



**Διαταραχές των οστών και μετάλλων  
στη χρόνια νεφρική νόσο**

**Dr. Χρήστος Μπαντής**  
Νεφρολόγος  
Επιμελητής Α΄  
Γ. Ν.Θ. Γ. Παπανικολάου

Ο καλύτερος τρόπος για να μειωθεί ο φώσφορος είναι:

1. Χορήγηση δεσμευτικών
2. Δίαιτα χαμηλών λευκωμάτων
3. Αποφυγή συντηρητικών
4. Αύξηση του Kt/V

Ο FGF-23 αναστέλλει:

1. την παραγωγή της iPTH
2. την 1-υδροξυλάση
3. την έκφραση του συμμεταφορέα νατρίου-φωσφόρου
4. όλα τα παραπάνω

Ο φώσφορος αυξάνει τα επίπεδα της iPTH δρώντας πάνω:

1. στην κλωθώ

2. στον διαμεμβρανικό του υποδοχέα

3. στον κυτταροπλασματικό του υποδοχέα

4. στον υποδοχέα του ασβεστίου

Αυξημένη θνησιμότητα παρατηρείται σε:

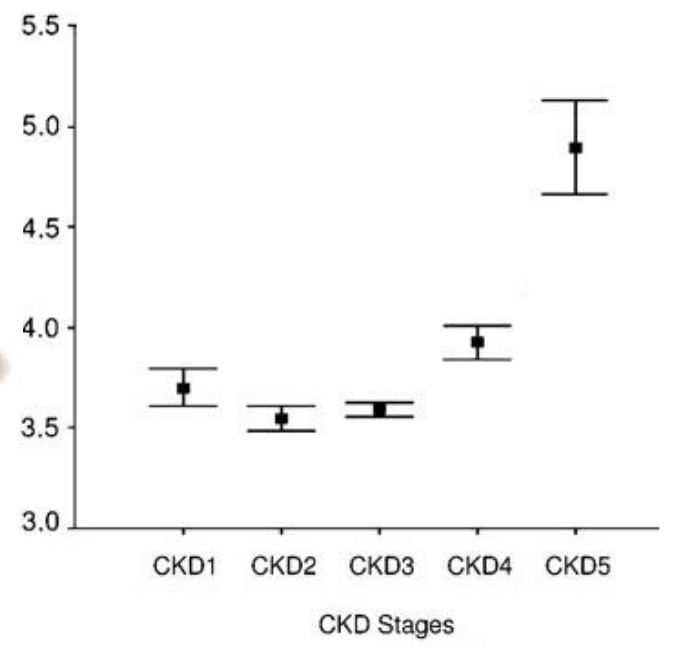
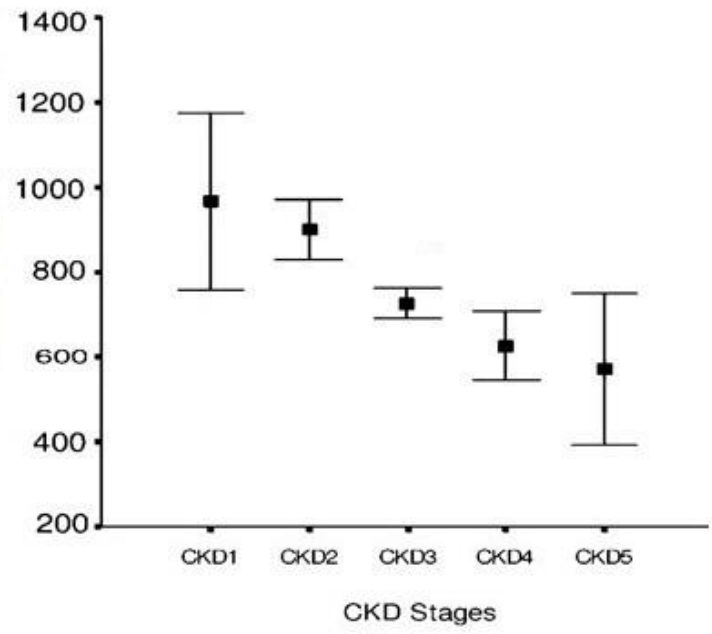
1. ↑ iPTH

