TMU-Research Center of Urology and Kidney

Monthly Meeting

Times：**2023/6/30(Friday) 14:00-15:00**

Google meet link： https://meet.google.com/zmf-qhgu-pwd

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. Kidney Transplant Team

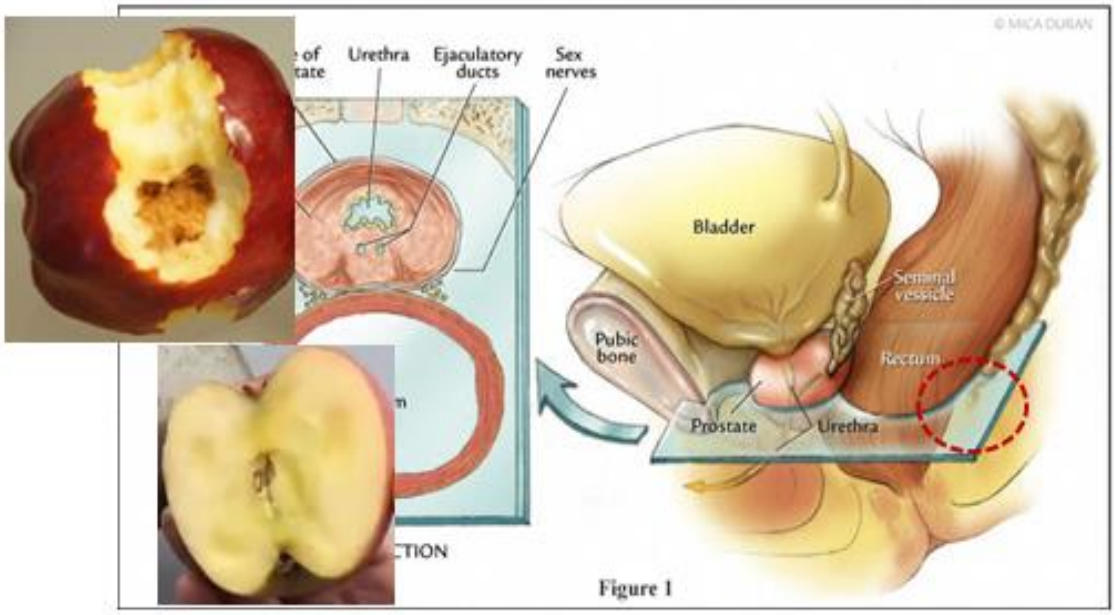
2. Urinary and Kidney Cancer Team

臺北醫學大學
TAIPEI MEDICAL UNIVERSITY

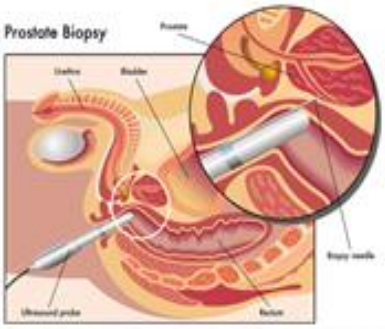
核磁共振與超音波影像融合
攝護腺精準切片

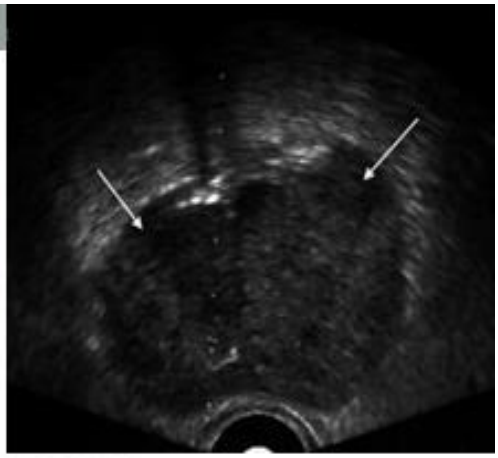
雙和醫院 劉家宏醫師

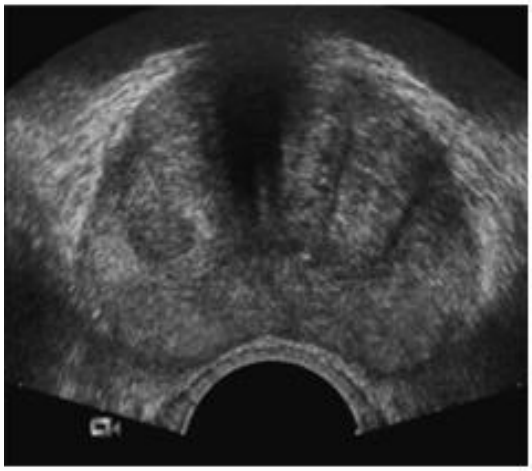
攝護腺的解剖位置

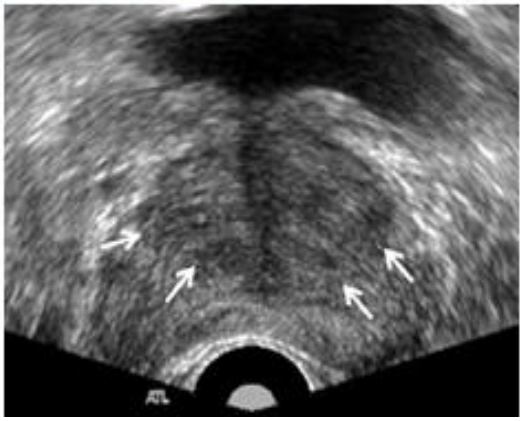


經直腸超音波導引攝護腺切片檢查

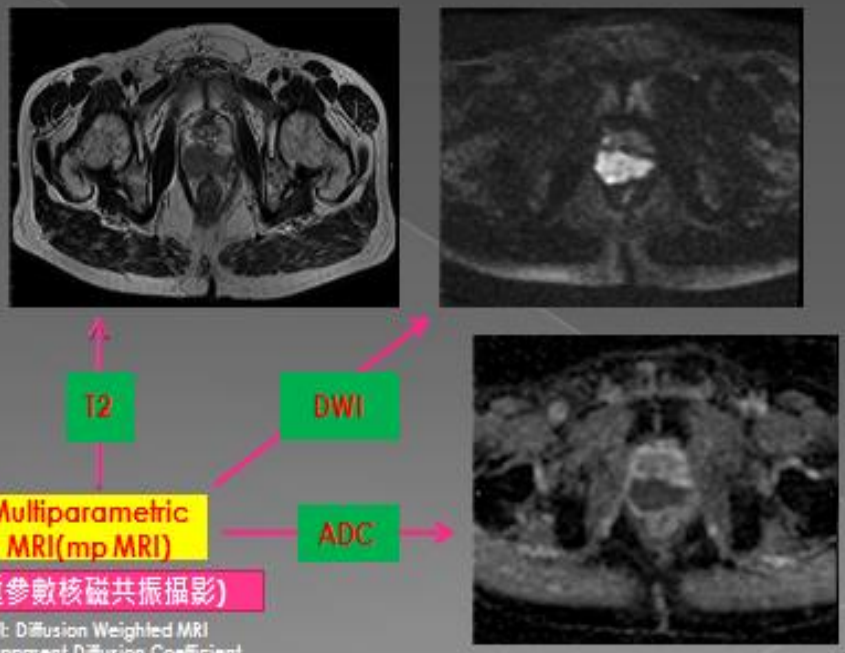








MP-MRI is the combination of multiple MRI sequences to give both anatomical and functional information



PI-RADS
(啪累分數)

PI-RADS v2 scoring system. (Prostate Imaging-Reporting and Data System)

Imaging sequence and score	Description
T2 weighted, PZ	
1	Uniform hyperintense signal intensity (normal)
2	Linear or wedge-shaped hypointensity or diffuse mild hypointensity, usually indistinct margin
3	Heterogeneous signal intensity or non-circumscribed, rounded, moderate hypointensity Includes others that do not qualify as 2, 4, or 5
4	Circumscribed, homogeneous moderate hypointense focus/mass confined to prostate and <1.5 cm in greatest dimension
