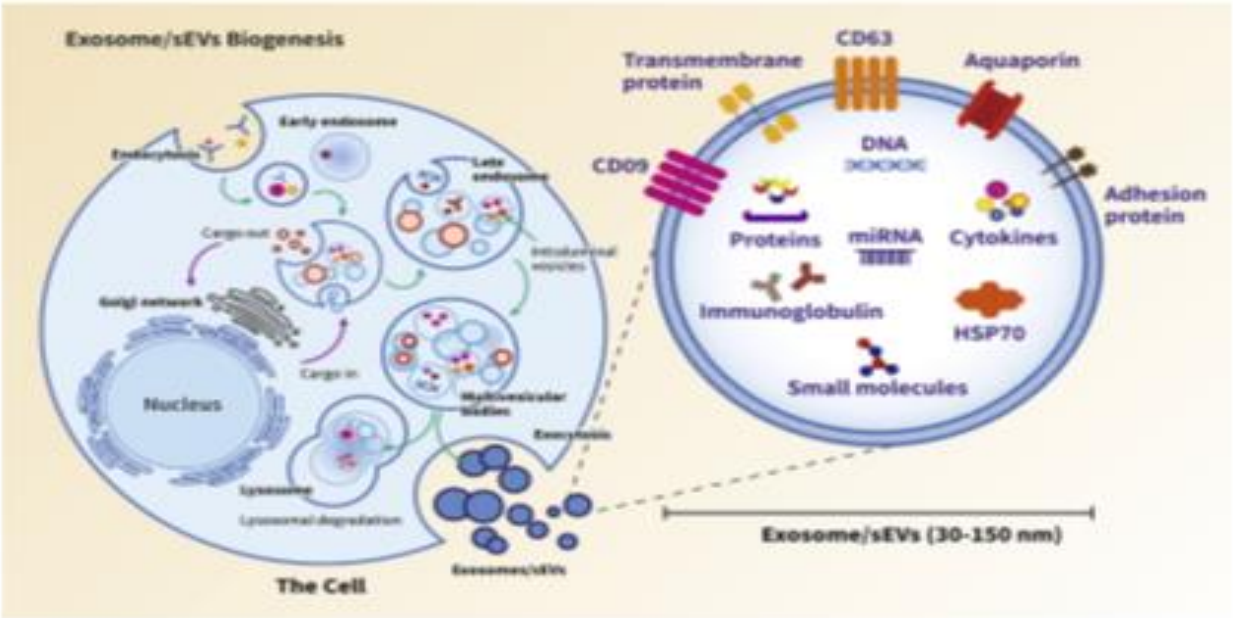


Sepsis-induced AKI



He *et al*. Frontiers in Pharmacology. 2022. 13 : 981578.

Exosomes (small extracellular vesicles)



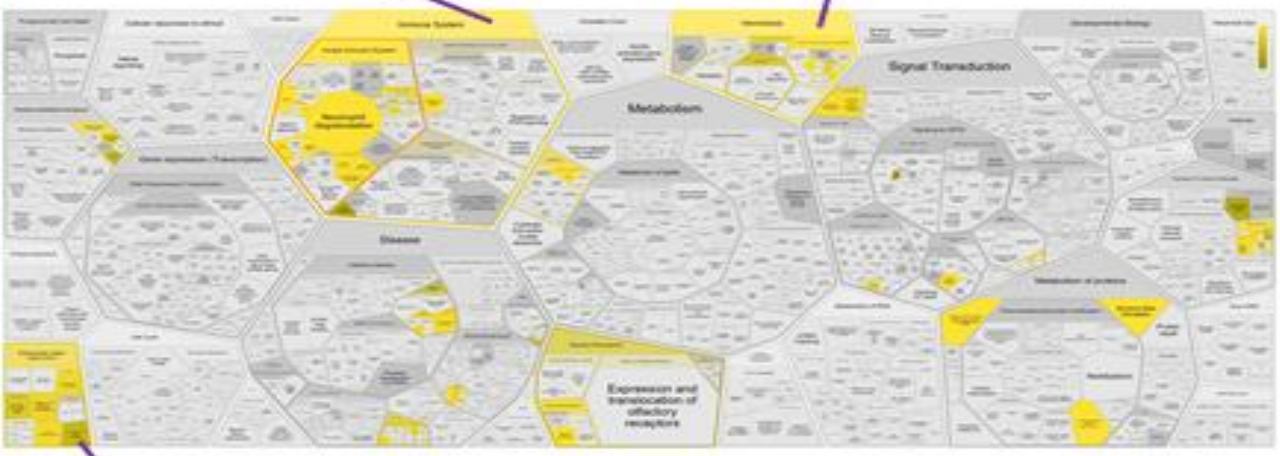
Ageng *et al*. JFDA. 2022. 30(2):3.