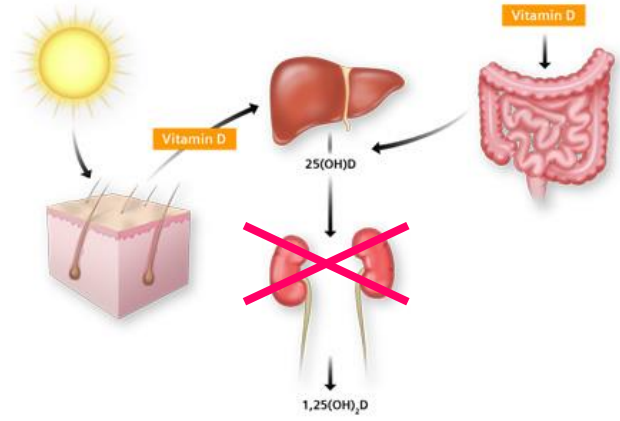
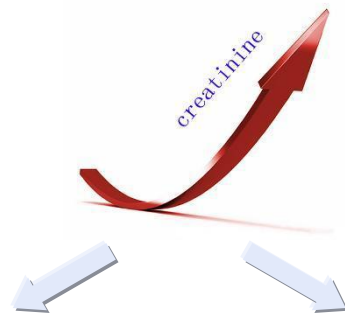
2. ↓ iPTH

3. ↑ FGF-23

4. όλα τα παραπάνω

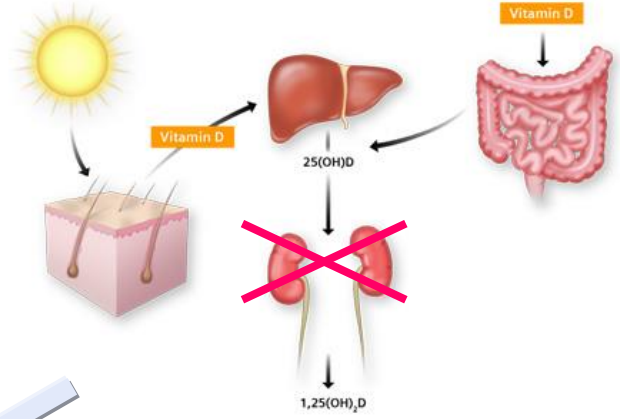






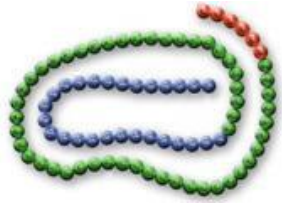
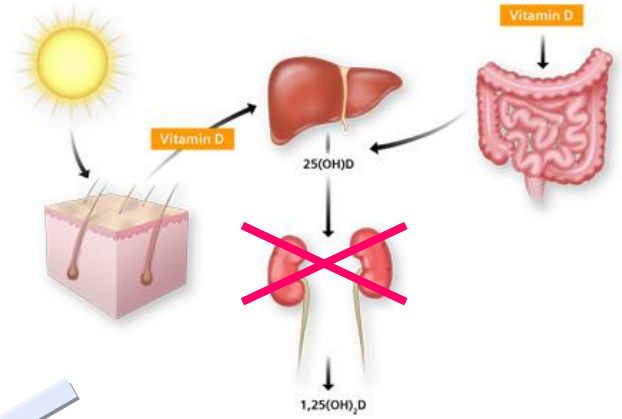


