Δίαιτα και ΧΝΝ
Σχολιασμός

Αντωνία Ν. Παπαδάκη
Διευθύντρια
ΜΤΝ/ Νεφρολογικής Κλινικής
Γ.Ν.Ν. Χανίων

ORIGINAL ARTICLES: CHRONIC KIDNEY DISEASE

Healthy Dietary Patterns and Incidence of CKD
A Meta-Analysis of Cohort Studies

Bach, Katrina E.; Kelly, Jaimon T.; Palmer, Suetonia C.; Khalesi, Saman; Strippoli, Giovanni F. M.; Campbell, Katrina L.
Author Information

CJASN 14(10):p 1441-1449, October 2019. | DOI: 10.2215/CJN.00530119

How does diet affect kidney outcomes?

CJASN
Clinical Journal of American Society of Nephrology

Systematic review & meta-analysis

- 18 cohort studies
- 630,108 adults
- Median follow up 10.4 years
- Low risk of bias in included studies

Evidence certainty

CKD	Moderate
eGFR decline rate	Low
Incident albuminuria	Low

Healthy dietary patterns

Encouraged higher intake of

Fruits and vegetables; Legumes; Nuts; Whole grains; Fish; Low-fat dairy

Encouraged lower intake of

Red meat; Sodium; Processed meat; Sugar-sweetened beverages

A healthy dietary pattern

was associated with **a lower incidence of CKD** (OR 0.71, 0.60 – 0.82)

was associated with **a lower incidence of albuminuria** (OR 0.77, 0.59-0.99)

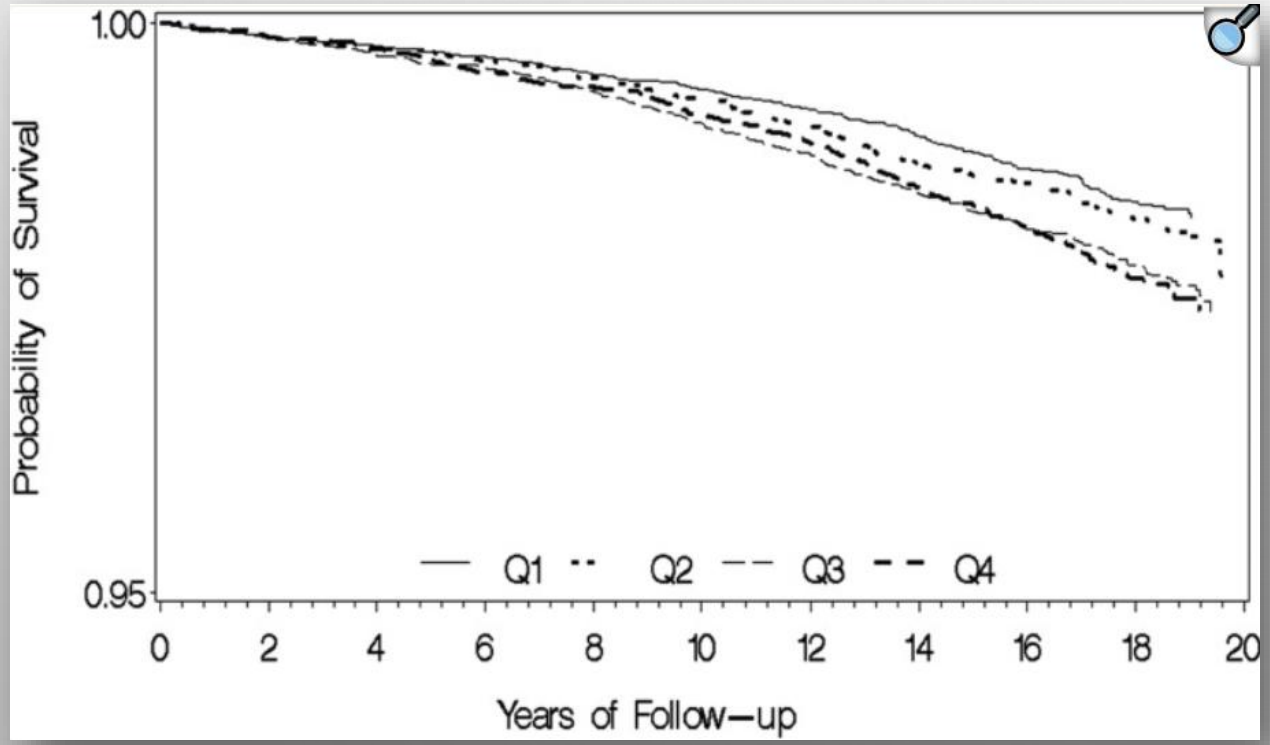
was not associated with **rate of eGFR decline** (OR 0.70, 0.49 – 1.01)

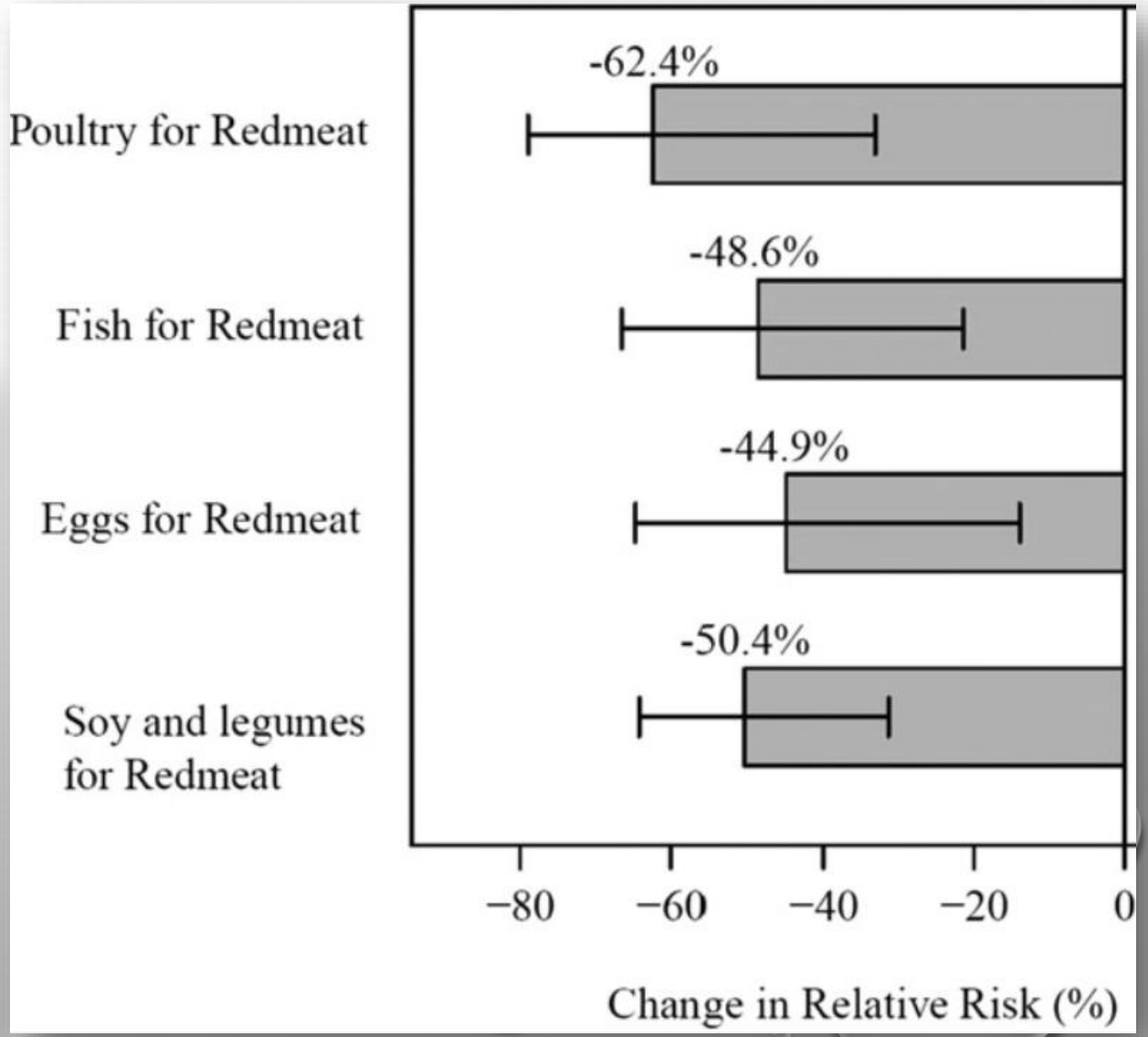
Conclusions A healthy dietary pattern may prevent chronic kidney disease and albuminuria.

