



伦敦国王学院整合中医药学中心 (King's CICM)

中文网站：<https://chinese.kingscicm.org/>

Website：<https://www.kingscicm.org/>



要有光：让传统中医药智慧照亮现代肾脏病学与药理学创新之路

Let there be light: Let TCM inspire modern nephrology & Pharmacology

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发现国王学院 Discover King's

伦敦国王学院

King's College London

- 由英王乔治四世与滑铁卢战役的胜利者威灵顿公爵于1829年共同创立。

- 拥有14位诺奖得主，生物学贡献包括发现维生素、解析DNA结构。

- 现代肾脏病学、护理学和《柳叶刀》的诞生地。



King George IV

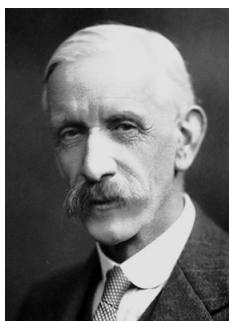


Duke of Wellington

- **Founded by King George IV and The Duke of Wellington**, victor of the Battle of Waterloo in 1829

- **King's has 14 Nobel laureates**,, e.g. by discovering vitamins and elucidating of the DNA structures.

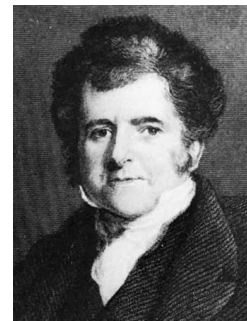
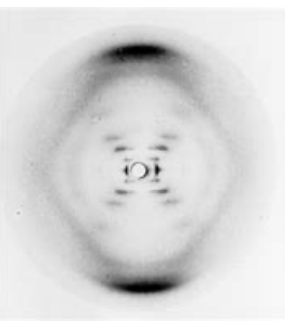
- **Birthplace of modern nephrology, nursing & *The Lancet*.**



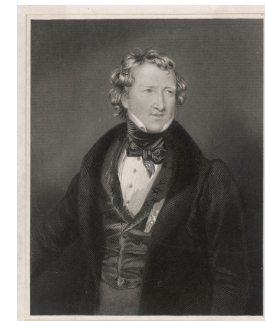
Frederick G. Hopkins
Nobel winner



Maurice Wilkins & Rosalind Franklin
The Nobel winner, "Photo 51" & the heroine behind it



Richard Bright, Florence Nightingale & Thomas Wakley
'Foundres of Modern Nephrology, Nursing and *The Lancet*'





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Distinguish yourself

伦敦国王学院整合中医药学中心 (King's CICM)

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King's CICM: Building upon our world-leading health sciences

King's College London in World University Rankings (QS 2026*):

- **No. 1** in Nursing
- **No. 4** in Dentistry
- **No. 11** in Life Sciences and Medicine

* **QS**: Quacquarelli Symonds, the name of the British company that publishes the rankings.



King's College London



St Thomas' Hospital



Maudsley Hospital



King's College Hospital



Guy's Hospital

特别感谢 Special acknowledgments

欧盟第七框架计划GP-TCM协作组的200位同仁们

200 Members of the FP7 GP-TCM Consortium
(The FP7 GP-TCM Final Conference, Holland, 2012)



后基因组时代中医药研究的良好实践 (2009-2012)
GP-TCM: Good Practice in TCM Research in the Post-genomic Era
(2009-2012)

- 支持协调项目旨在协调研究活动和相关政策：建立研究网络和交流平台、共享基础设施、协作攻关、主办会议，等。
As a **Coordination Action**, it aimed to **coordinate research activities**, supporting networking, exchanges, access to facilities, resources and conferences.
- 一个协作团队：25个国家、110个单位、200名科学家。
As a **research consortium**, it was an interregional, interdisciplinary and intersectoral cooperation involving 25 countries, 110 institutions/companies and 200 individual members.

 Uzuner H, et al. TCM research in the post-genomic era: good practice, priorities, challenges and opportunities. *J Ethnopharmacol.* 2012;140:458-68. 

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在该协作组的众多结论中，两个尤其重要

Among FP7 GP-TCM conclusions, two are of particular importance

1. Modern medicine can learn from TCM
中医药值得现代医学学习、借鉴

2. TCM should guide Chinese materia medica
中药研究要自觉接受中医理论与实践的指导

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SEVENTH FRAMEWORK PROGRAMME

Good Practice in Traditional Chinese Medicine Research in the Post-genomic Era

Fact Sheet Result in Brief Reporting News & Multimedia

DE EN ES FR IT PL

Modern medicine can learn from traditional practices

Researchers have finalised a picture of current traditional Chinese medicine (TCM) research practices in the EU and on the use, safety and efficacy of this ancient medical system.

BIOLOGY, MEDICINE

© Thinkstock

TCM is based on an individual and holistic approach to health and disease, with an emphasis on harmony between bodily functions. Although it is generally thought to be at odds with the reductionist approach of western medicine, both systems can learn from one

Project information

GP-TCM

Grant agreement ID: 223154

Status: Closed project

Start date: 1 May 2009 | End date: 31 October 2012

Funded under: FP7-HEALTH

Overall budget: € 1 117 778

EU contribution: € 995 100

Coordinated by: KING'S COLLEGE LONDON

中药是中医理论指导下使用的药物

Miao Jiang, Cheng Lu, Chi Zhang, Jing Yang, Yong Tan, Aiping Lu, Kelvin Chan.
Syndrome differentiation in modern research of traditional Chinese medicine.
J Ethnopharmacol. 2012; 140(3):634–42.

Cited 156 times by 26 June 2019

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    graph TD
      A[Syndrome differentiation] --> B[Stratification method for patients based on TCM]
      B --> C[Diagnostic method with intergrating biomedicine and TCM]
      C --> D[TCM diagnostic equipment development]
      C --> E[TCM new drug discovery]
      C --> F[Pharmacological evaluation]
      C --> G[Clinical efficacy evaluation]
    
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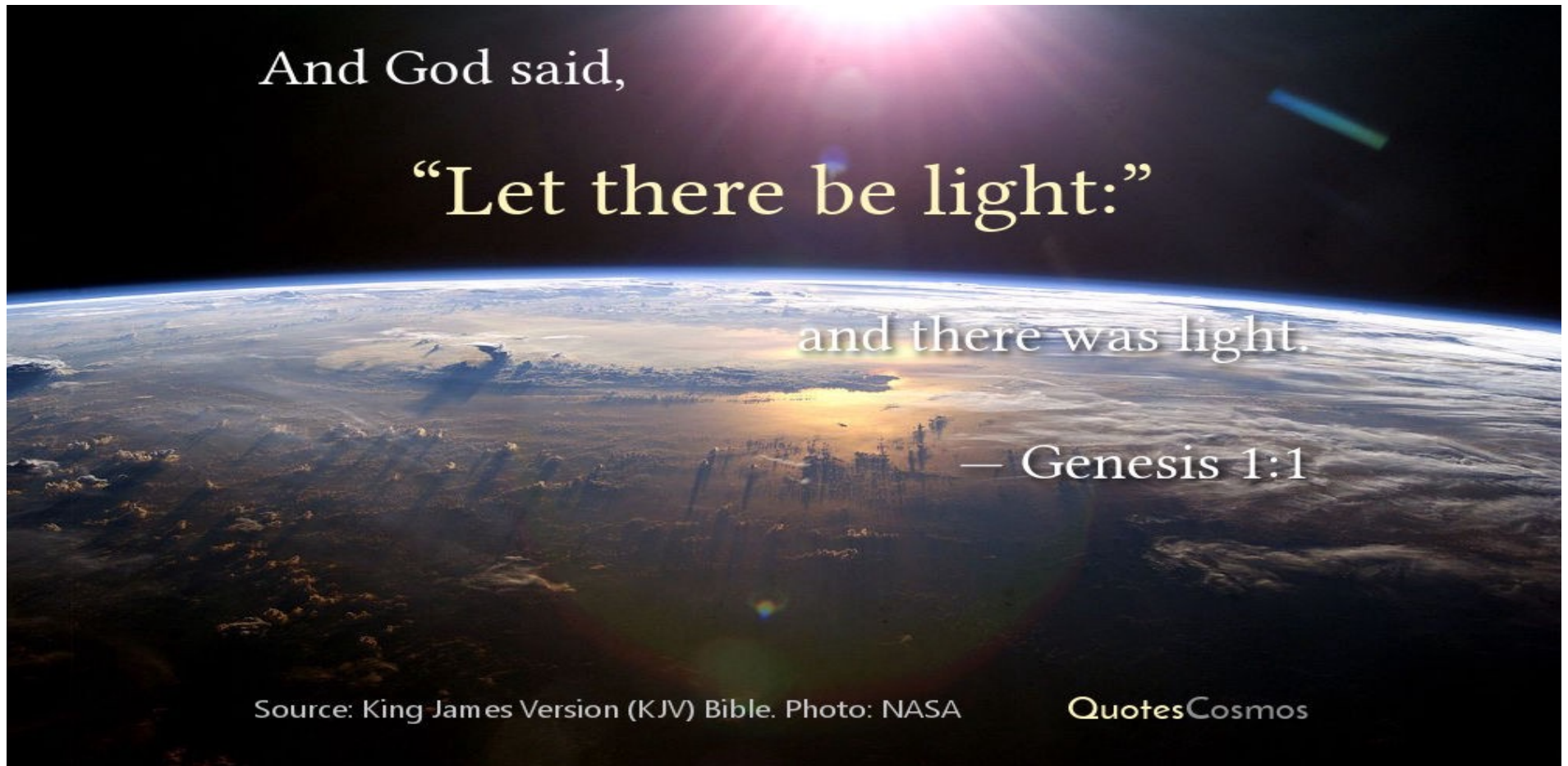
J Ethnopharmacol 2012;140:634–42