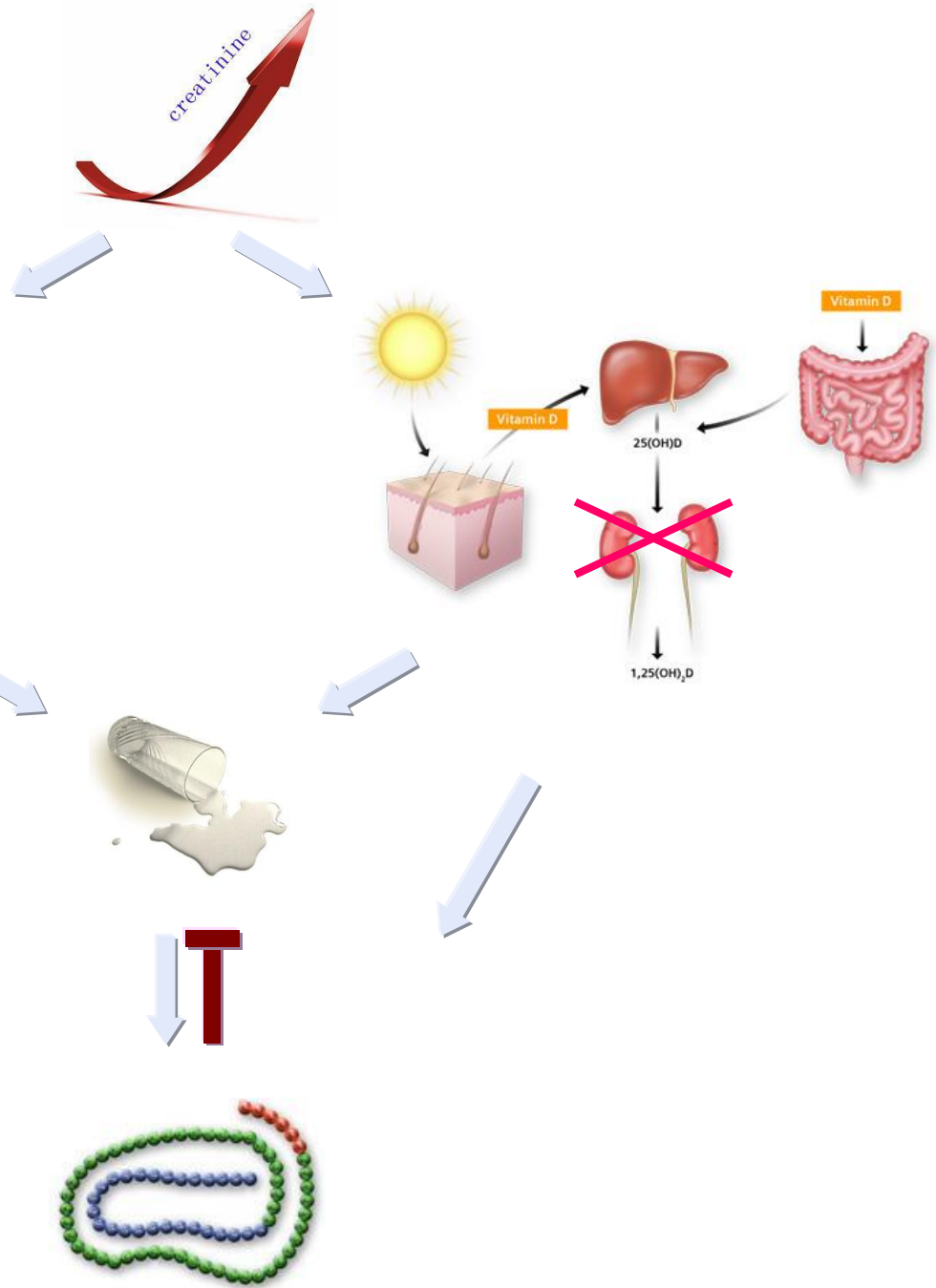
creatinine





creatinine