Katrina E. Bach, Jaimon T. Kelly, Suetonia C. Palmer, et al. ***Healthy dietary patterns and incidence of chronic kidney disease: A meta-analysis of cohort studies.*** CJASN doi: https://doi.org/10.2215/CJN.00530119. **Visual Abstract by Michelle Lim, MBChB**

Μεταανάλυση
18 κοορτές
~600.000 ασθενείς

63.267 Κίνα/ Γενικός πληθυσμός
Τυχαιοποιημένη ελεγχόμενη
Παρακολούθηση για ~15 έτη
ESRD





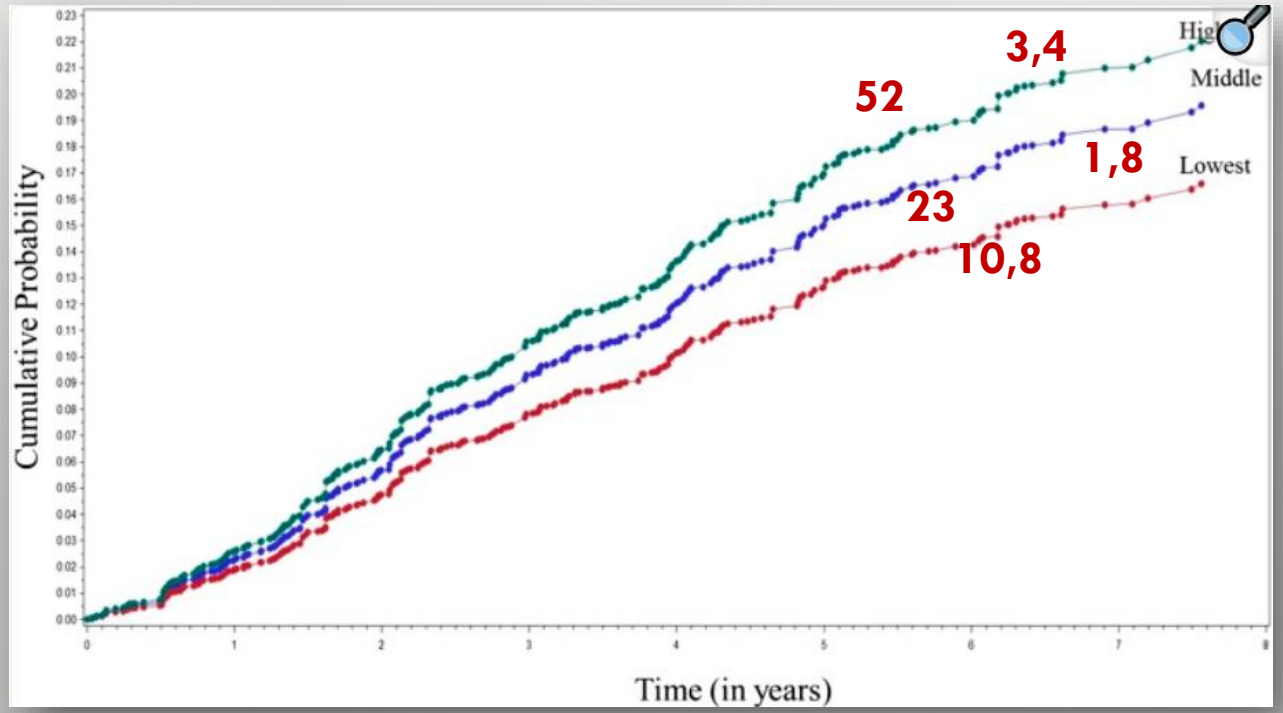
J Am Soc Nephrol. 2015 Jul;26(7):1693-700. doi: 10.1681/ASN.2014040332. Epub 2015 Feb 12.

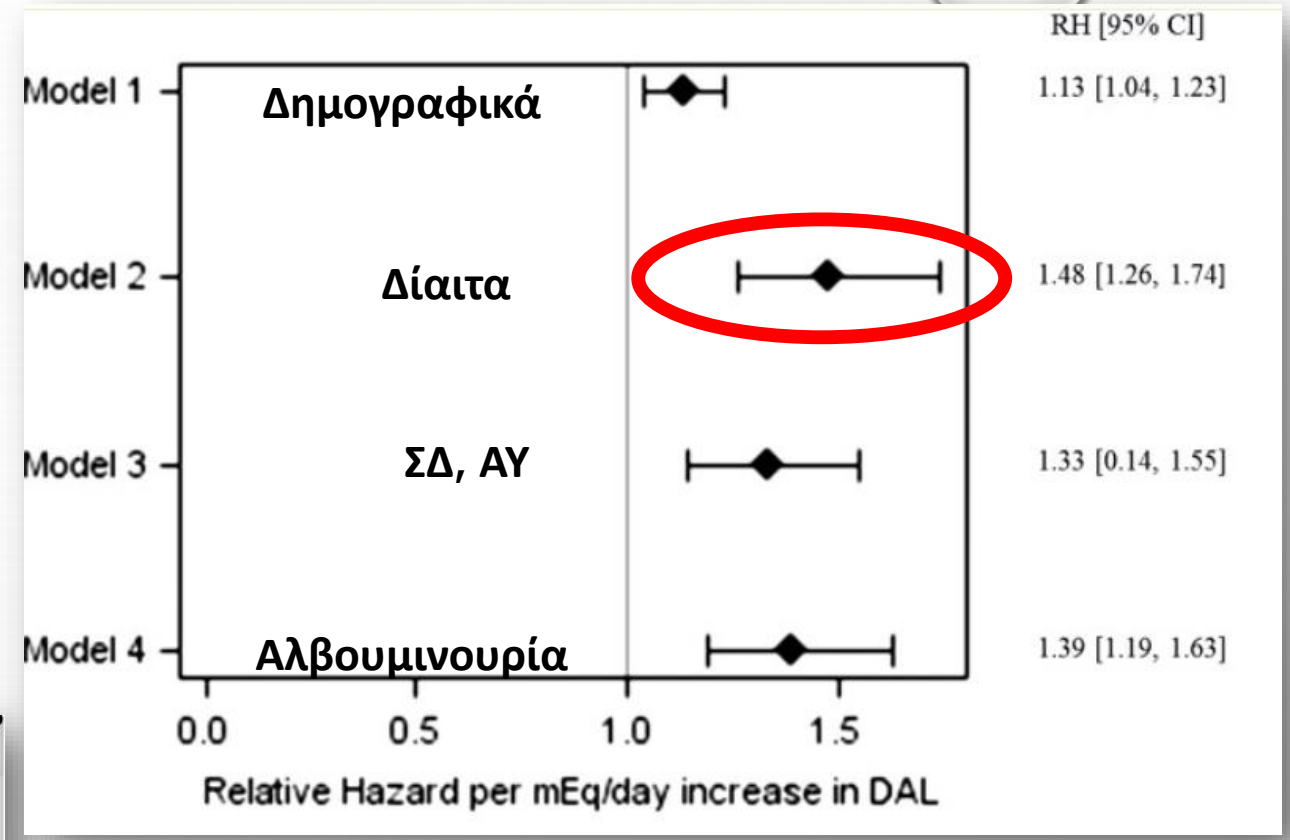
High Dietary Acid Load Predicts ESRD among Adults with CKD

Tanushree Banerjee [1], Deidra C Crews [2], Donald E Wesson [3], Anca M Tilea [4], Rajiv Saran [5], Nilka Ríos-Burrows [6], Desmond E Williams [6], Neil R Powe [7]; Centers for Disease Control and Prevention Chronic Kidney Disease Surveillance Team

Κρέας +σιτηρά
vs
φρούτα +λαχανικά

Κοορτή
1480 ασθενείς/ CKD 3+4
14 έτη





Prevention and treatment of protein energy wasting in chronic kidney disease patients: a consensus statement by the International Society of Renal Nutrition and Metabolism

T. Alp Ikizler[1] · Noel J. Cano[2] · Harold Franch[3] · ... · Daniel Teta[10] · Angela Yee-Moon Wang[11] · Christoph Wanner[12] ... Show more

Table 1 | Recommended minimum protein, energy, and mineral intakes for chronic kidney disease (CKD) and maintenance dialysis patients

	Nondialysis CKD	Hemodialysis	Peritoneal dialysis
Protein	0.6-0.8 g/kg/day Illness 1.0 g/kg	>1.2 g/kg/day	>1.2 g/kg/day Peritonitis >1.5 g/kg
Energy	30–35[a] kcal/kg/day	30–35[a] kcal/kg/day	30–35[a] kcal/kg/day including kcal from dialysate
Sodium	80–100 mmol/day	80–100 mmol/day	80–100 mmol/day
Potassium	<1 mmol/kg if elevated	<1 mmol/kg if elevated	Not usually an issue
Phosphorus	800–1000 mg and binders if elevated	800–1000 mg and binders if elevated	800–1000 mg and binders if elevated

Greater than 50% of high biological value protein (that is, complete protein sources, containing the full spectrum of essential amino acids) is recommended.
[a]Based on physical activity level. In sedentary elderly adults, recommended energy intake is 30 kcal/kg/day. All recommendations are based on ideal body weight. Regular follow-up supports compliance.