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KING'S COLLEGE LONDON

借圣经《创世纪》中上帝的话 Light is the ultimate inspiration and guide

“要有光”：中医智慧可以成为照亮现代医学、药学创新道路的启发与指引



做为肾脏病学者30年，从“肾”出发，
谈中医为可以堪为指引创新之“光”

**As a nephrologist for 30 years, I'd like to illustrate these conclusions
from a nephrology point of view**

- 1989-1992: 北大医院肾内科
Centre for Nephrol. (CfN), Peking University 1st Hospital, China
- 1992-1999: 解放军总医院肾科 CfN, Chinese PLA General Hospital, China
- 1999-2005: 伦敦大学学院肾脏病中心 CfN, UCL, UK
- 2005-2006: 美国卫生研究院肾脏病科 CfN, NIDDK, NIH, USA
- 2006-2019: 伦敦国王学院肾脏病科 CfN, KCL, UK

肾（脏）与“kidney”

- 在西医中，“肾”是一个解剖学实体；而在中医，“肾”更多的是一个功能学概念。二者异也同也？
- 二者都认为：
 - “肾”主水 (AQP1-3)
- In conventional medicine, “kidney” is primarily an *anatomical* concept; **in TCM**, however, “kidney” is more of a *functional* concept.
- Both agree that:
 - “kidney” governs water homeostasis (AQP1-3)

温馨提示

A warm reminder

- **肾恶燥**。常饮水就是肾脏锻炼。不要渴了再喝水！

- Both agree "**Kidney dislikes dryness / dehydration!**"

中老年人生理肾功能减退，再不注意经常补充水分，对健康很不利——在2023年发表在BMC Medicine的文章中，研究者对1957名年龄在55-75的人调查后发现，有56%的参与者处于生理脱水状态……

Nishi SK, et al. **Water intake, hydration status and 2-year changes in cognitive performance: a prospective cohort study.** *BMC Med.* 2023 8;21:82



肾（脏）与“kidney”

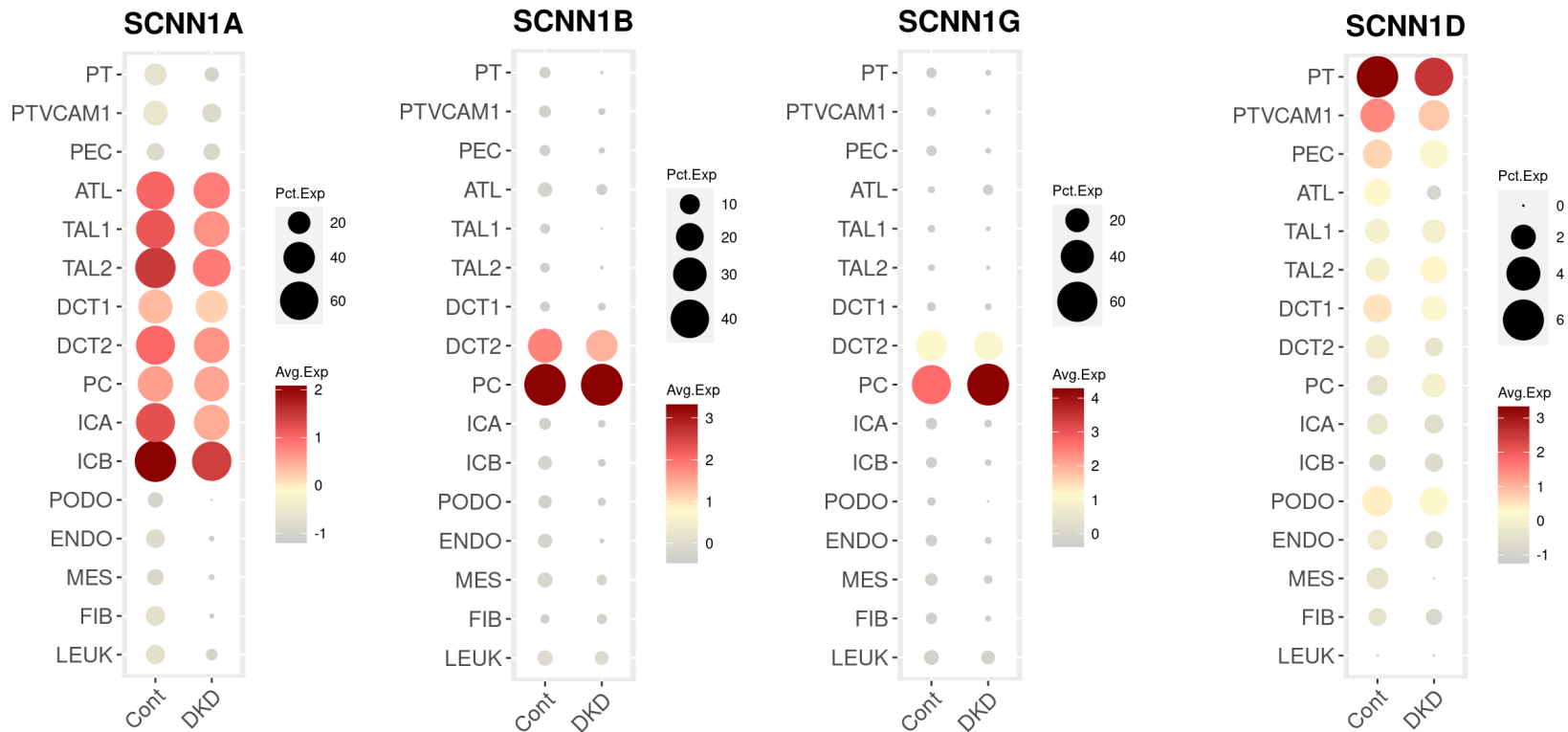
- Both agree that kidney manages salt.
- 二者都认为：
 - “咸入肾”

咸入肾：肾脏细胞表达钠离子转运蛋白四个亚基

Kidney cells express all four ENaC subunits

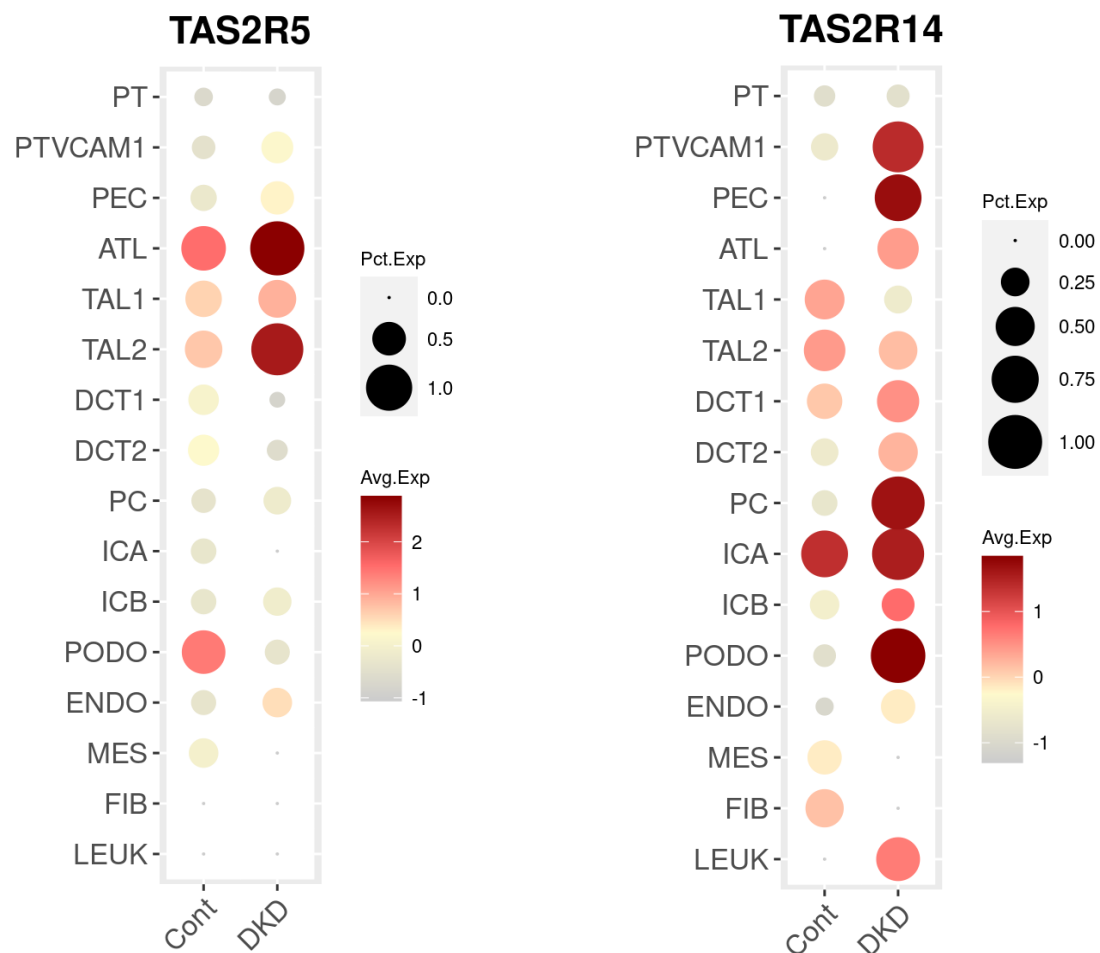
- SCNN1B and 1G are selectively expressed by 30-60% DCT2 and PC;
- SCNN1A is highly expressed in kidney cells: 40-60% ATL, TAL, DCT, PC, IC;
- SCNN1D is expressed in ~6% of PT, PEC, DCT and Podocytes.