5	Same as 4 but ≥1.5cm in greatest dimension or definite extraprostatic extension/invasive behavior
T2 weighted, TZ	
1	Homogeneous intermediate signal intensity (normal)
2	Circumscribed hypointense or heterogeneous encapsulated nodule(s) (BPH)
3	Heterogeneous signal intensity with obscured margins Includes others that do not qualify as 2, 4, or 5
4	Lenticular or non-circumscribed, homogeneous, moderately hypointense, and <1.5 cm in greatest dimension
5	Same as 4, but ≥ 1.5cm in greatest dimension or definite extraprostatic extension/invasive behavior
DWI	
1	No abnormality (i.e. normal) on ADC and high b-value DWI
2	Indistinct hypointense on ADC
3	Focal mildly/moderately hypointense on ADC and isointense/mildly hyperintense on high b-value DWI.
4	Focal markedly hypointense on ADC and markedly hyperintense on high b-value DWI; <1.5cm in greatest dimension
5	Same as 4 but ≥1.5cm in greatest dimension or definite extraprostatic extension/invasive behavior
DCE	
Negative	no early enhancement, diffuse enhancement not corresponding to a focal finding on T2 and/or DWI, or focal enhancement corresponding to a lesion demonstrating features of BPH on T2WI
Positive	focal, and earlier than or contemporaneously with enhancement of adjacent normal prostatic tissues, and corresponds to suspicious finding on T2W and/or DWI