Pathway analysis

Reactome: Input 50 proteins reported from PEAKS software (fold change >1.3)

Immune System: Neutrophil degranulation

Hemostasis



Extracellular Matrix Organization

Clues from the literature

Lysozyme, a mediator of sepsis that deposits in the systemic vasculature and kidney as a possible mechanism of acute organ dysfunction

Gotes *et al.* Shock, 41. (2014)

Urinary angiotensinogen predicts adverse outcomes among acute kidney injury patients in the intensive care unit

Alge *et al.* Critical Care, 17. (2013)

SAA1 and SAA2 have been reported as biomarkers in S-AKI animal model.

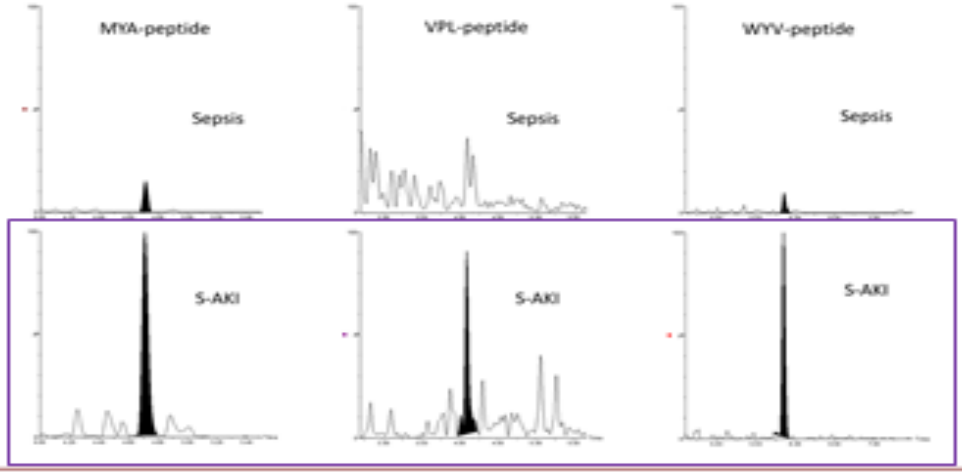
Lin *et al.* Mol Cell Proteomics, 17. (2020)

What is the next step?

Target biomarker analysis

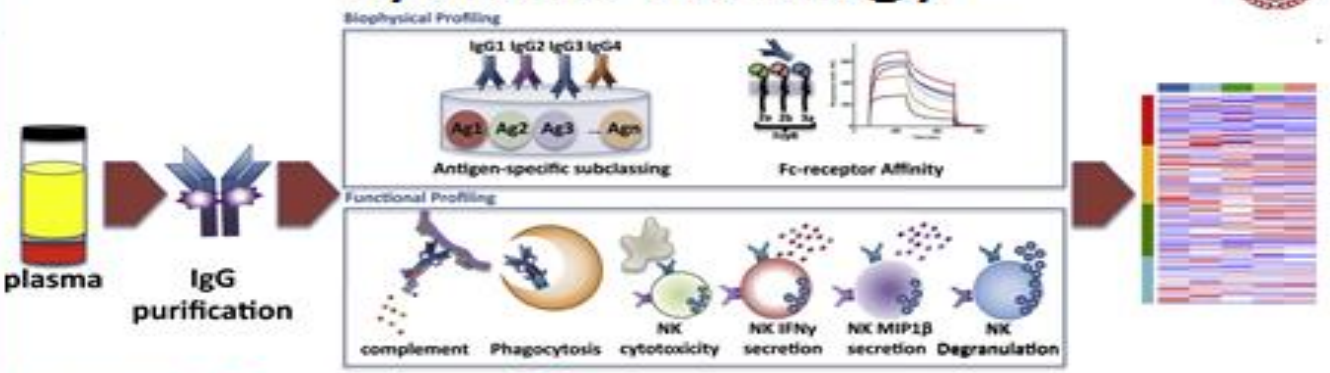
Multi-biomarkers analysis
Absolute quantification?
Screening criteria?

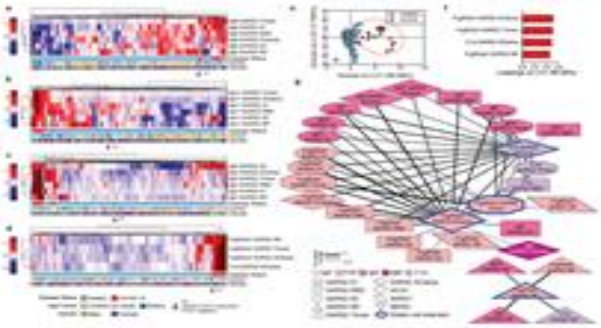
NGAL: Neutrophil gelatinase-associated lipocalin



Urine-EVs

Systems Serology





Galit Alter

Ragon Institute
MASS GENERAL | MIT | HARVARD

Amy W. Chung *et al.* Cell. 2015, 163, p.988-998
Selva *et al.* Nature Communications 2021, **12**: 2037 (2021)

Summary

- We have identified potential protein biomarkers from plasma-EVs for S-AKI. The proteins will be verified in validation set and integrated into targeted analytical method.
- Urine-EVs were purified and prepared for instrumental analysis, and we will compare the results to those identified from plasma-EVs.
- We are building up platforms for systems serology, especially for antibody biological function profiling.

Acknowledgement

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National Science and Technology Council

Thank you!
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