- 酸 (sour): OTO1 (H⁺ pump)
- 甜 (sweet): TAS1R3/TAS1R2
- 苦 (bitter): TAS2Rs*
- 咸 (salty): ENaC, encoded by SCNN1A, SCNN1B, SCNN1G and SCNN1D
- 鲜 (umami): TAS1R3/TAS1R1



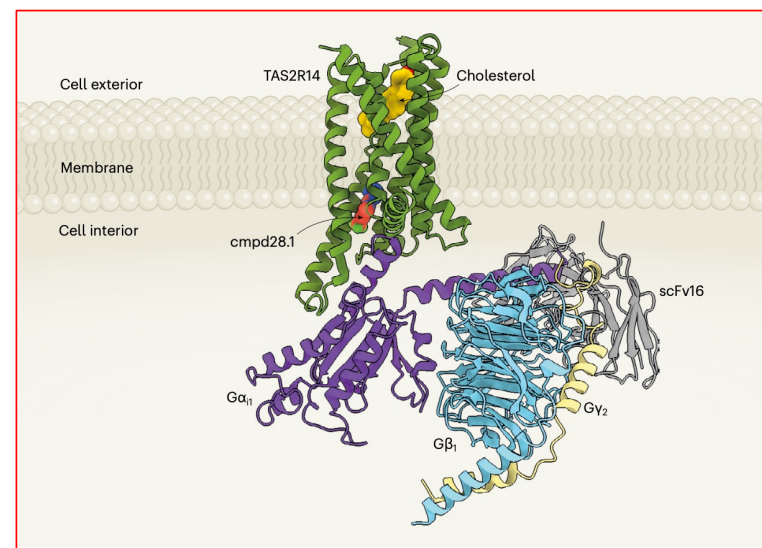
<https://humphreyslab.com/SingleCell/displaycharts.php>

肾细胞不表达苦味受体TAS2R多数亚型，表达微量亚型5和14 (1%左右)，在糖尿病肾病患者出现上调
 Kidney cells do not express bitter sensor TAS2R1-4, 7, 8, 38, 46, but do moderately express TAS2R5 and TAS2R14: ~1% kidney cells, increased in DKD.



<https://humphreyslab.com/SingleCell/displaycharts.php>

- 酸 (sour): OTO1 (H⁺ pump)
- 甜 (sweet): TAS1R3/TAS1R2
- 苦 (bitter): TAS2Rs*
- 咸 (salty): ENaC, encoded by SCNN1A, SCNN1B, SCNN1G and SCNN1D)
- 鲜 (umami): TAS1R3/TAS1R1

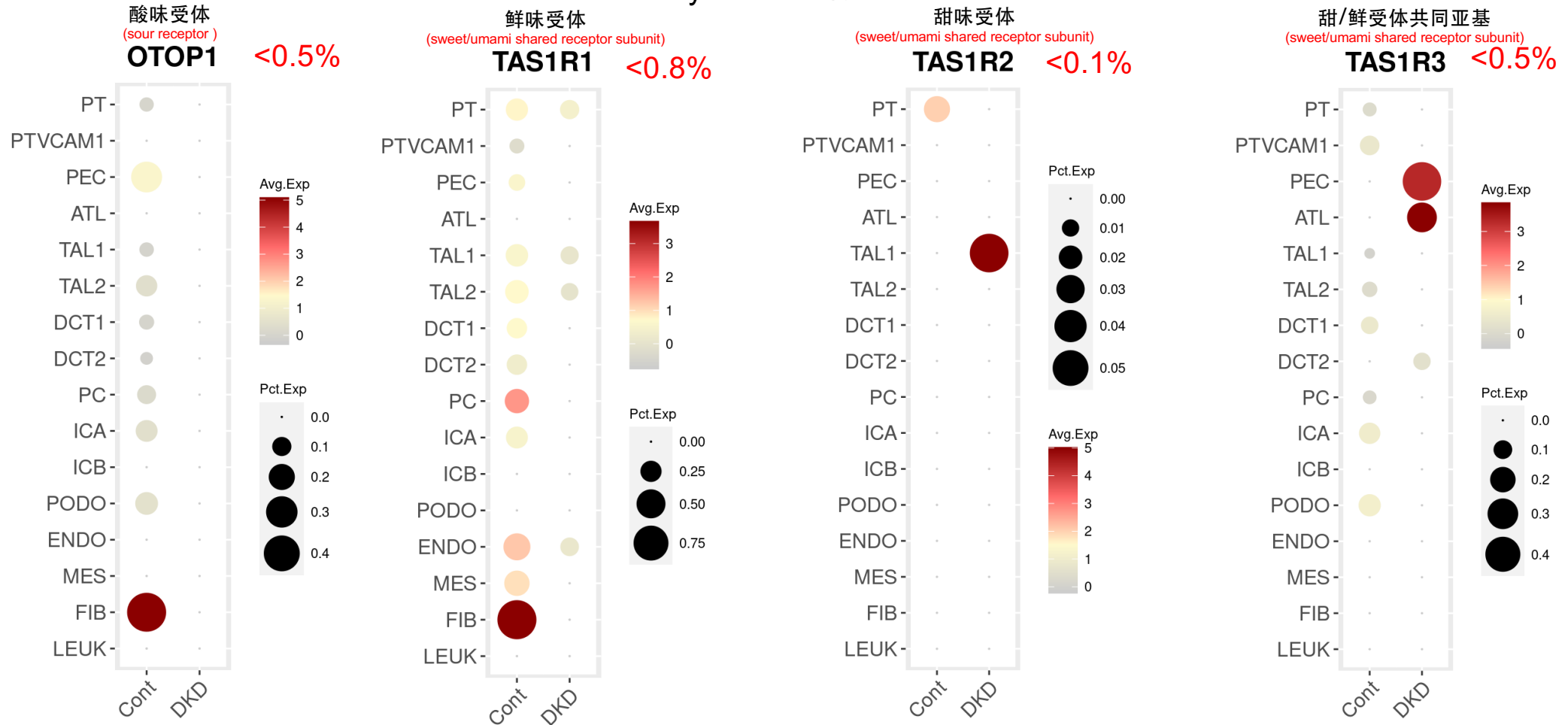


- Kim Y *et al. Nature* 2024;628664–671: **Cholesterol, which does not taste bitter, affects the function of the TAS2R14.**

相比之下，肾脏细胞几乎不表达酸味感受器OTOP1以及甜味/鲜味感受器TAS1R1、2、3：表达率均仅<0.1-0.8%

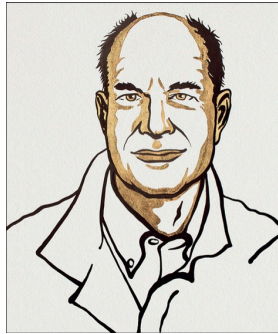
In further contrast, kidney cells rarely express the sour sensor OTOP1 and sweet/umami sensors TAS1R1: merely ~0.1-0.8%

- 酸 (sour): OTOP1 (H⁺ pump)
- 甜 (sweet): TAS1R3/TAS1R2
- 苦 (bitter): TAS2Rs*
- 咸 (salty): ENaC, encoded by SCNN1A, SCNN1B, SCNN1G and SCNN1D)
- 鲜 (umami): TAS1R3/TAS1R1

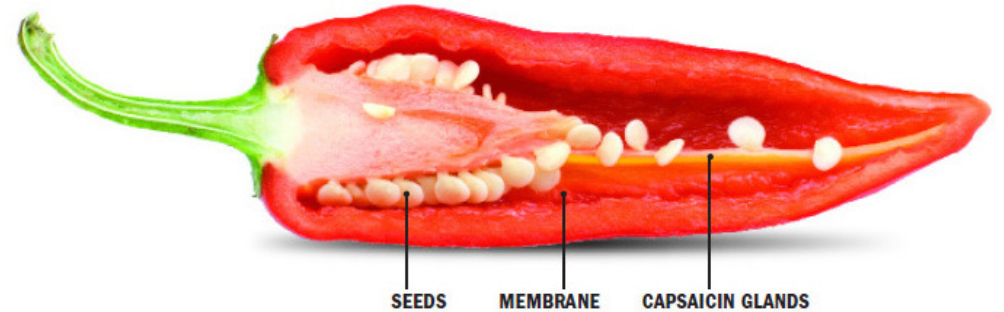


<https://humphreyslab.com/SingleCell/displaycharts.php>

辛(Pungent): one of the five flavours in TCM.



David Julius
for discovering pain &
temperature sensors
TRPV1, TRPM8 &
TRPA1



Julius used **capsaicin** (辣椒素), the chemical that causes your mouth to burn after eating a chilli pepper, to pinpoint the sensor that reacts to heat.

A Systematic Review of the Effects of Capsaicin on Alzheimer's Disease
Inyang D et al. *Int J Mol Sci* 2023;24:10176

An interview with the Nobel Prize 2021 winners.
Burki T. *Lancet* 2021;398:1392-1393.