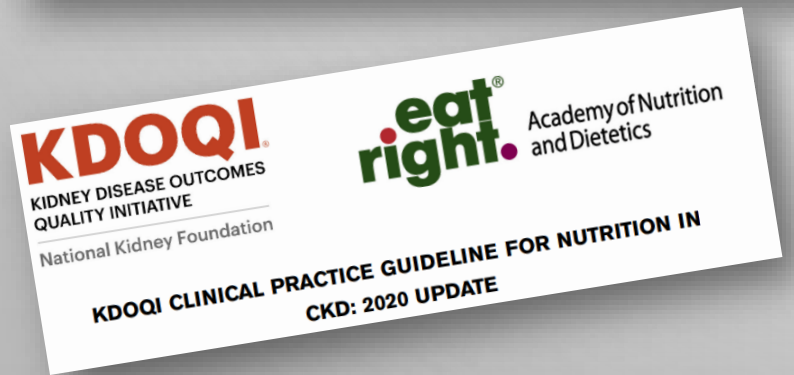
Guideline 3: Protein and Energy Intake

3.0 Statements on Protein Amount

Protein Restriction, CKD Patients Not on Dialysis and Without Diabetes

3.0.1 In adults with CKD 3-5 who are metabolically stable, we recommend, under close clinical supervision, protein restriction with or without keto acid analogs, to reduce risk for end-stage kidney disease (ESKD)/death (*1A*) and improve quality of life (QoL) (*2C*):

- a low-protein diet providing 0.55–0.60 g dietary protein/kg body weight/day, or
- a very low-protein diet providing 0.28–0.43 g dietary protein/kg body weight/day with additional keto acid/amino acid analogs to meet protein requirements (0.55–0.60 g /kg body weight/day)



Protein Restriction, CKD Patients Not on Dialysis and With Diabetes

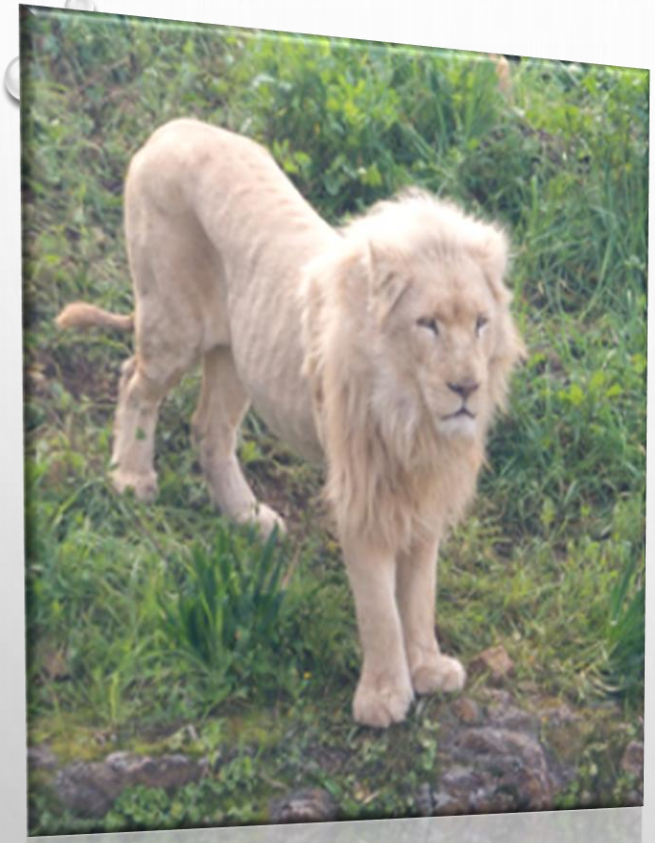
3.0.2 In the adult with CKD 3-5 and who has diabetes, it is reasonable to prescribe, under close clinical supervision, a dietary protein intake of 0.6 - 0.8 g/kg body weight per day to maintain a stable nutritional status and optimize glycemic control (OPINION).

Dietary Protein Intake, MHD and PD Patients Without Diabetes

3.0.3 In adults with CKD 5D on MHD (*1C*) or PD (OPINION) who are metabolically stable, we recommend prescribing a dietary protein intake of 1.0-1.2 g/kg body weight per day to maintain a stable nutritional status.

Dietary Protein Intake, Maintenance Hemodialysis and Peritoneal Dialysis Patients With Diabetes

3.0.4 In adults with CKD 5D and who have diabetes, it is reasonable to prescribe a dietary protein intake of 1.0-1.2 g/kg body weight per day to maintain a stable nutritional status. For patients at risk of hyper- and/or hypoglycemia, higher levels of dietary protein intake may need to be considered to maintain glycemic control (OPINION).



Υποθρεψία (PEW)

- Ημερήσια πρόσληψη πρωτείνης 1,2gr/ Kg ΒΣ
- Θερμιδική κάλυψη ~30-35 Kcal/Kg /day ΒΣ
- Διατήρηση φυσιολογικών επιπέδων υδατοδιαλυτών βιταμινών και FA
- 1999 ~ 1% 20 έτη TN / 2018 ~8,6%
- Γήρανση πληθυσμού, ↑ προσδόκιμου επιβίωσης
- Ουραιμική υποθρεψία/ καχεξία
- Malnutrition Inflammation Atherosclerosis (MIA)

Benefits and Risks of Low-Protein Diet (LPD) in Chronic Kidney Disease

BENEFITS

- Slows progression of renal function decline
- Reduces uremic symptoms and azotemia
- Reduces phosphate and acid loads
- Delays dialysis initiation
- May reduce mortality, particularly for CVD

RISKS

- Protein–energy wasting (PEW)
- Sarcopenia
- Frailty

↓ CVD–
↑ CVD-related mortality

RECOMMENDATIONS

- LPD should be prescribed in patients with CKD
- Consider adherence, age, nutritional status
- Individualized diet therapy:
  - LPD. VLPD with adequate energy intake and/or supplemented with ketoacids