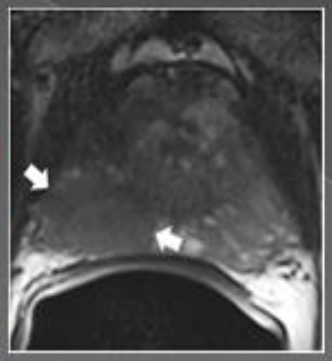
Table 3 MRI lesion-based detection rate of target biopsies

PIRADs V2 score	Significant cancer *n* (%)			Insignificant cancer *n* (%)
5	16/30 (53.3)	3+3	1	1/30 (3.3)
		3+4	9	
		4+3	5	
		8–10	2	
4	22/55 (40%)	3+3	5	5/55 (9.1)
		3+4	14	
		4+3	4	
		8–10	4	
3	0/22 (0)	3+3	2	2/22 (9.1)
		3+4	0	
		4+3	0	
		8–10	0	
Unclassified	2/9 (22.2)	3+3	0	0/9 (0)
		3+4	1	
		4+3	1	
		8–10	0	

Significant cancer = Gleason score > 6

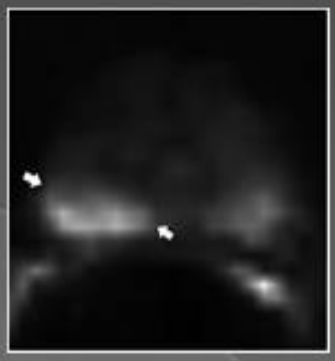
Assigning a PI-RADS 5 score for a lesion in the peripheral zone

(a) Axial T2W image (b) Axial b1400 DWI image (c) Corresponding ADC map (d) Axial DCE image



T2

(a)

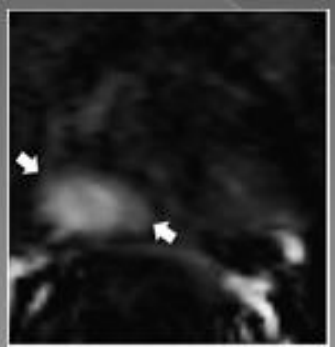


DWI

(b)

ADC

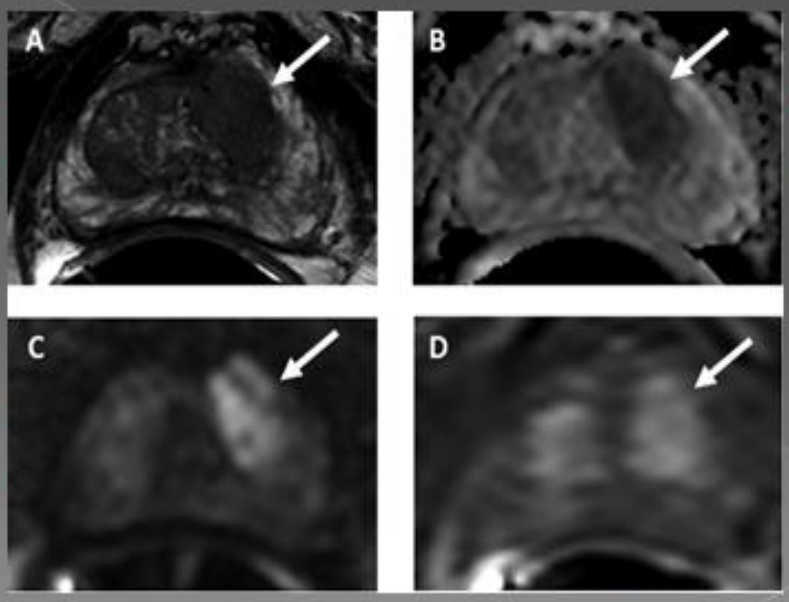
(c)



(d)

Hassanzadeh et al. Abdom Radiol, 2017

An MP MRI scan shows a PI-RADS 5 lesion in the left mid-anterior transition zone (arrow)