神农尝百草，尝出了四气五味，尝出了阴阳

The Yin & Yang: Taste receptors are expressed in tissues beyond taste buds

全小林院士：以苦治甜是自然之理，也是医学之理。黄连是治疗糖尿病降糖的首选——第一方阵的唯一中药。

Academician Tong Xiaolin:

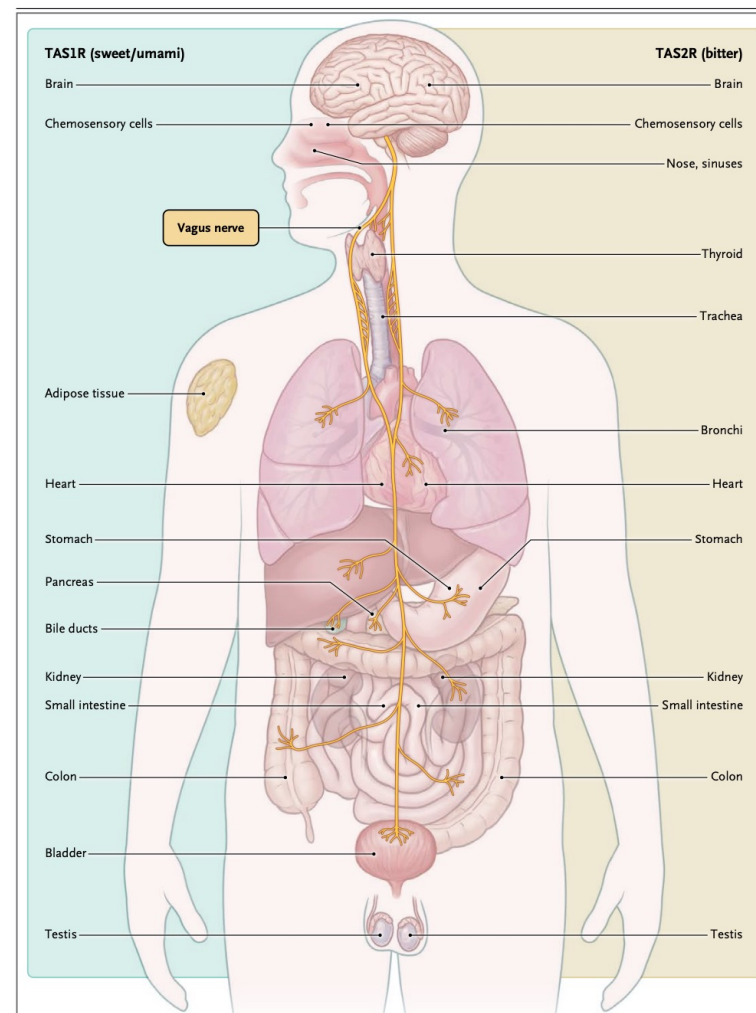
- Coptidis Rhizome is the premier first-line herbal drug for lowering blood glucose in patients with diabetes..
- **Using bitterness to counteract sweetness—the principle of nature is the principle of medicine.**

The Clinical Efficacy of Gegen Qinlian Decoction in Treating Type 2 Diabetes is Positively Correlated with the Dose of Coptidis rhizome: Three Randomized, Double-blind, Dose-Parallel Controlled Clinical Trials.

(Kang X, et al. *Drug Des Devel Ther.* 2024;18:5573-82)

甜/鲜受体的全身表达
TAS1R for sweet/umami

苦味受体的全身分布
TAS2R for bitter taste

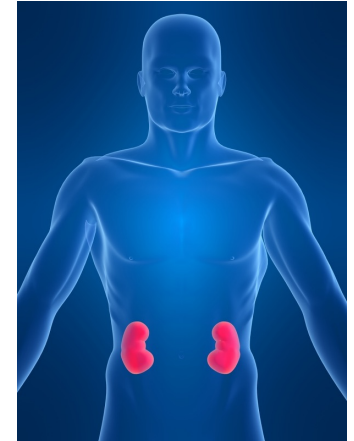


Egan JM. Physiological Integration of Taste and Metabolism. *N Engl J Med.* 2024;390:1699-1710.

现代科学对解剖学肾脏功能的认识与中医相向而行 (1)

Growing “kidney” functions in keeping with TCM (1)

- 肾主骨: **Kidney governs bone**
- Lieu S H(刘士豪), Chu H I(朱宪彝). Treatment of renal osteodystrophy with dihydrotachysterol (骨化三醇). *Science* 1942;95:388-389
- The first *Science* paper by Chinese authors.
- They even correctly hypothesised the mechanisms – kidneys activate vitamin D!



50 years later...

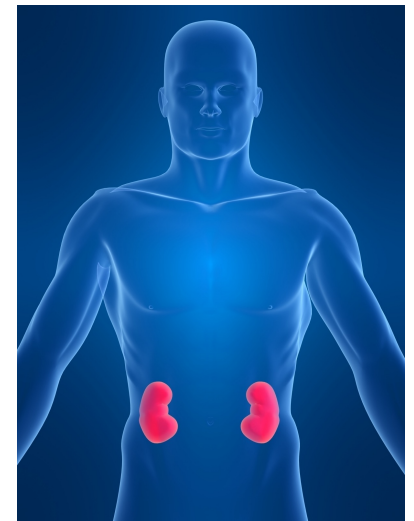
- Xu Q, Liu P. Use of Rocaltriol in patients with chronic renal failure. *J Practical Medicine* 1992; (5): 275-276.
- Xu Q, Liu P, Li J, Jiang Y. Relationship between calcium and the parathyroid status of the patients on hemodialysis. *Chin J Nephrol Dial and Transplant*. 1993;1:28-31.
- Xu Q, Liu P, Jiang Y. Non-screen paper cassette radiography and bone mineral density measurement in Diagnosis of renal bone diseases of hemodialysis patients. *J Dialysis Artificial Organs* 1993; 4:15-17.
- Liu P, Xu Q, Wang GS. Clinical Investigation of the calcium and phosphate metabolism disturbance in patients on haemodialysis. *J Practical Internal Medicine*. 1993; 13:272-3.
- Xu Q, Liu P. Renal osteodystrophy. *Intermediate Medical Journal*. 1993; 28:10-11.
- Xu Q, Liu P, Li J. Significance of three PTH radioimmunoassays in patients on hemodialysis. *J Beijing Med University*. 1994;26:287-288.
- Xu Q, Liu P, Li J, Jiang Y. Effect of Shenggu Capsule on calcium and phosphorus metabolism in haemodialysis patients. *Acad J PLA Postgrad Med School*. 1997;18:210-212.

现代科学对解剖学肾脏功能的认识与中医相向而行 (2)

Growing “kidney” functions in keeping with TCM (2)

肾主骨, 骨生髓, 髓造血 (Kidney governs bone and BM produces blood)

- **1960-70s:** Kidney produces erythropoietin (EPO, 促红细胞生成素), which controls red blood cell production
- **1980:** Amgen EPO approved by FDA (thanks to Taiwan-born Chinese scientist 林福坤博士)
- **1990:** Advised by Dr Lin, EpoGen was made available to China for free through a donation through the Carter Centre



现代科学对解剖学肾脏功能的认识与中医相向而行 (3) Growing “kidney” functions in keeping with TCM (3)

肾为先天之本 (Kidney is the fountain of youth)

- **2014:** Kidneys are the “fountain of youth”, producing 80% of the anti-ageing Klotho (克洛素)

Lindberg K. *J Am Soc Nephrol.* 2014;25:2169-75

Wolf M. *J Am Soc Nephrol.* 2014;25:2143-5

- **2022:** A klotho-derived peptide mimics Klotho function and ameliorates diabetic kidney diseases and renal fibrosis.

Yuan Q et al. *Nat Commun.* 2022;13:438

Chen X et al. *Kidney Int.* 2022;102:506-520



南方医科大学、匹兹堡大学
刘友华教授

现代科学对解剖学肾脏功能的认识与中医相向而行 (4)

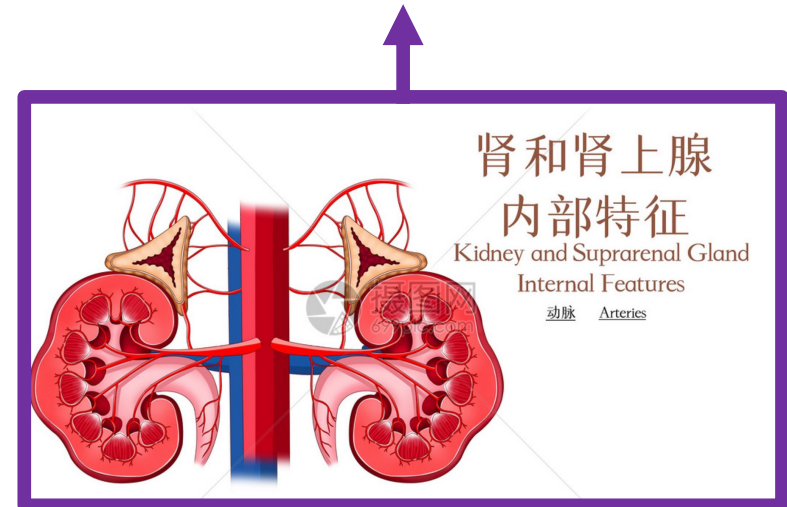
Growing “kidney” functions in keeping with TCM (4)