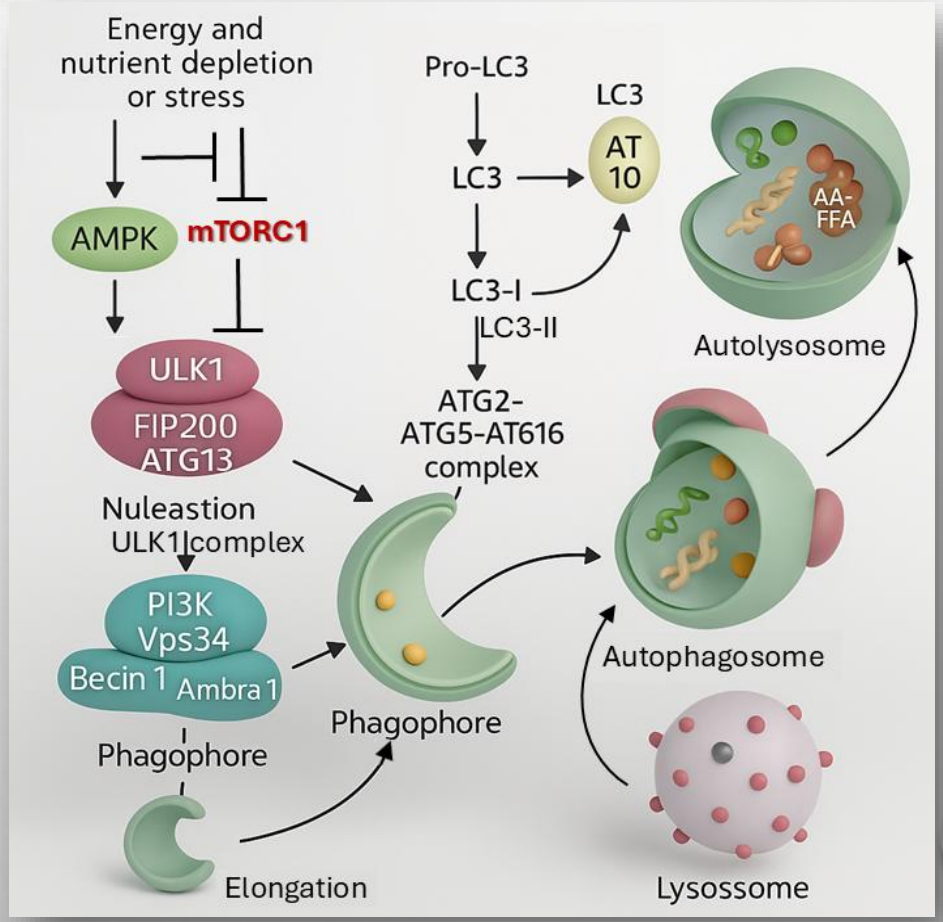
nutrients

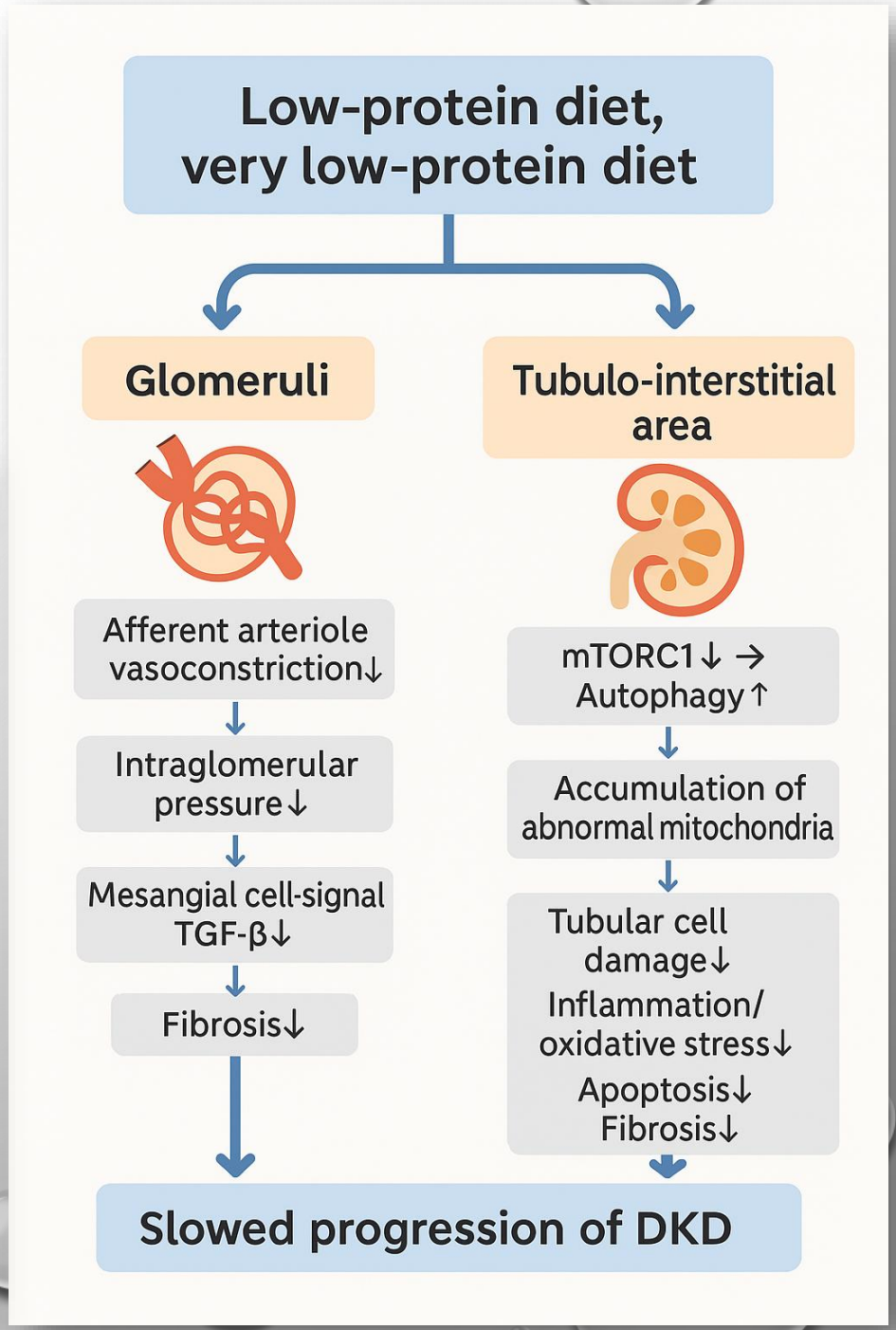
MDPI

Nutrients. 2018 Apr 27;10(5):544. doi: 10.3390/nu10050544

A Low-Protein Diet for Diabetic Kidney Disease: Its Effect and Molecular Mechanism, an Approach from Animal Studies

Munehiro Kitada [1,2,*], Yoshio Ogura [1], Itaru Monno [1], Daisuke Koya [1,2]





NARRATIVE REVIEW · Volume 67, Issue 2, P307-317, February 2016

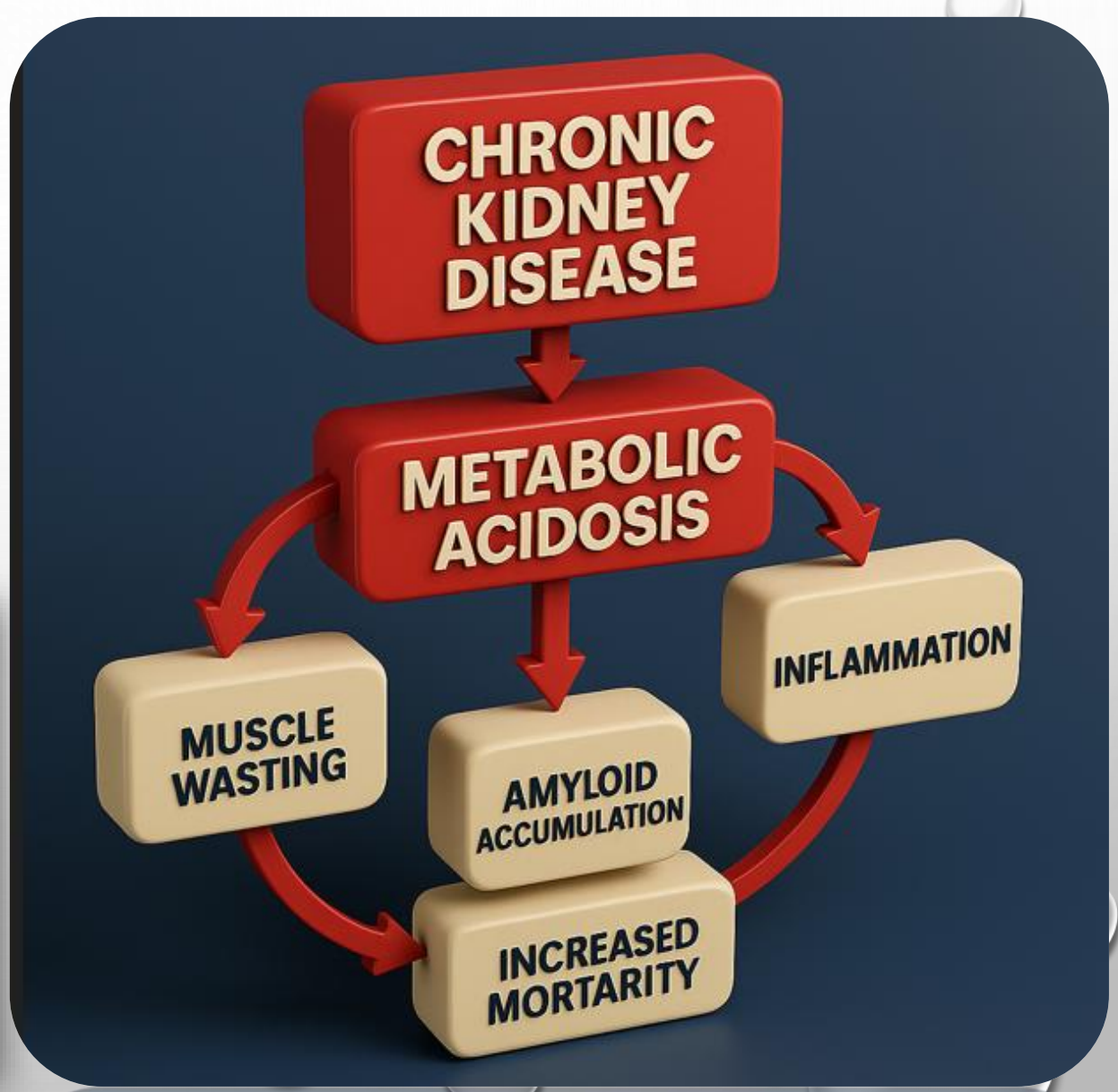
Metabolic Acidosis of CKD: An Update

Jeffrey A. Kraut, MD [1,2] · Nicolaos E. Madias, MD [3,4]

Affiliations & Notes · Article Info

Adverse Effects of the Metabolic Acidosis of Chronic Kidney Disease

- Increased degradation of muscle protein with muscle wasting and suppression of growth in children
- Dissolution of bone and bone disease
- Decreased albumin synthesis with predisposition to hypoalbuminemia
- Progression of chronic kidney disease
- Stimulation of inflammation
- Impairment of insulin secretion and responsiveness
- Stimulation of amyloid accumulation
- Increased risk for death



Guideline 6: Electrolytes

6.1 Statements on Acid Load

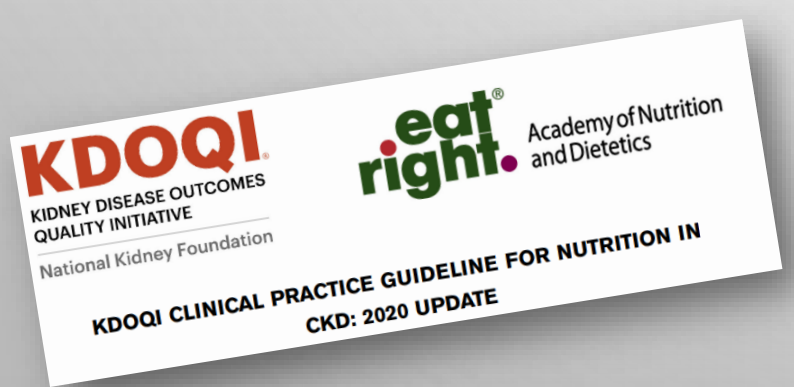
Dietary Management of Net Acid Production (NEAP)

6.1.1 In adults with CKD 1-4, we suggest reducing net acid production (NEAP) through increased dietary intake of fruits and vegetables (*2C*) in order to reduce the rate of decline of residual kidney function.

Bicarbonate Maintenance

6.1.2 In adults with CKD 3-5D, we recommend reducing net acid production (NEAP) through increased bicarbonate or a citric acid/sodium citrate solution supplementation (*1C*) in order to reduce the rate of decline of residual kidney function.