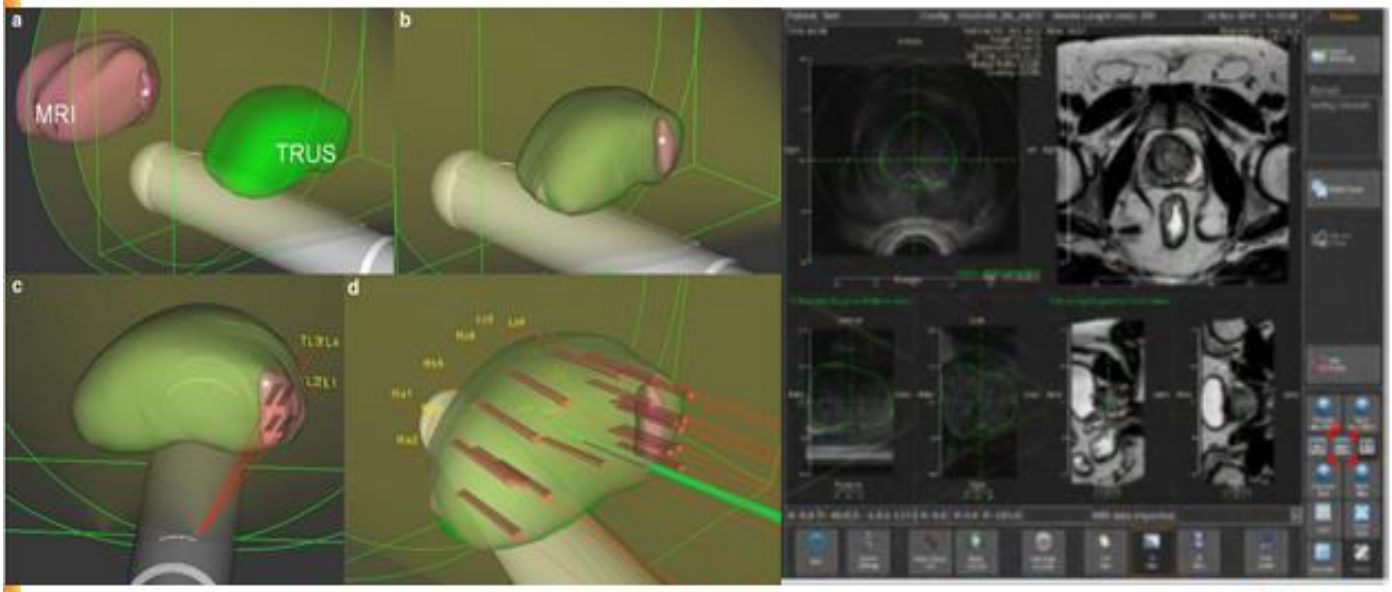
T2

ADC

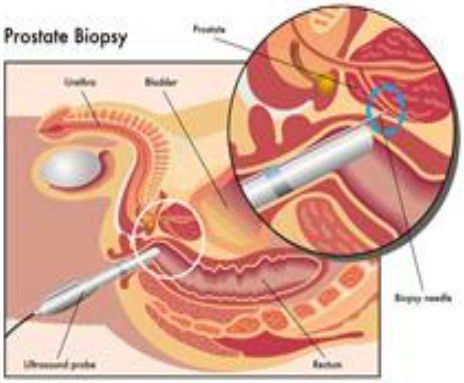
DWI

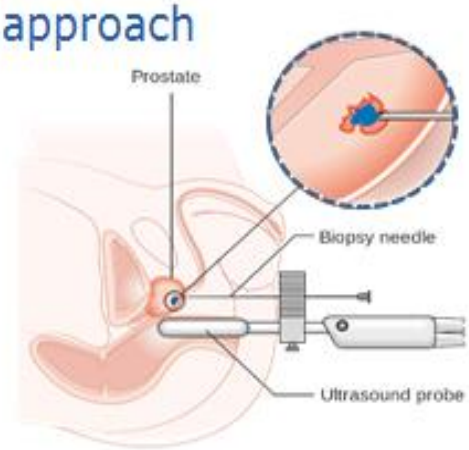
Tosoian et al, Am Soc Clin Oncol Educ Book, 2016

MRI-ultrasound fusion capability



Transrectal and Transperineal approach





Transrectal (經直腸)

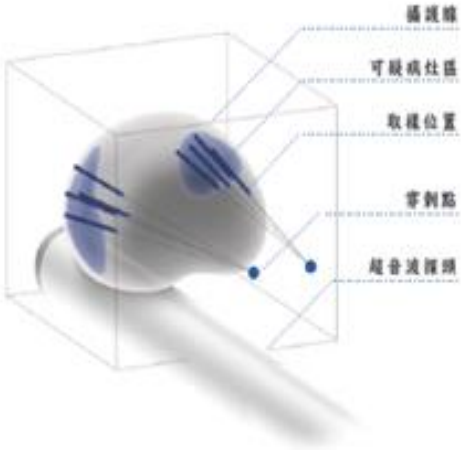
- Most commonly, the transrectal ultrasound-guided (TRUS) prostate biopsy is used.
- The biopsy needle is inserted into the prostate through the rectum wall.