“肾藏精”的物质基础

Kidney essence has its material basis

- 骨化三醇 (Calcitriol)
- 促红细胞生成素 (EPO)
- 克洛素 (Klotho)
- 犬尿氨酸 (L-kynurenine)：介导孕妇肾与胎盘的对话，防先兆子痫
- 肾素-血管紧张素 (保水、升血压)
- 肾酶 (Renalase)：降解儿茶酚胺，降血压，护心脏
- 糖皮质激素 (Glucocorticoid)
- 盐皮质激素 (mineralocorticoid)
- 肾上腺素 (adrenaline, epinephrine)
-

沈自尹教授的研究表明：“肾阳”与下丘脑-垂体-靶腺（肾上腺等）密切相关，强调了中医“肾”的功能不仅限于解剖学的肾脏，还包含肾上腺及其上游神经内分泌腺体，强调了肾脏概念的整体性特征。



Vijayakumar A, Mahapatra NR. *Hypertens Res.* 2022;45:1582-1598.
Enninga, Elizabeth Ann L. et al. *Kidney Int* 2023; 103: 651-65
Dupont V, Berg AH, Yamashita M, et al. *JCI.* 2022;132:e158346.5

肾脏不仅重要，而且脆弱

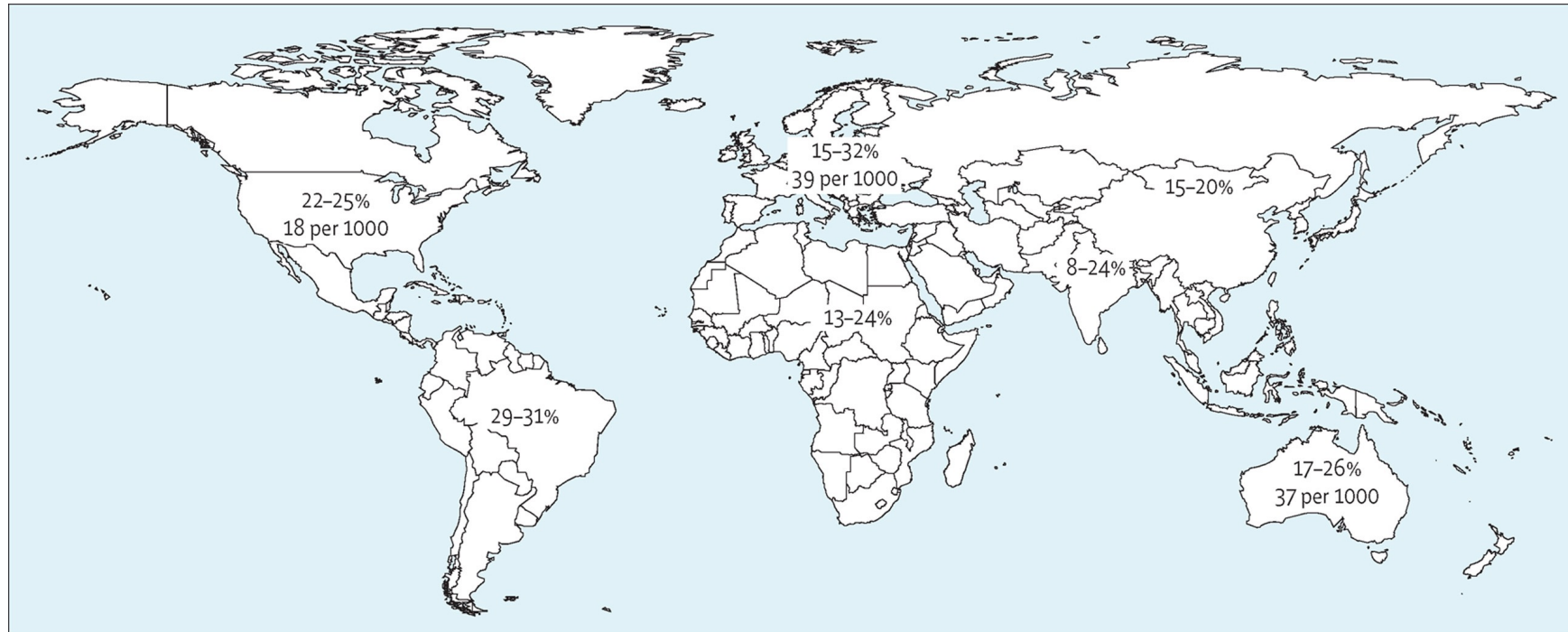
Kidneys are not only *important* but also *vulnerable*.

- AKI (急性肾损伤)
- CKD (慢性肾脏病)

全球约20%的住院患者罹患AKI；而社区获得性AKI的发生率，可能使总发病人数翻倍。

Worldwide, ~20% hospitalised patients suffer from AKI;
community-acquired AKI may double the total incidence

AKI epidemiology per hospital admission (%) and corresponding incidence by region (per 1000 person)



2025年2月，世界卫生组织已将CKD确定为全球健康优先事项：其患病率高、死亡率持续攀升，并已成为导致灾难性医疗支出的主要原因。

In Feb. 2025, the WHO has designated CKD a global health priority: High prevalence, high increasing mortality and a leading cause of catastrophic health expenditure.

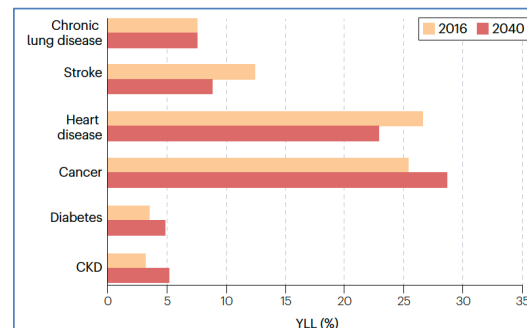
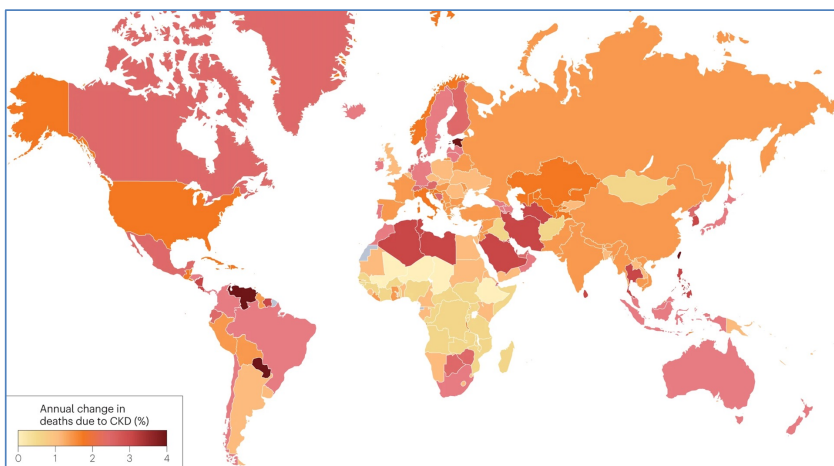
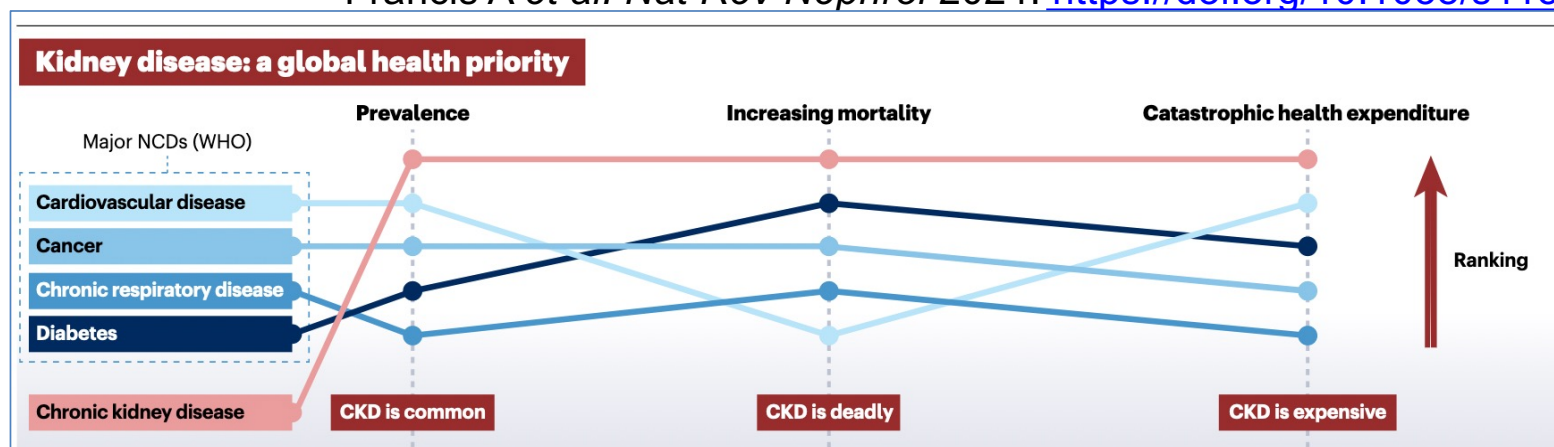


Fig. 4 | Predicted years of life lost from CKD by 2040. Compared with data from 2016, the years of life lost (YLL) because of WHO-recognized major non-communicable diseases such as stroke and heart disease are predicted to have decreased by 2040. By contrast, YLL due to chronic kidney disease (CKD) are predicted to continue to increase and CKD is expected to surpass diabetes as a cause of YLL by 2040. Graph created using data from ref. 14.