6.1.3 In adults with CKD 3-5D, it is reasonable to maintain serum bicarbonate levels at 24-26 mmol/L (*OPINION*).



Kidney Disease and the Westernization and Industrialization of Food

Holly Kramer, MD, MPH

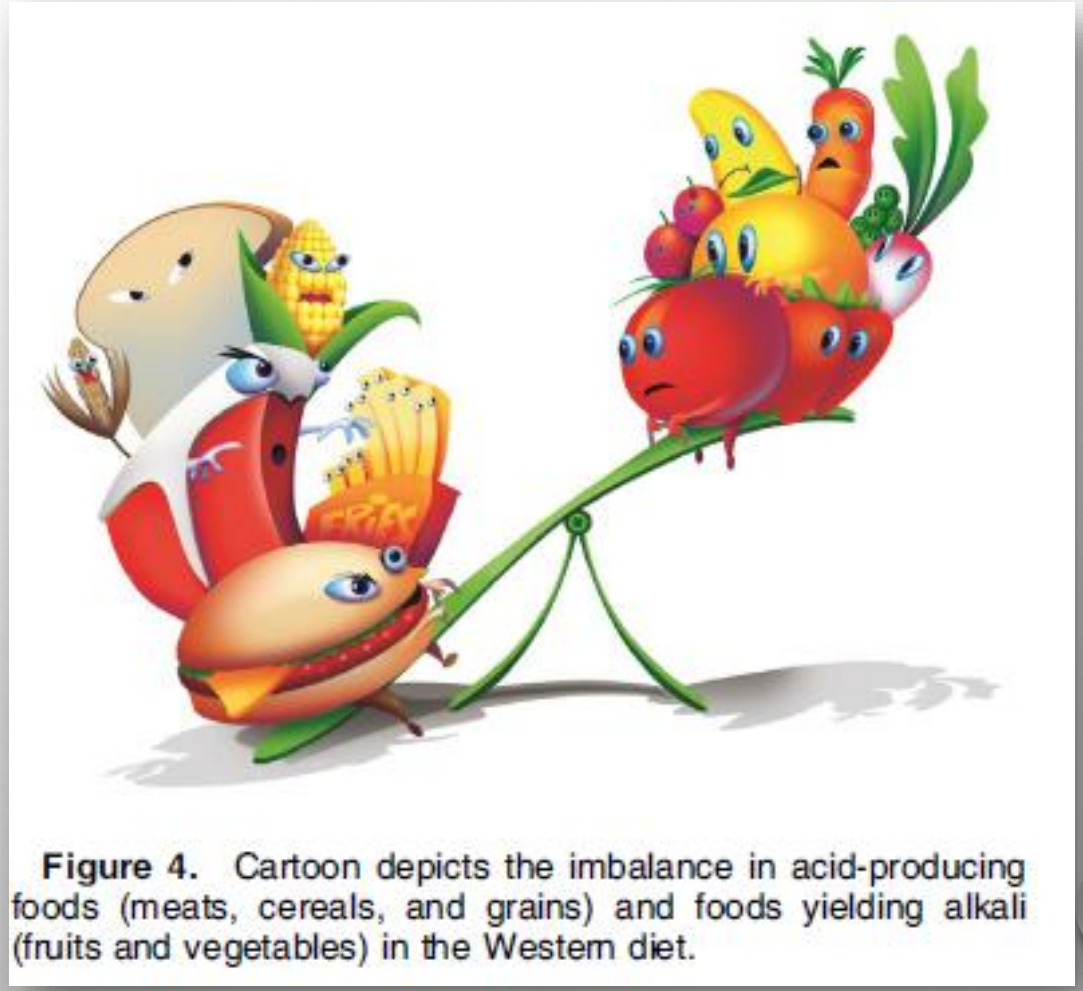
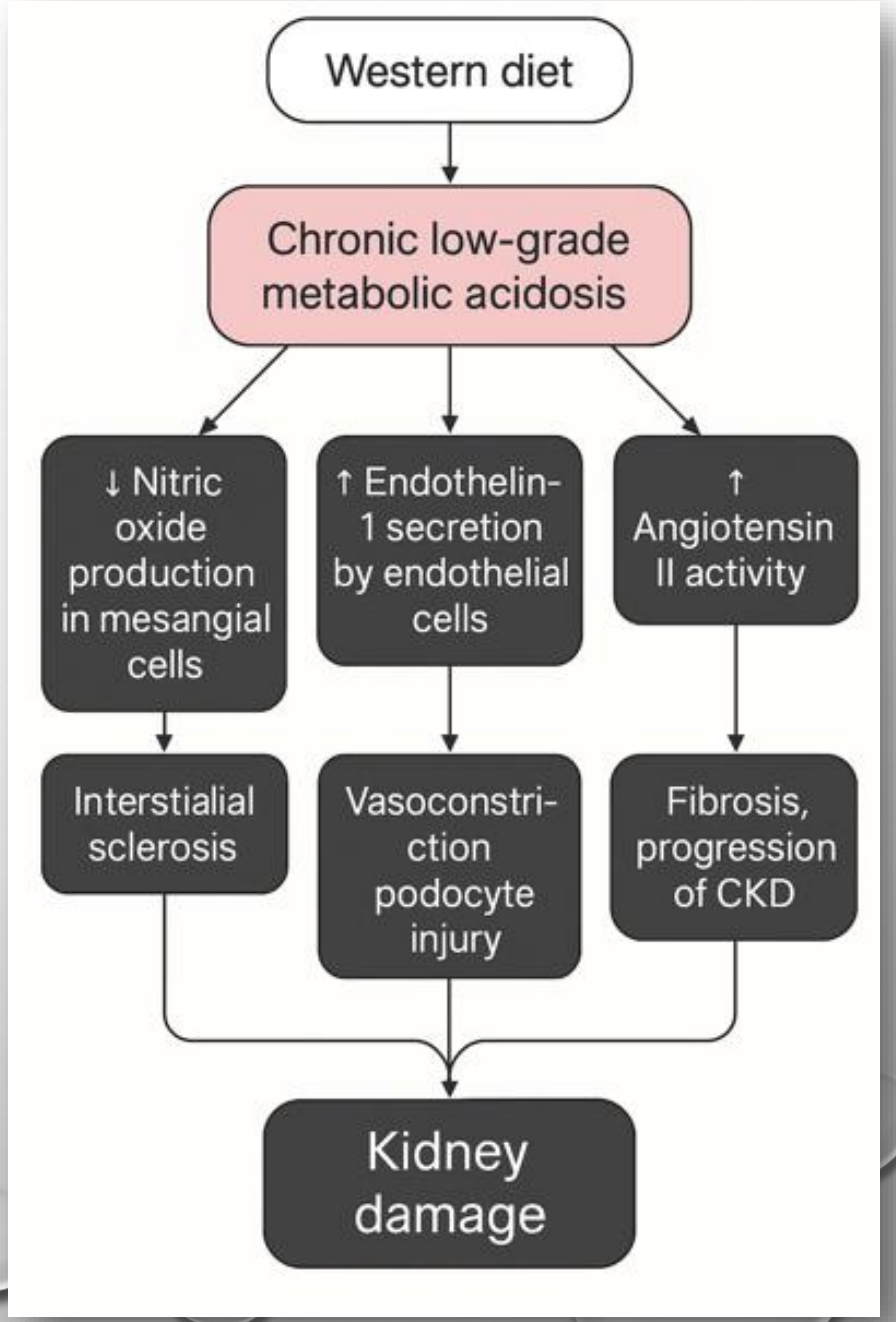
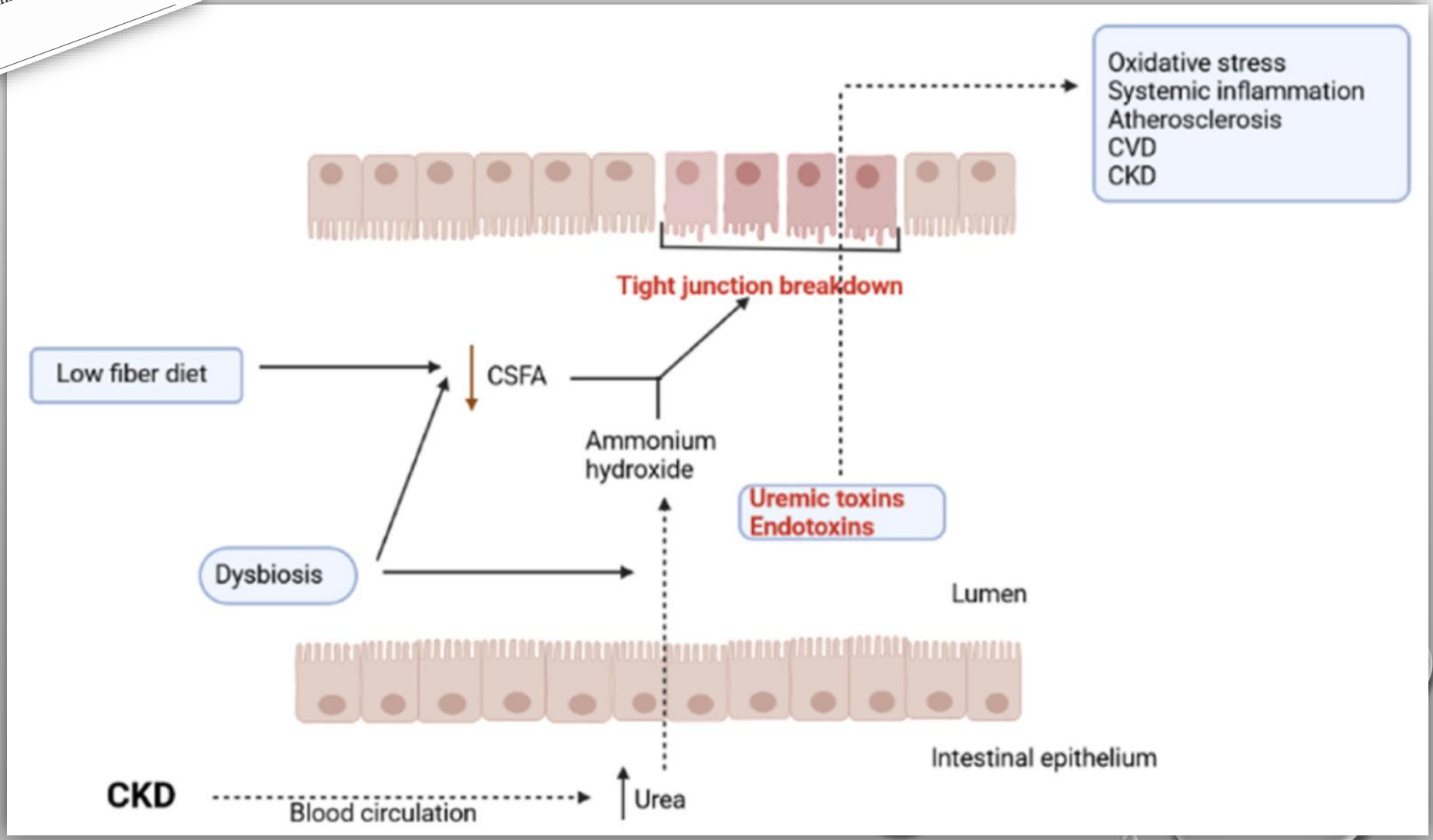