Transperineal (經會陰)

- The biopsy needle is inserted into the prostate through a guidance grid placed against the perineum (skin area between the scrotum and anus)
- **Minimal risk of sepsis or hematuria**

攝護腺採檢的比較

	傳統經直腸穿刺	機器手臂自動導航會陰穿刺
穿刺位置	直腸壁	會陰部（陰囊和肛門中間區域）
操作方式	手動，無法精準定位	電腦導航，精準至1mm
影像	僅使用超音波圖像	MRI+超音波融合
取樣	侷限性高，無法確認實際採檢點。	全攝護腺採檢，可指定採檢點。
傷口數量	多點（取量數量決定）	少至2個點
診斷	僅能做區域判讀，檢出率低。	每個採檢點皆能判讀，提高檢出率
併發症	敗血症：高 血尿：高 尿路感染：低 血便：高	敗血症：低 血尿：低 尿路感染：極低 血便：無



biobot

Introducing the robotic prostate biopsy system - iSR'obot™ Mona Lisa

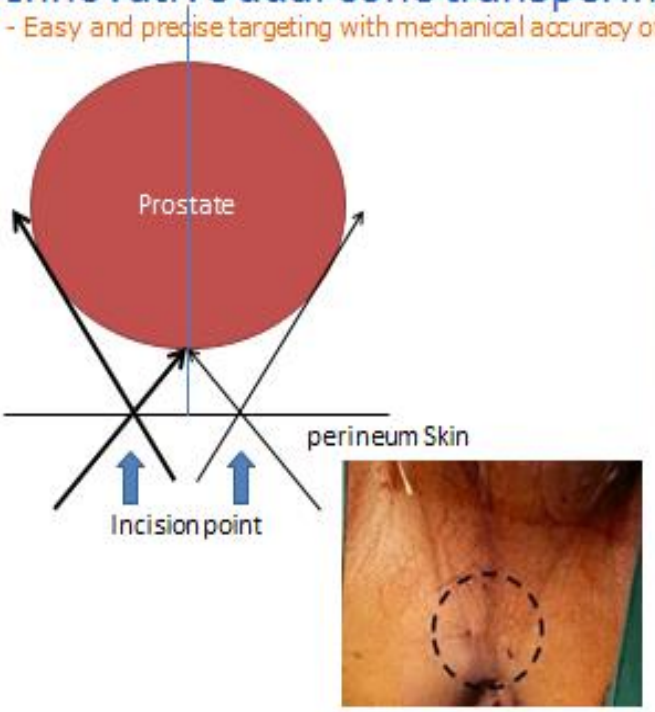
Targeted biopsy with precision and ease, through:

- Innovative dual cone transperineal prostate biopsy
- Auto modeling 3D image
- Robotic biopsy needle positioning and depth control, Prostate stability using unique probe sheath
- MRI-ultrasound fusion capability

DaVinci

Innovative dual cone transperineal prostate biopsy

- Easy and precise targeting with mechanical accuracy of 1.5mm



biobot

Table 1 Detailed biopsy results

Biopsy results (systematic and targeted biopsy)	*n* (%)
Overall detection rate (systematic and targeted biopsy)	34 (61.8)
Overall significant PC (Gleason score ≥7)	29 (85.3)
PC only in systematic biopsy	5 (14.7)
Significant PC only in systematic biopsy	1 (2.9)
Proportion of systematic biopsies with significant PC	4.8%
PC only in targeted biopsy	15 (44.1)
Significant PC in targeted biopsy	15 (44.1)
Proportion of targeted biopsies with significant PC	40.9%
Patients with anterior lesions	9 (26.5)

- 簡單
- 精準
- 安全
- 無疤無痛
- 可重複
- 降低過度治療的風險

Table 2 Detection rate of cancer

	Significant cancer
Overall	44/86 (51.2%)
Target biopsy	35/86 (40.7%)
Exclusively present in random biopsy	9/86 (10.5%)

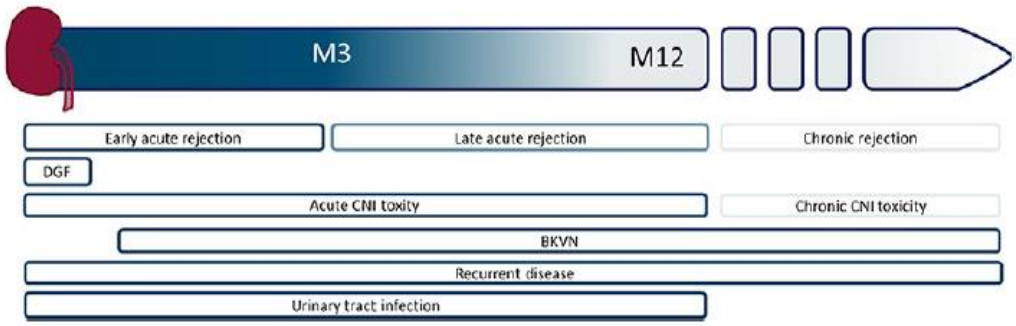
Significant cancer = Gleason score > 6

Immune Profile of Kidney Transplant Patients

馮博皓/吳美儀
雙和醫院 內科部 胸腔內科
雙和醫院 內科部 腎臟內科

2023/06/30

Background

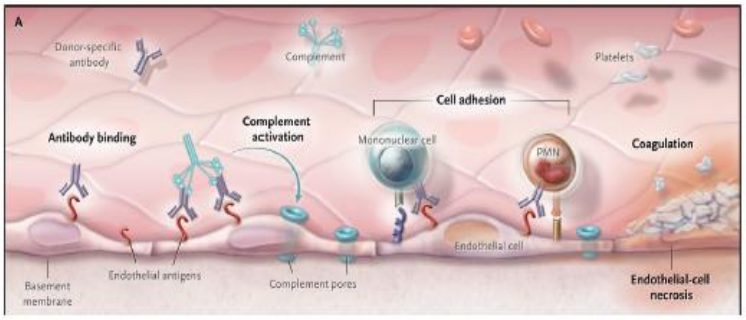


- About **10%** rejection rate in the **first year** after a kidney transplant
- After **5 years** of kidney transplant, **about 80%** patient remain un-dialysis in Taiwan.