Francis A et al. *Nat Rev Nephrol* 2024. <https://doi.org/10.1038/s41581-024-00820-6>



Editorial. *Nat Rev Nephrol* (2024). <https://doi.org/10.1038/s41581-024-00829-x>

路在何方？

- 汲取中医智慧，启迪创新思路；
- 融汇传统医药学精粹与现代科技，共筑健康新篇章。

The way forward

- To seek inspiration from TCM;
- To catalyse innovation by integrating TCM wisdom with modern science.

从整合中医药角度审视新陈代谢在健康与疾病中的作用

Role of metabolism *in integrative Chinese medicine*



qi (气) – Nature & life

Healthy qi (正气) – Health & its defence

→ Yin-qi (阴气): Defence machinery, substances, barrier, containment and inhibition (防御物质基础)

⇒ Yang-qi (阳气): **Active metabolism** (新陈代谢) that drives, excites and increases signs of life

Li Ke: “Where *Yang qi* fails to arrive, where is an illness”

李可：阳气不到的地方就是病

2017-06-24 06:51

导读：“没有阳气就没有生命。从养生治病的经历来看：阳萎则病，阳衰则危，阳亡则死；所以救阳，护阳，温阳，养阳，通阳，一刻不可忘；治病用药切切不可伤阳。所以古人云：万病不治求之于肾。求之于肾就是救阳气。”



李可 原山西灵石县中医院院长

1930-2013年，著名中医。曾任山西灵石县中医院院长，中华全国中医学会山西分会会员，《中医药研究》特邀编委，香港《中华医药报》医事顾问，世界华人交流协会特邀研究员。著有《李可老中医急危重症疑难病经验专集》，又通过四十多年的搜集、整理，校注了清末民初著名医家彭子益的《圆运动的古中医学》。晚年多次到广东带徒传艺，分别在南方医院、广东省中医院开辟传承基地和经典病房，轰动全国。

Yang qi =metabolism

1. 《黄帝内经》中阴气的涵义 为明确和规范阴气的概念，将《黄帝内经》160篇（除《素问》遗篇）中所有“阴气”二字连读者98处以及“阴”、“阳”分别确指“阴气”、“阳气”者5处检出，合为78条以梳理其涵义。从《黄帝内经》中检出的78条有关“阴气”的条文中，阴气是指地气，与阳气指代天气相对者1条，占1.28%；阴气是指自然界的寒气，与阳气是指风气相对者1条，占1.28%；阴气是指自然界的寒凉之气，与阳气指代温热之气相对者9条，占11.54%；阴气是指人体的在下之气，与阳气指代人体的在上之气相对者8条，占10.26%；阴气指代行于人体的体内之气，与阳气指代行于体表之气相对者6条，占7.69%；阴气是指人体内具有凉润、宁静、

2005年第20卷第11期

中华中医药杂志（原中国医药学报）

· 645 ·

· 论著 ·

中医学的阴气、阳气概念辨析

孙广仁

（山东中医药大学中医基础理论教研室，济南 250014）

抑制等作用的气，与阳气指代具有温煦、推动、兴奋等作用的气相对者53条，占67.95%^[1]。因此，《黄帝内经》中阴气的基本涵义是：①指人体内具有凉润、宁静、抑制等作用的气，与阳气指人体内具有温煦、推动、兴奋等作用的气相对待；②有时指人体的在内或在下之气，与阳气指人体的在外或在上之气相对待；③在自然界主要指寒凉之气，与阳气主要指温热之气相对待。

“阳化气，阴成形”与现代医学的代谢观

《中国中医基础医学杂志》2007年第8期 | 宋清江 白晓莉 刘红燕 河北保定市第一中医院 河北保定071000

摘要：“阳化气，阴成形”源自《内经》，其本义是论人体阴刚两方面与人的形体和功能之间的关系。笔者在“读经典，做临床”的过程中发现，这一论点与现代医学的新陈代谢理论相比较，不论从过程分析还是从结果判断，都是高度一致的。

研究发现：以细胞外基质聚集为标志的纤维化，其本质是细胞内代谢紊乱，而抗纤维化效能伴随代谢改善

My research findings: Fibrosis, a disease characterized by excessive extracellular matrix deposition, is an intracellular metabolic disorder, which is improved by antifibrotics

Zhou S et al. 2020; 10: 19054

scientific reports

OPEN

Proteomic landscape of TGF- β 1-induced fibrogenesis in renal fibroblasts

Shujun Zhou¹, Xiaoke Yin², Manuel Mayr², Mazhar Noor¹, Peter J. Hylands³ & Qihe Xu¹✉

Zhou S, et al. 2022;100:154049.

Phytomedicine 100 (2022) 154049



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Phytomedicine

journal homepage: www.elsevier.com/locate/phymed



Original Article

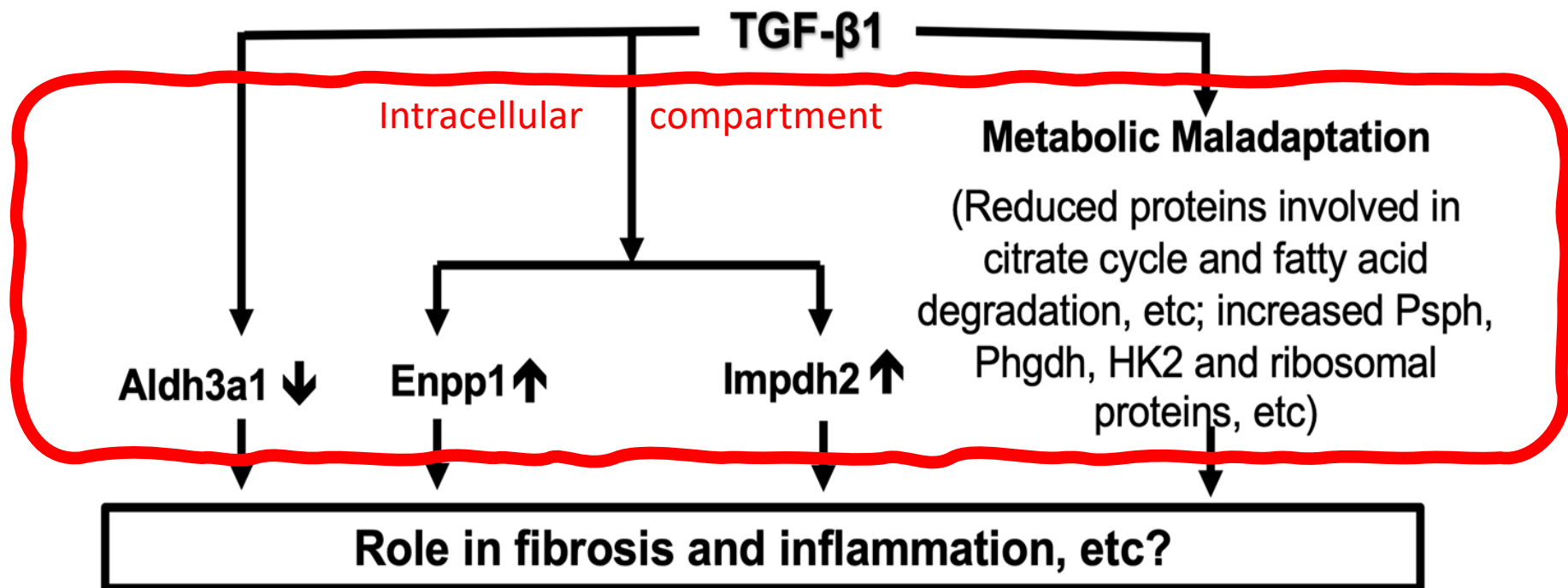
Antifibrotic activities of Scutellariae Radix extracts and flavonoids: Comparative proteomics reveals distinct and shared mechanisms

Shujun Zhou^{a,1}, Xiaoke Yin^{b,1}, Jun Yuan^c, Zhitao Liang^c, Jingzheng Song^d, Yunxia Li^e, Cheng Peng^e, Peter J Hylands^f, Zhongzhen Zhao^c, Qihe Xu^{a,*}



1. The SCAR hypothesis: Stop fibrosis by modulating Cellular metabolism

- Omics-based antifibrotic strategy;
- TCM modulation of metabolism.