Figure 4. Cartoon depicts the imbalance in acid-producing foods (meats, cereals, and grains) and foods yielding alkali (fruits and vegetables) in the Western diet.



P-cresyl
Θειϊκό Ινδοξύλιο
Υδροξείδιο της τριμεθυλανίνης



My Nutrition

Nutrition and Kidney Disease

Aim to cover half of your plate with a variety of colourful **vegetables** and choose two serves of **fruit** every day.

Aim to cover a quarter of your plate with **protein** foods.

Aim to cover a quarter of your plate with **wholegrain** foods.

Image: Canada's Food Guide (Government of Canada) copied from version available at: https://food-guide.canada.ca/en/

Κάλιο

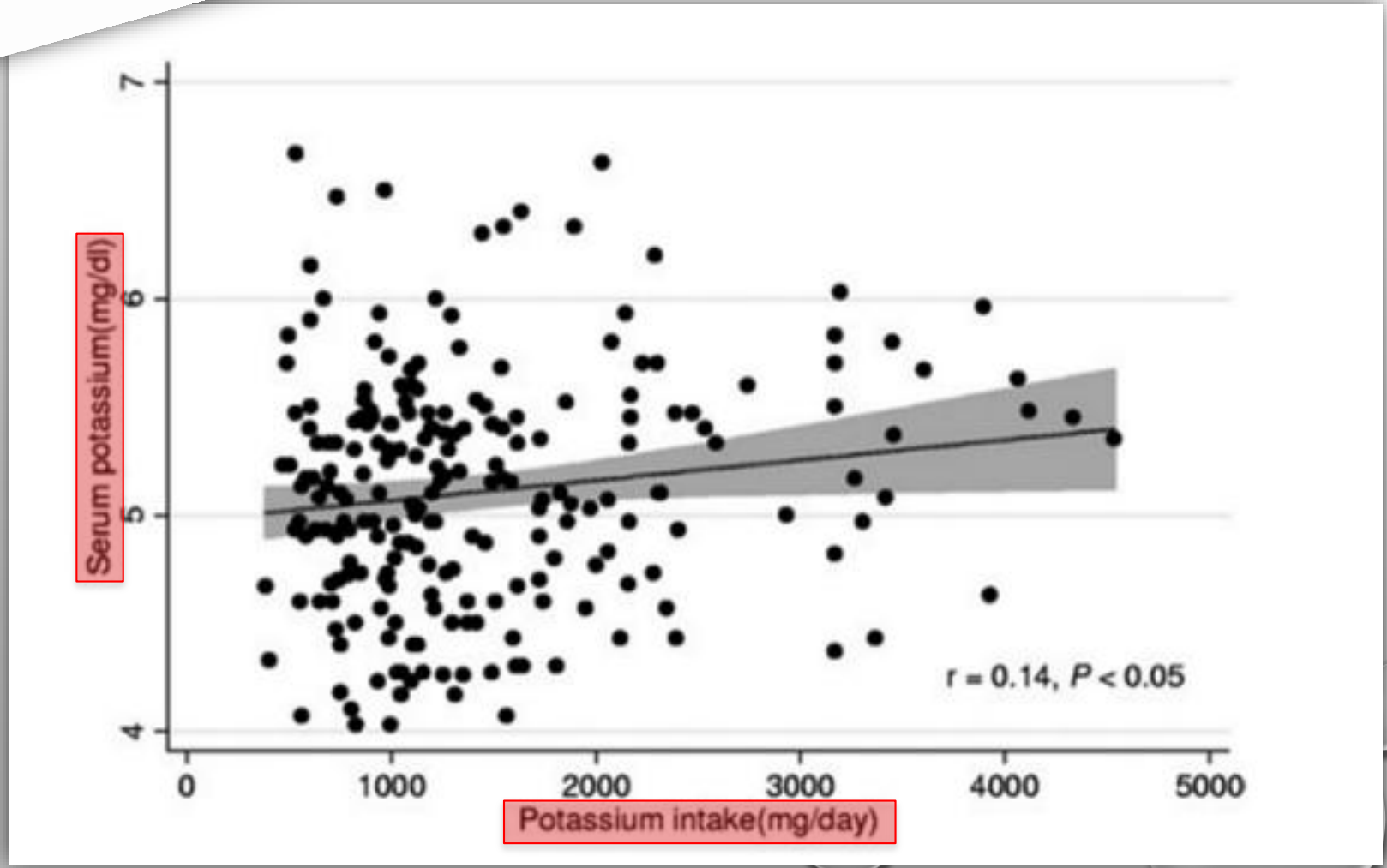
- Ενδοκυττάριο κατιόν (κυτταρικά δυναμικά, νευρομυϊκή αγωγιμότητα, σύσπαση μυϊκών ινών)
- 6,5% K^+>5,5 meq/lt
- Οξεοβασική ισσοροπία, δυσκοιλιότητα, μεταβολισμός S,μετακίνηση K+, συνθήκες αιμοκάθαρσης , φάρμακα
- 3πλάσια αποβολή K^+ από τα κόπρανα, διούρηση
- Διατροφή
- ↑(2) ποσότητα K^+ σε συντηρητικά/ βράσιμο >75% μείωση του K^+

Review > J Ren Nutr. 2016 Sep;26(5):282-7. doi: 10.1053/j.jrn.2016.02.005. Epub 2016 Mar 12.

Nutrient Non-equivalence: Does Restricting High-Potassium Plant Foods Help to Prevent Hyperkalemia in Hemodialysis Patients?

David E St-Jules [1], David S Goldfarb [2], Mary Ann Sevick [3]

Ορμόνες (αλδοστερόνη, ινσουλίνη, επινεφρίνη)
Εξωκυττάριο Ph
Ωσμωτικότητα
Κιρκάδιος ρυθμός
Φάρμακα
Νηστεία
Δυσκοιλιότητα



Κοορτή, 2010
224 ασθενείς, 2%, ↑0,4 meq/lt

1ο παράδοξο:
Περιορισμός στο Κ και υγειϊνή διατροφή

Plant based food is good for your heart.
Potassium is dangerous for your heart…

PROS: plant based food in dialysis patients:

The relationship between regular consumption of fruit and vegetables and cardiovascular health is of potential importance in subjects at risk for cardiovascular diseases, such as dialysis patients.

Regular consumption of plant derived food may have a protective effect on the development of neoplasia, whose risk is increased in dialysis patients.

Plant derived, fiber rich food helps prevent constipation and diverticulosis.

CONS: plant based food in dialysis patients:

Since fruits and vegetables are relatively rich in potassium and poor in calorie, the balance may be unfavorable for caloric intake and risk of hyperkalemia.

Pre dialysis hyperkalemia, and rapid decrease of potassium during dialysis may induce arrhythmia in dialysis patients, which is associated with a higher risk of death.

Potassium binding resins are associated with risk of intestinal ischemia, especially if assumed with sorbitol or laxatives, and may chelate important nutrients.