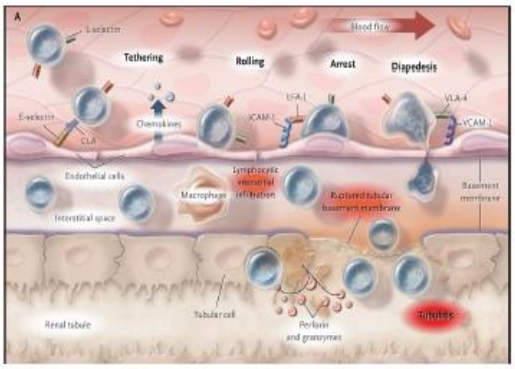
1. Eikmans, M. Frontiers in Medicine 2. 2021 台灣腎病年報

Mechanisms of Cellular mediated kidney rejection

Acute antibody mediated rejection



Acute T cell mediated rejection



Whether the immune profile is different between graft rejection and non-rejection?

Nankivell, NEJM 2010

Complex mechanisms of kidney graft loss

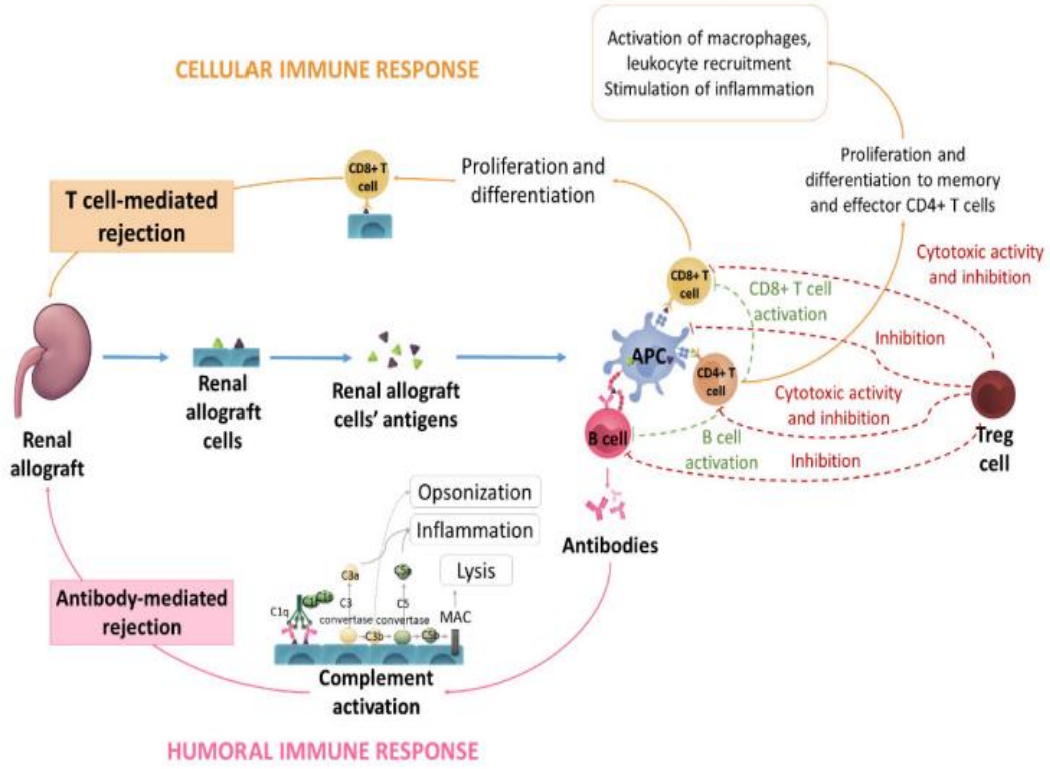
Traditional CV risk factors for KT recipients	Non-Traditional CV risk factors for KT recipients
Hypertension Dyslipidemia Pre and post transplant diabetes Obesity Smoking Familial history of CVD	Immunosuppressive drugs Rejection episodes Arterial stiffness Endothelial dysfunction Arteriovenous dialysis access Persistent inflammation