Zhou S et al. *Sci. Rep* 2020; 10: 19054

Zhou S et al. *Phytomedicine*. 2022;100:154049

非代谢疾病的代谢原理 **Metabolic mechanisms of non-metabolic disorders**

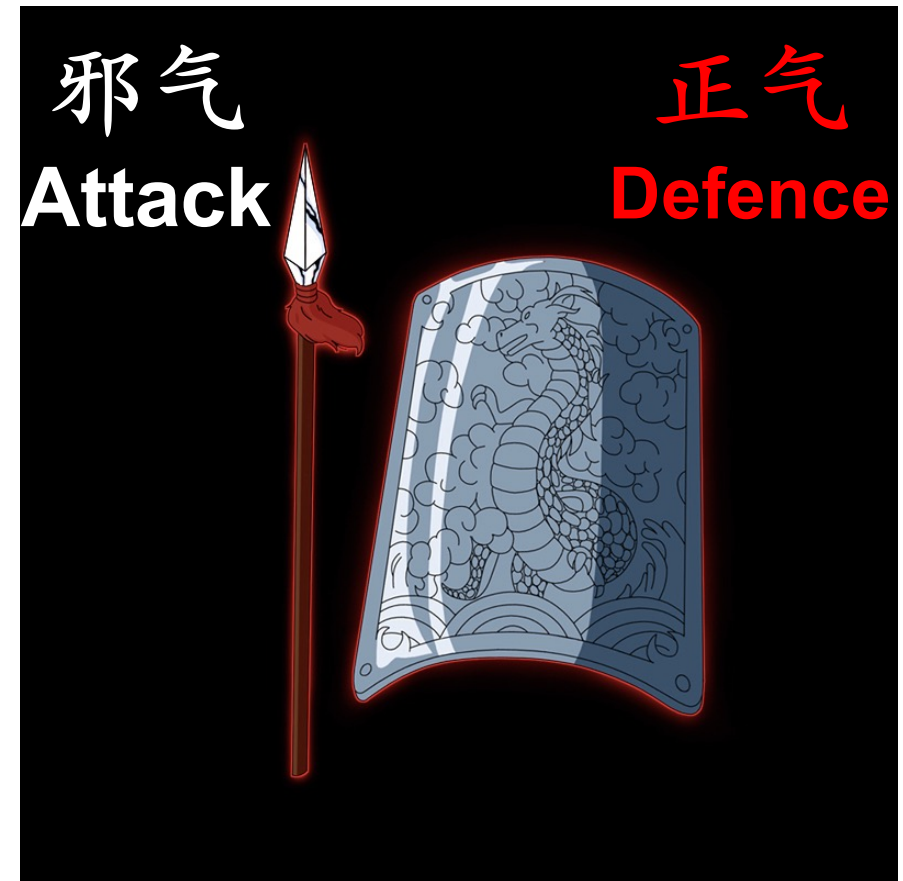
- **Cell death** (Zhang T, et al. Metabolic orchestration of **cell death** by AMPK-mediated phosphorylation of RIPK1. *Science*. 2023;380:1372-1380; Zhang DD. Natural inhibitor found for cell death by **ferroptosis**. *Nature* 2024;626:269)
- **Inflammation** (Certo M, et al. Targeting metabolism as a therapeutic approach in **chronic inflammation**. *Br J Pharmacol*. 2021;178:2041-2059)
- **Immunity** (Pearce EJ, Pearce EL. Driving **immunity**: all roads lead to metabolism. *Nat Rev Immunol*. 2018;18:81-82).
- **Ageing** (Amorim JA, et al. Mitochondrial and metabolic dysfunction in **ageing and age-related diseases**. *Nat Rev Endocrinol*. 2022;18:243-258)。
- **Cancer** (Gyamfi J, et al. **Cancer as a metabolic disorder**. *Int J Mol Sci*. 2022;23:1155)
- **AKI** (Barbosa ACA, et al. Dicarboxylic Acid Dietary Supplementation Protects Against **Acute Kidney Injury**. *JASN*. 2023; DOI:10.1681/ASN.0000000000000266)
- **AKI-CKD transition** (Zhu Z, et al. **Transition of acute kidney injury to chronic kidney disease: role of metabolic reprogramming**. *Metabolism*. 2022;131:155194)

正气存内 *Healthy qi exists inside*

《黄帝内经》：“正气存内,邪不可干;邪之所凑,其气必虚”

“When there is **sufficient defence** inside, external pathogenic factors have no way to hurt;”

“when damage does occur, the **defence must be deficient.**”



与最新科学观不谋而合 **In keeping with modern science**

- **Hallmarks of Health.** López-Otín C, Kroemer G. *Cell*. 2021;184:33.
 - “健康的标志”理论：健康需要多维保护机制来捍卫，而对这些保护性防御机制的破坏具有致病性。
 - Health requires multidimensional protective mechanisms to maintain, and the destruction of these protective defence mechanisms is pathogenic.
- **Hallmarks of Environmental Insults.** Peters A, et al. *Cell*. 2021;184:1455.
 - “环境致病因子的标志”理论：环境致病因子必须克服机体的防御才能造成伤害。
 - Environmental pathogens must overcome the body's defences to cause harm.



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But we know little on
the **defence machinery**
against renal tubulointerstitial injury

What should a defender (bodyguard) look like?

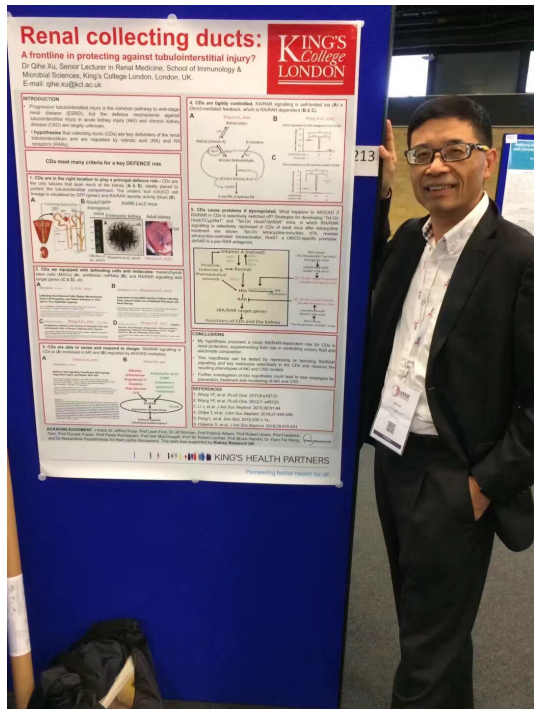


- Be there
- Be resilient
- Well equipped & empowered
- Sense and respond to danger
- Must be tightly controlled
- Cause problems if dysregulated
- Be therapeutic if properly mobilised

“集合管中心防御假说”

Renal collecting ducts (CDs) rise to the defence

UKKW 2018



UKKW 2019



2019年正式发表“集合管中心防御学说”

nephron
Experimental
Nephrology
and Genetics

Experimental Nephrology and Genetics **Special Article**

Nephron 2019;143:148–152
DOI: 10.1159/000502452

Received: June 26, 2019
Accepted after revision: August 1, 2019
Published online: August 13, 2019

The Renal Collecting Duct Rises to the Defence

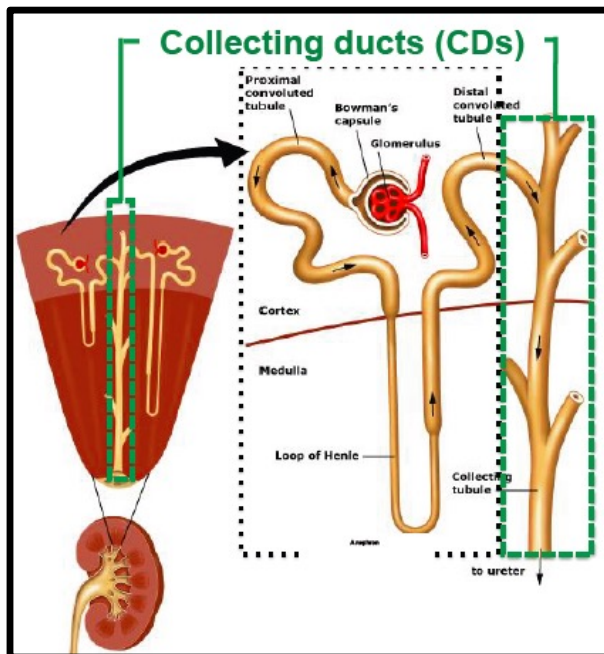
Qihe Xu

King's Centre for Integrative Chinese Medicine, Department of Inflammation Biology, School of Immunology and Microbial Sciences, and Institute for Pharmaceutical Science, Faculty of Life Sciences and Medicine, King's College London, London, UK

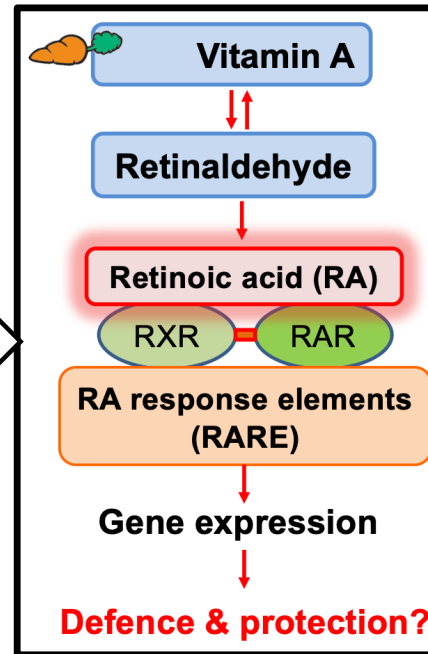
2.1 The Rain-CD hypothesis

- **RA/RAR** in the **C**ollecting **D**uct protect against renal TI injury;
- Dysregulation of this signalling pathway increases the susceptibility and severity of AKI, facilitates AKI transition to CKD, and promotes CKD progression.