ΠΙΝΑΚΑΣ 17.11 | Τρόφιμα φυτικής προέλευσης και αναλογία καλιου/γρ φυτικών ινών[69]

Φυτικής προέλευσης τρόφιμο	Περιεκτικότητα σε Κάλιο (mg/g φυτικών ινών)		
	<75	75-150	>150
Φρούτα	Λεμόνια, αχλάδια, μήλα, μύρτιλο, σμέουρα	Βατόμουρο, αποξηραμένα δαμάσκηνα, φράουλες, ροδάκινο, πορτοκάλι, σταφύλι, γκρειπφρουτ, μανταρίνια	Ακτινίδιο, μάνγκο, κεράσια, μπανάνες, βερίκοκα, ανανάς, πεπόνι
Λαχανικά	Βασιλικός, κόκκινο ραδίκι, καρότα, μελιτζάνες	Μανιτάρια, φασολάκια, ελιές, μπρόκολο, πιπεριές, σπαράγγια, πατζάρια, μάραθος, κρεμμύδια, σκόρδο	Ξεφλουδισμένες τομάτες, γλυκοπατάτες, πατάτες, λάχανο, κολοκυθάκι, σέλερυ, γαϊδουράγκαθο,ρόκα, αγγούρι, σέσκουλο, σπανάκι, κολοκύθα
Όσπρια	Αρακάς, ρεβίθια, φακές, λούπινα	Ξηρά φασόλια	Σόγια
Δημητριακά	Κριθάρι, δημητριακά καλαμποκιού, ψωμί σικάλεως, άσπρο ψωμί, ψωμί ολικής άλεσης, μακαρόνια, καστανό ρύζι, αλεύρι	Άσπρο ρύζι	-

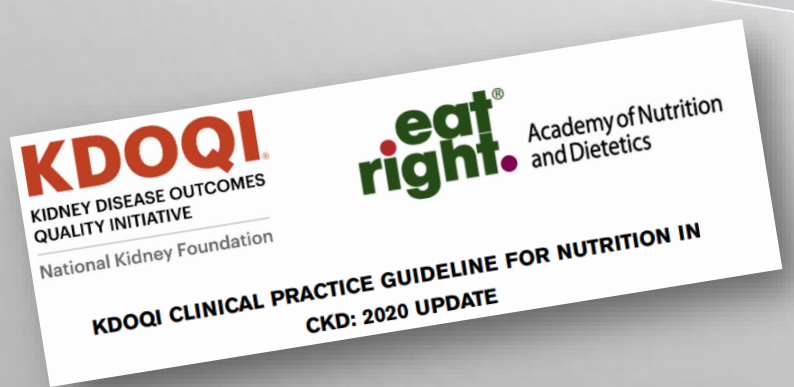
Σχετική απελεθεύρωση της δίαιτας σε K^+ (μαγείρεμα)

Περιορισμός πρόσθετου K^+ (συντηρητικά)

Έλεγχος για φλεγμονή, αιμορραγία, αιμόλυση

Εντατική αιμοκάθαρση

Δεσμευτικά του καλίου

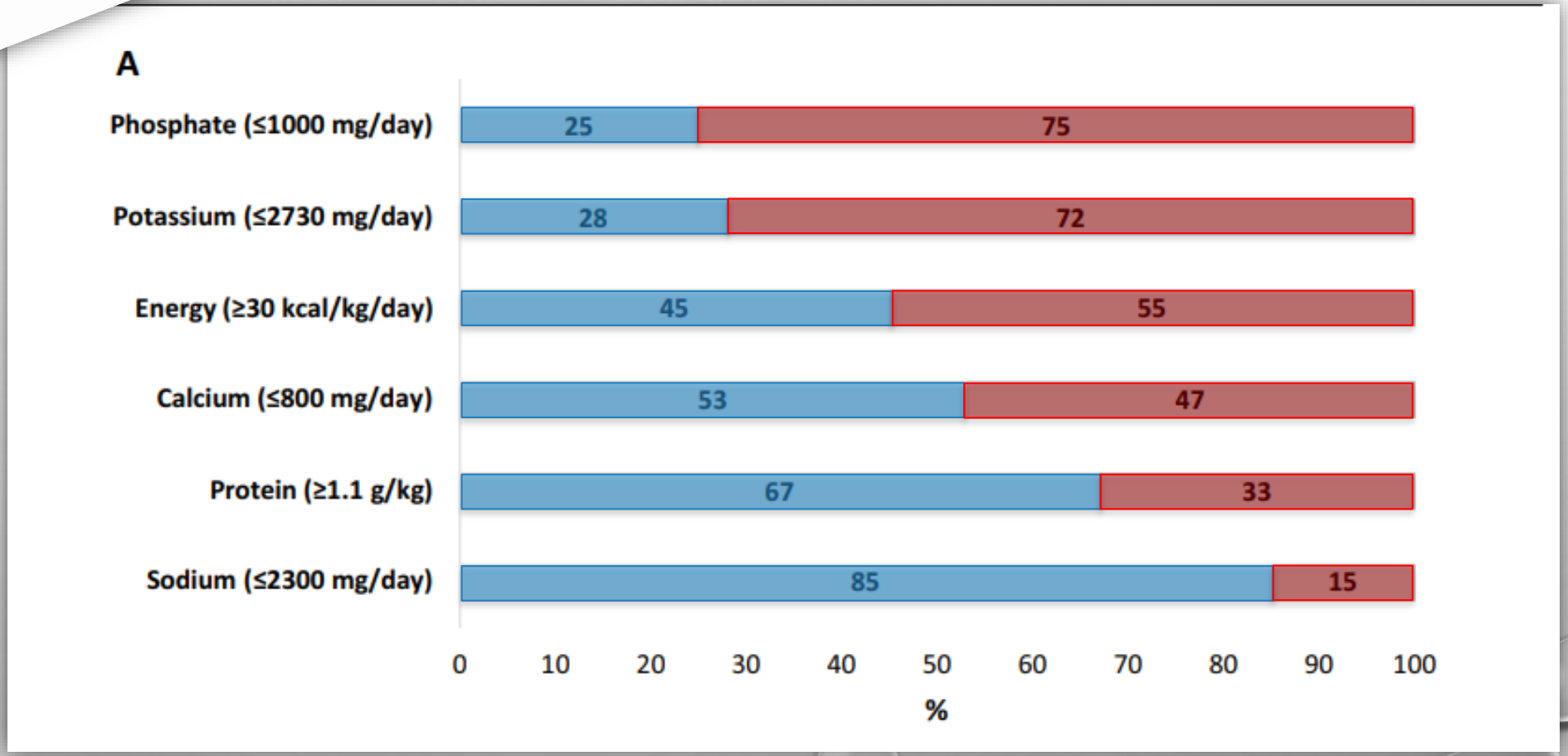


J Nephrol. 2021 Dec;34(6):1999-2007. doi: 10.1007/s40620-020-00962-3. Epub 2021 Feb 16.

Dietary intake in adults on hemodialysis compared with guideline recommendations

Valeria M Saglimbene [1 2], Guobin Su [3 4 5], Germaine Wong [1 6], Patrizia Natale [1 2], Marinella Ruospo [2], Suetonia C Palmer [7], Jonathan C Craig [8], Juan J Carrero [5], Giovanni F M Strippoli [9 10]