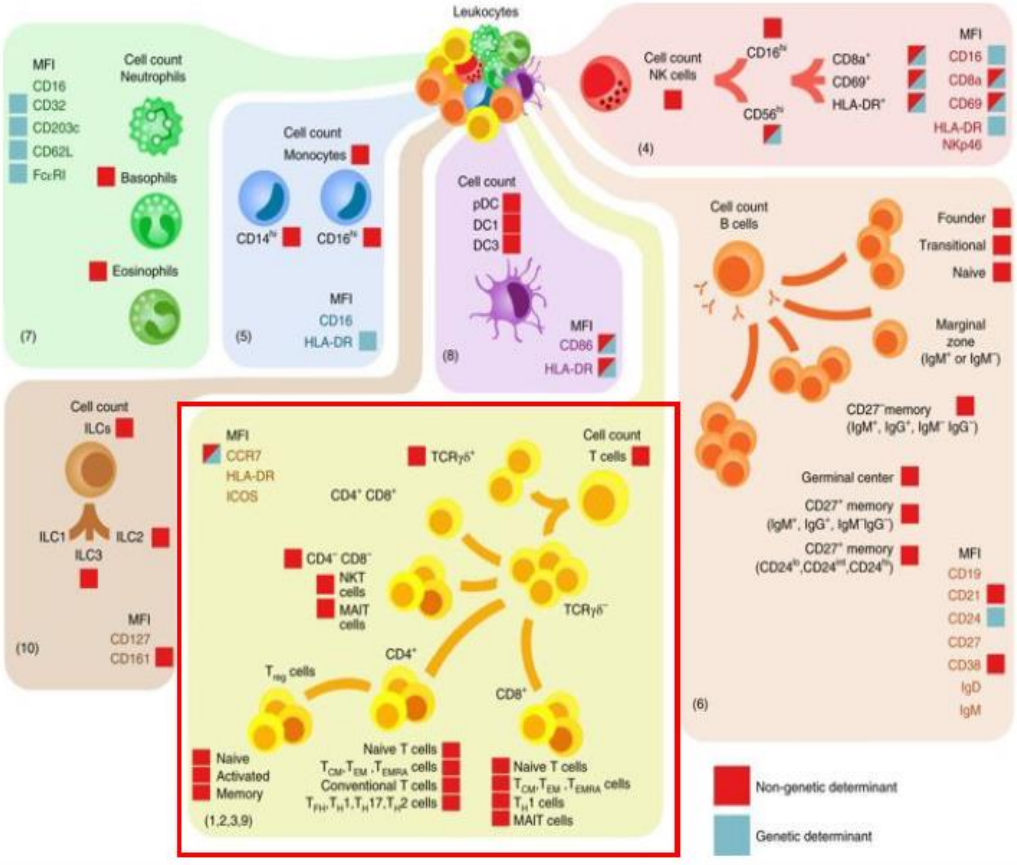
Kidney dysfunction and graft loss

Immunological factors	High rate of medical events (CV events and infections leading to decreased GFR)	Non-traditional risk factors
Antibody-mediated rejection acute/chronic T-cell mediated rejection acute/chronic Microvascular inflammation without antibodies	Donor quality Ischemia reperfusion injury CNI toxicity Viral nephropathies (PVAN, CMV) Urologic/vascular complications (thrombosis, leaks, hemorrhage) and perioperative events Recurrent disease	CKD-MBD after transplantation Immunosuppressive drug variability Hypomagnesemia Metabolic acidosis Glomerular ischemia