A. The CD is ideally positioned to protect the entire TI compartment



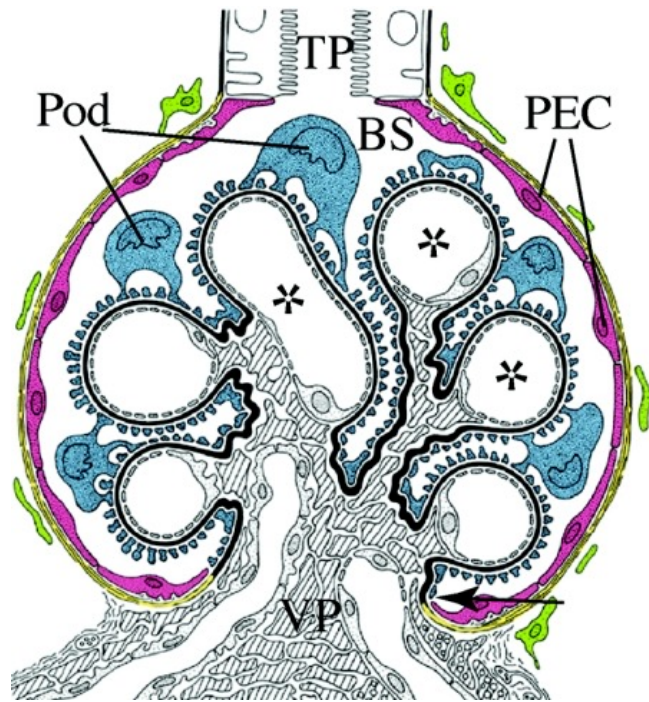
B. RA/RAR protects against TI injury by regulating gene expression in PCs



Papadimitriou A, et al. *Sci Rep.* 2020;10:16683
Xu Q.. *Nephron.* 2019;143:148-152
Wong YF et al. *PLoS One.* 2012;7:e45725.
Wong YF et al. *PLoS One.* 2011;6:e16770.

卫气御于外 **Wei-defensive qi protects from outside**

- 中医将体内之气分为“元气、宗气、营气、卫气”四大类。
- 《黄帝内经·灵枢·营卫生会》有云：“**营在脉中，卫在脉外。**”



- PECs are the overlooked parts of the *wei-defensive qi* (卫气) of glomeruli – EC, MsC, Pod are well-studied.
- *Wei-defensive qi* circulates differently between day and night – the PEC biology deserves investigation.

孙晨耀，张其成. 营气、卫气、宗气考辨.
中华中医药杂志2023年4月第38卷第4期.
https://www.sohu.com/a/691627649_121119379



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整合中医药学研究再成英国肾脏周亮点

2025年6月12日，英国肾脏病学会年会、英国肾脏周在美丽的海滨城市伯恩茅斯胜利落幕。12日下午，由伦敦国王学院徐启河博士提议、组织，并发表最新研究成果的专题研讨会成功举办。该研讨会聚焦“肾小球长城”壁层上皮细胞在肾脏健康以及疾病中的作用，现场来自北京、伦敦、牛津、卡迪夫以及英国其它地区的学者兴致盎然，讨论热烈，并达成了进一步合作的意向。徐博士的研究以及这一研讨会均得益于英国肾脏研究基金会 (Kidney Research UK) 的慷慨资助。徐博士2007-2009年曾获得该基金会至今唯一中草药研究的面上项目，为后来创意、领导组织与实施欧-中合作欧盟第七框架计划首个重大合作、协调项目《后基因组时代传统中医药研究的良好实践》以及创建King's CICM奠定了基础。会议期间，徐博士与基金会同仁们探讨了通过整合医学方法促进肾脏研究和临床创新的合作前景。

从中医正气、卫气理论寻找灵感，肾脏解剖、细胞、分子生物学研究如何沟通东西方医学？敬请阅读研讨会报道：

The King's Centre for Integrative Chinese Medicine

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Integrative Chinese Medicine Research Shines Again at UK Kidney Week

On 10th-12th June 2025, the **UK Kidney Association Annual Conference 2025** and the **UK Kidney Week 2025** was successfully concluded in the picturesque coastal city of Bournemouth. On the day, a workshop proposed and organised by Dr. Qihe Xu, King's College London, featured his latest research findings. The workshop focused on the role of **parietal epithelial cells (PECs) — the “bricks of the glomerular wall”** — in kidney health and disease. Scholars from Beijing, London, Oxford, Cardiff, and other regions across the UK engaged in lively discussions and reached agreements for further collaboration.

The workshop was sponsored by **Kidney Research UK (KRUK)**, UK's national charity dedicated to eliminating kidney diseases by supporting research and innovation. Dr Xu was awarded KRUK's first ever and sole grant dedicated to Chinese herbal medicine research in 2007. This project paved the way for *Good Practice in Traditional Chinese Medicine Research in the Post-Genomic Era* (2009-2012)—the first ever and sole major EU-China collaboration under EU's 7th Framework Programme dedicated to traditional Chinese medicine (TCM) research—and King's CICM. During the Conference, Dr. Xu and **KRUK** colleagues discussed the prospect for King's CICM and KRUK joining forces to promote innovation in kidney research and care through an integrative medicine approach.

How can TCM theory inspire modern nephrology? Read the following **workshop report** to find out:

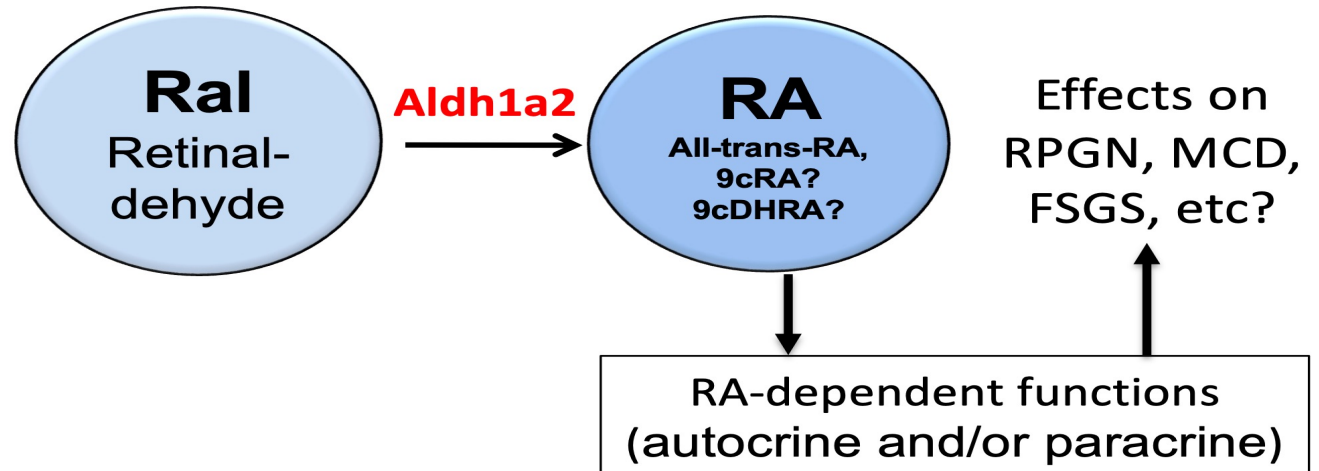
2.2 The APEC hypothesis: ALDH1A2/RA in the Great Wall of glomeruli

ALDH1A2-mediated retinoic acid in PECs defends against glomerular and tubular injury and its dysregulation has detrimental effects on AKI and CKD.

A. Aldh1a2 expression is enriched in human and mouse PECs



B. Aldh1a2 is a key RA synthesizing enzyme



[Single-cell RNA sequencing data locate ALDH1A2-mediated retinoic acid synthetic pathway to glomerular parietal epithelial cells.](#)

Liu WB, et al. Exp Biol Med (Maywood). 2024 Sep 18;249:10167.

结论 Conclusions

1. 中西医认识“肾”的角度不同，但不乏共识。这为整合两种智慧体系解决肾的健康问题提供了前提。
 2. 整合中医学理论提示，加强防御与代谢机制的研究有望科学阐释“正气”的本质，并为肾脏病学、药理学研究提供“新”途径。
 3. 以中医药为师，大胆假设，小心求证，整合中医药有望为明日肾脏病学、药理学做出突破性贡献。
1. TCM and modern medicine observe “kidney” from different angles and share common ground for integration.
 2. ICM emphasizes studies on defence and metabolic mechanisms, which underlie *Healthy qi / Yang qi in TCM*, in catalysing medical innovation.
 3. Seeking inspirations from TCM, making bold assumptions and verifying carefully, ICM will bring about new breakthroughs.

鸣谢 Acknowledgements

☐ Funders



PuraPharm PhD Scholarship, Sino-British Fellowship Trust, UK Centre of Chinese Medicine, Pheonix Medical Ltd., Dr Dan Jiang, Dr Zhao (anonymous donation), and Other Donors to the *King's CICM Fund* and *King's CICM Memorial Awards*.

☐ Co-workers

- **55 Members of the Honorary Advisory Board** (Co-chaired by Prof. Y Cheng, Yale, and Prof C Lau, HKU)
- **A growing list of King's CICM Faculty Members:** Dr. Q Xu (Director), Prof. Y Wang (Co-Director), Dr. M Zhang (Assistant Director), Professors F Alberti, K Al-Jamal, C Berry, L Gnudi, I Macdougall, K Rahman, E So, and Drs H Gu, Z Huo, Y Li, R Siow, P So, Q Zhang, Mr. M Noor and Ms. T Laattala.
- **A growing list of internal and external collaborators:** Prof K Brown (KCL), Mr. G He (CCMUK), J Kopp (NIH), M Simmonds (Kew), Z Zhao (HKBU), L Fu (CACMS), C Peng (CDUTCM), Q Wu, W Liu (BUCM), P Wilson (UCL), F Tam (Imperial), D Fraser (Cardiff), ...
- **Special thanks go to** colleagues of the **FP7 GP-TCM Consortium** and the **GP-TCM Research Association**, and the **KCL/KHP Senior Management and Fundraising team**, especially Prof. Graham Lord, Mr O Mangham and Mr. A Page.





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Website：<https://www.kingscicm.org/>



抛砖引玉，谢谢！

Thank YOU for your attention.