DIET-HD/ 2021
N~7000



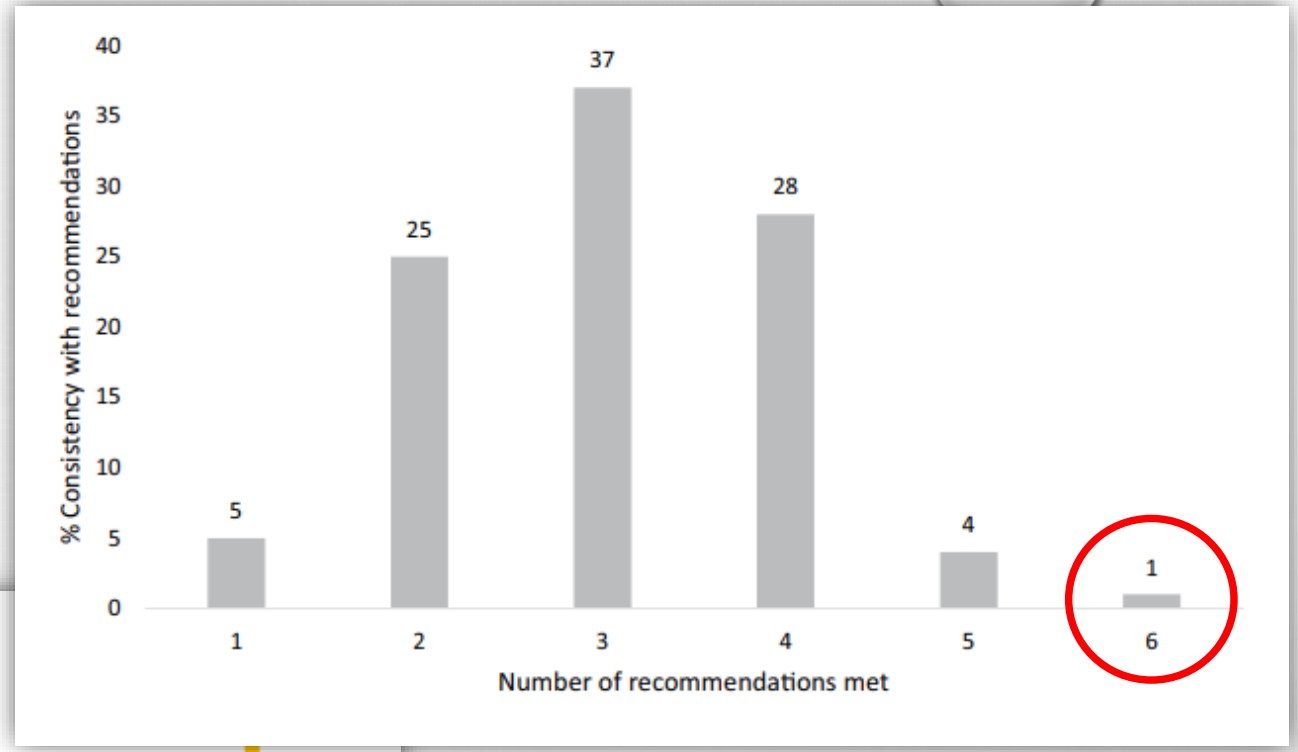
EBPG

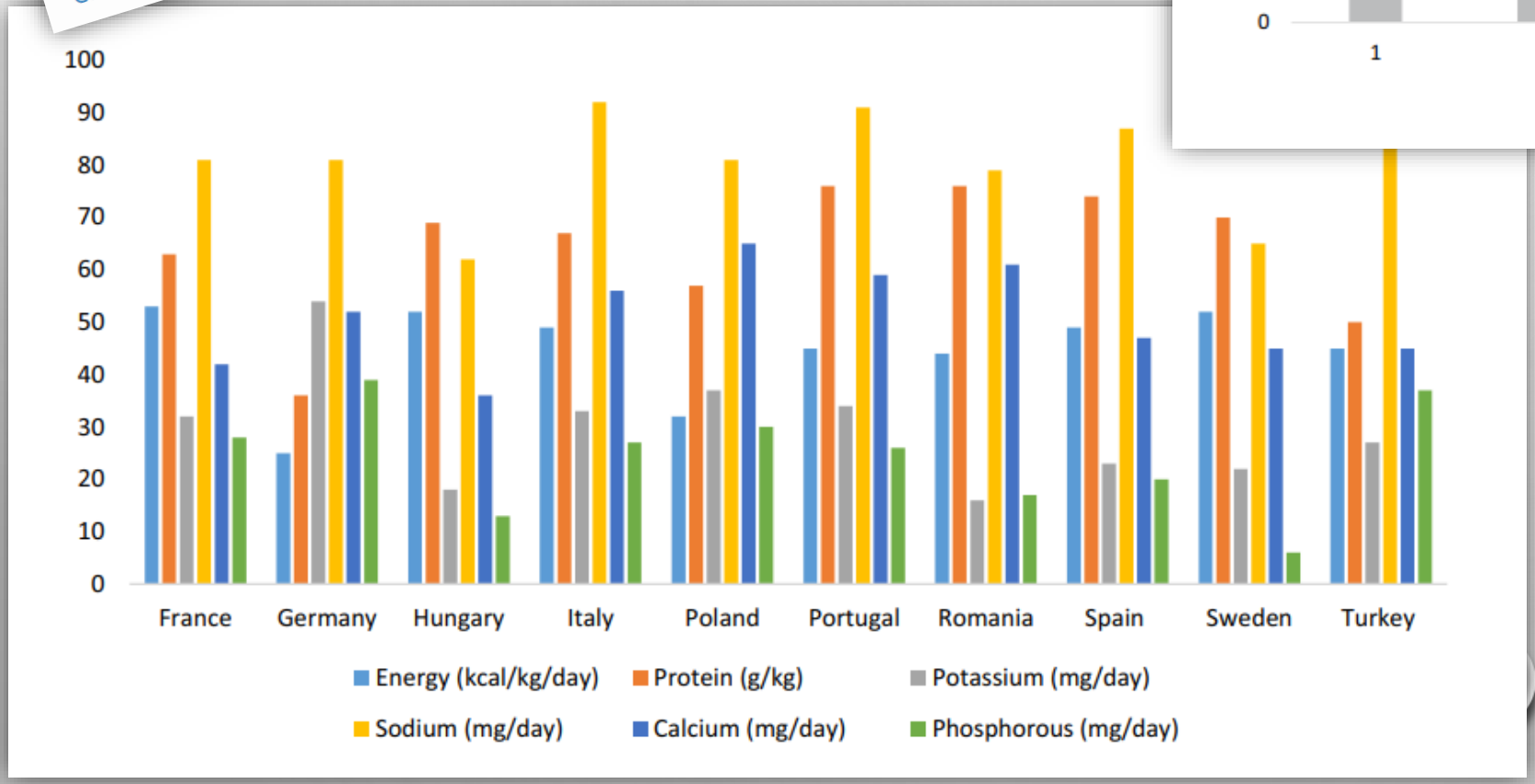
Energy	> 30 Kcal/kg/day
Protein	> 1,1 g/kg
Phosphate	< 1000 mg/day
Potassium	< 2370 mg/day
Sodium	< 2300 mg/day
Calcium	< 800 mg/day

J Nephrol. 2021 Dec;34(6):1999-2007. doi: 10.1007/s40620-020-00962-3. Epub 2021 Feb 16.

Dietary intake in adults on hemodialysis compared with guideline recommendations

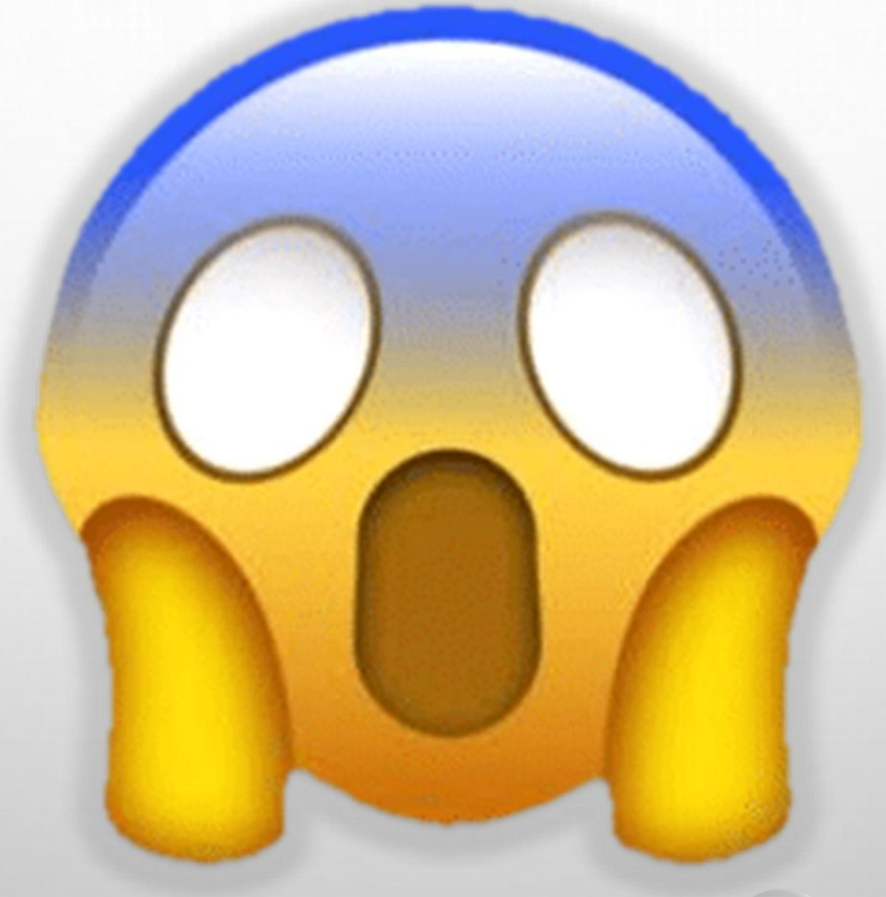
Valeria M Saglimbene [1 2], Guobin Su [3 4 5], Germaine Wong [1 6], Patrizia Natale [1 2], Marinella Ruospo [2], Suetonia C Palmer [7], Jonathan C Craig [8], Juan J Carrero [5], Giovanni F M Strippoli [9 10]





N~10.000

Αφού όλα απαγορεύονται τι μπορώ να τρώω τελικά??



Νέα προσέγγιση- σχετική απελευθέρωση
Συμβουλευτική και εκπαίδευση

Diet Plan

You can eat 1/3 cup of pinto beans unless your phosphorus is high, then you should eat ½ cup of potatoes, unless your potassium is high, then you should eat lots of protein, unless your BUN or phosphorus is high, then you should drink clear broth unless your fluid weight gain is high, then you should eat hard candy unless your glucose is high.... Any questions?

Απλές
Εξατομικευμένες
Στοχευμένες
Έξυπνες

KDOQI
KIDNEY DISEASE OUTCOMES QUALITY INITIATIVE
National Kidney Foundation

eat right. Academy of Nutrition and Dietetics

KDOQI CLINICAL PRACTICE GUIDELINE FOR NUTRITION IN CKD: 2020 UPDATE

Prioritize and simplify instructions!


ΕΛΛΗΝΙΚΗ ΝΕΦΡΟΛΟΓΙΚΗ ΕΤΑΙΡΕΙΑ
27ο Πανελλήνιο Συνέδριο
Νεφρολογίας
20 - 23
Μαΐου 2026
Ξενοδοχείο Astir-Egnatia
Αλεξανδρούπολη
WWW.27PSN.GR