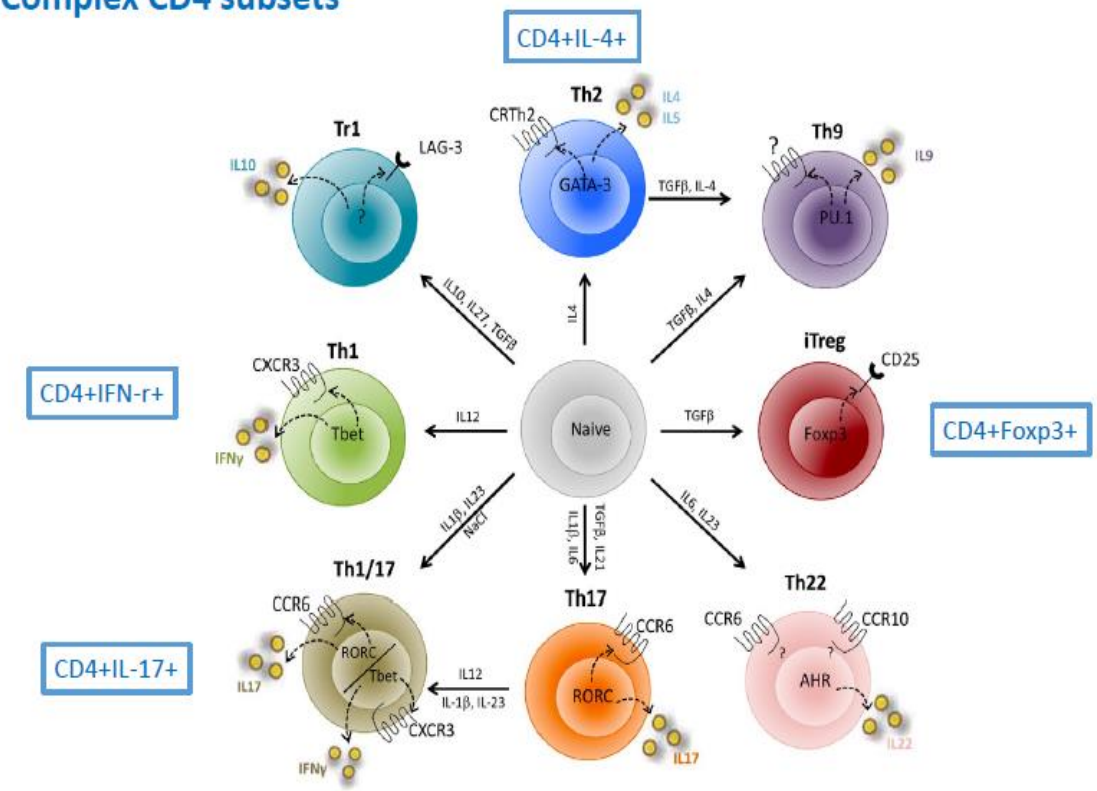
Journal of clinical medicine 2023

Complex immune systems involved in kidney transplant rejection





Complex CD4 subsets



Geginat, J. Seminars in Immunology 2013

Hypothesis

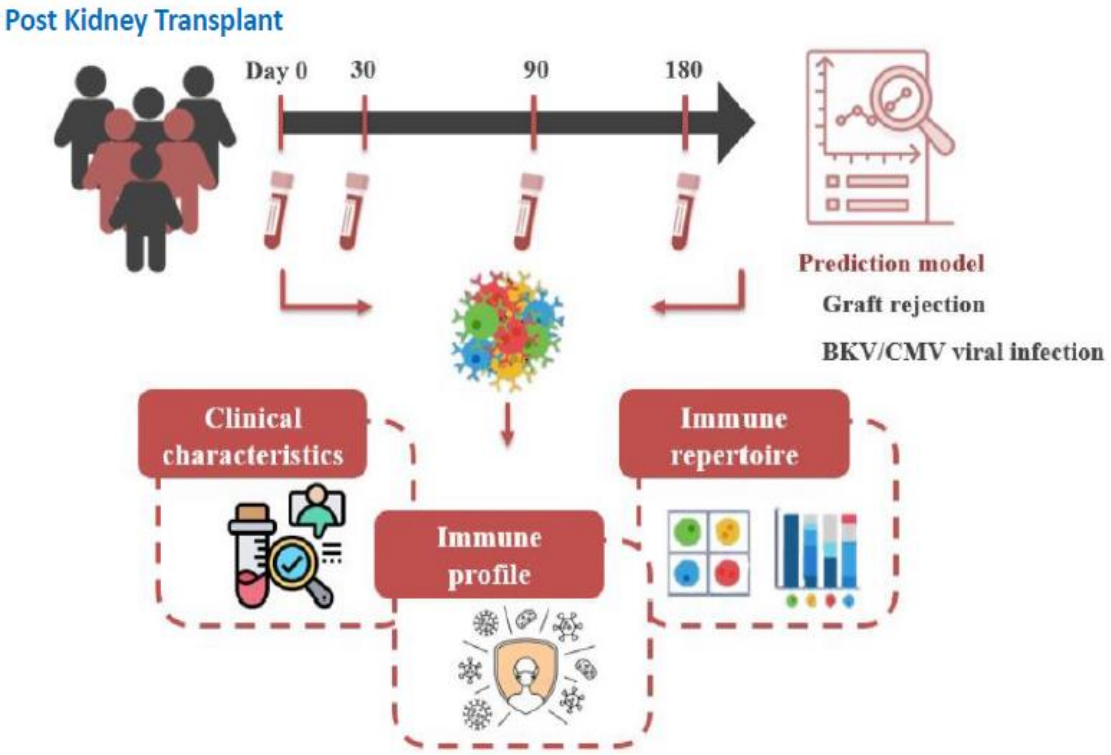
- Immune cells are associated with renal outcome in kidney transplant recipients

Aim 1

Investigate the immune phenotypes in KT recipients

Aim 2

Develop a panel of immune biomarkers for therapeutic monitoring



Summary

- No significant different in CD4 or CD8 activation between CKD+ with or without deterioration of renal function (CKD+GFR+ vs CKD+GFR-)
- Increased peripheral Tfh in CKD+GFR+ comparing to CKD+GFR-