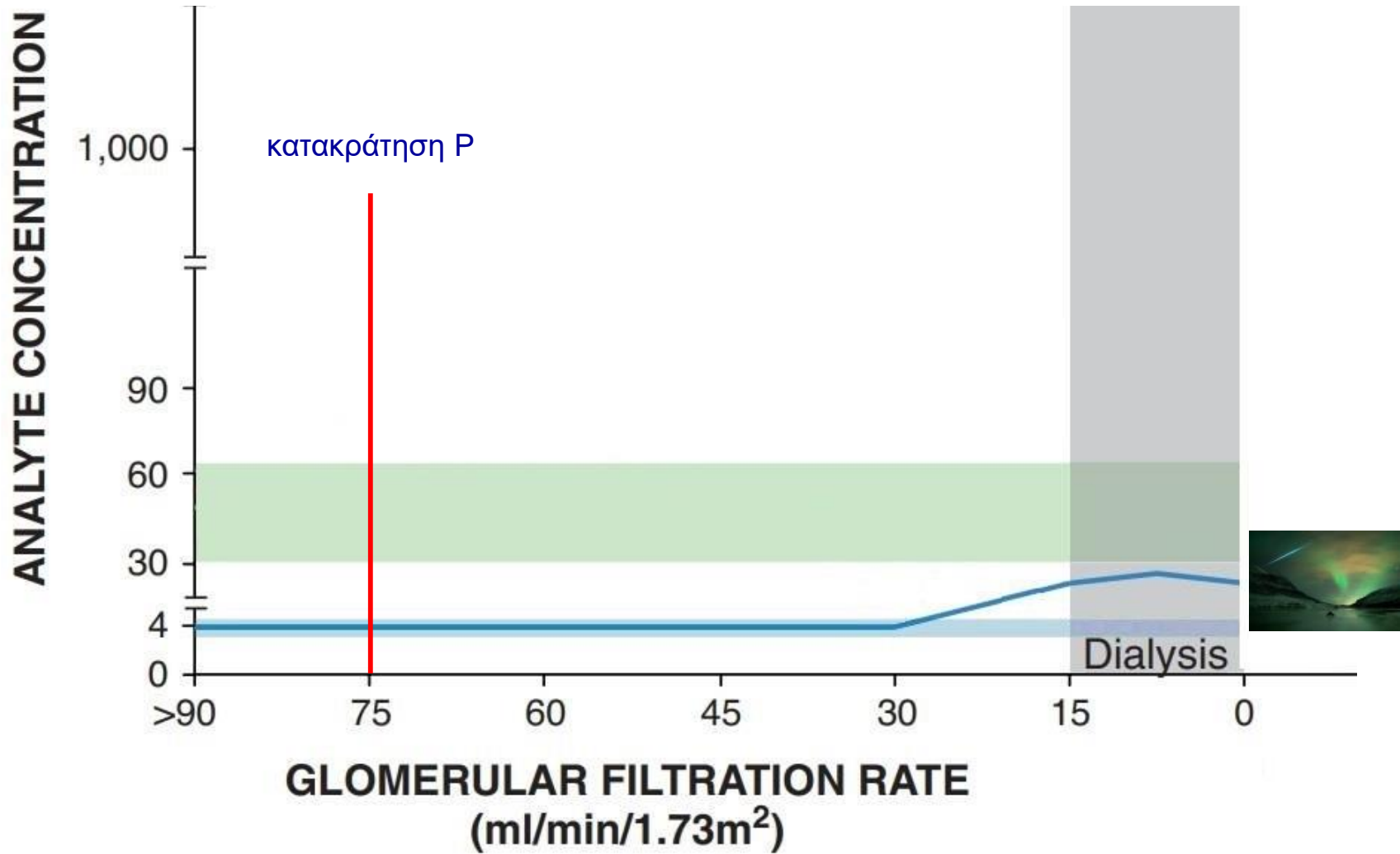




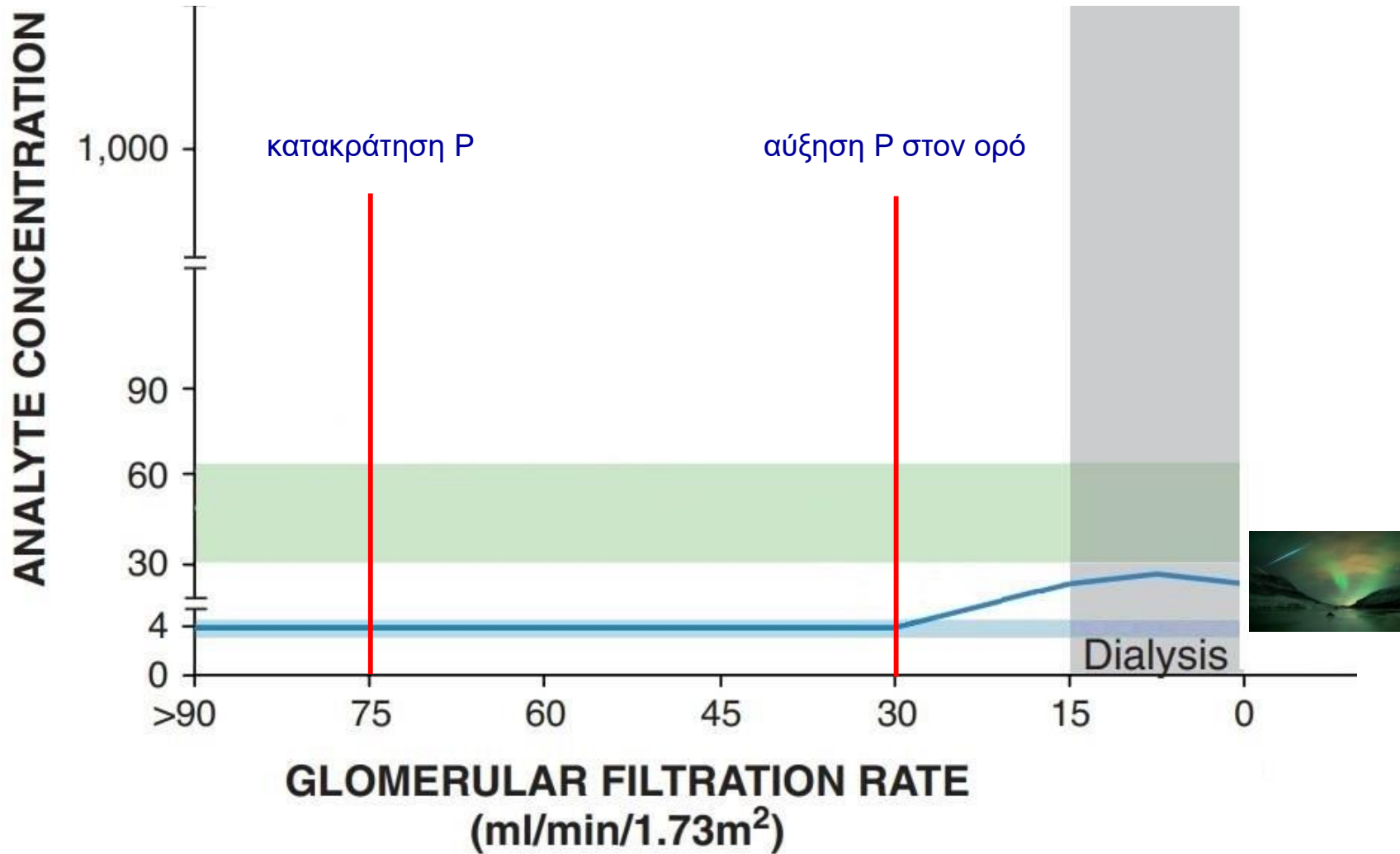
# ON THE PATHOGENESIS OF THE UREMIC STATE: AN EXPOSITION OF THE "TRADE-OFF HYPOTHESIS"



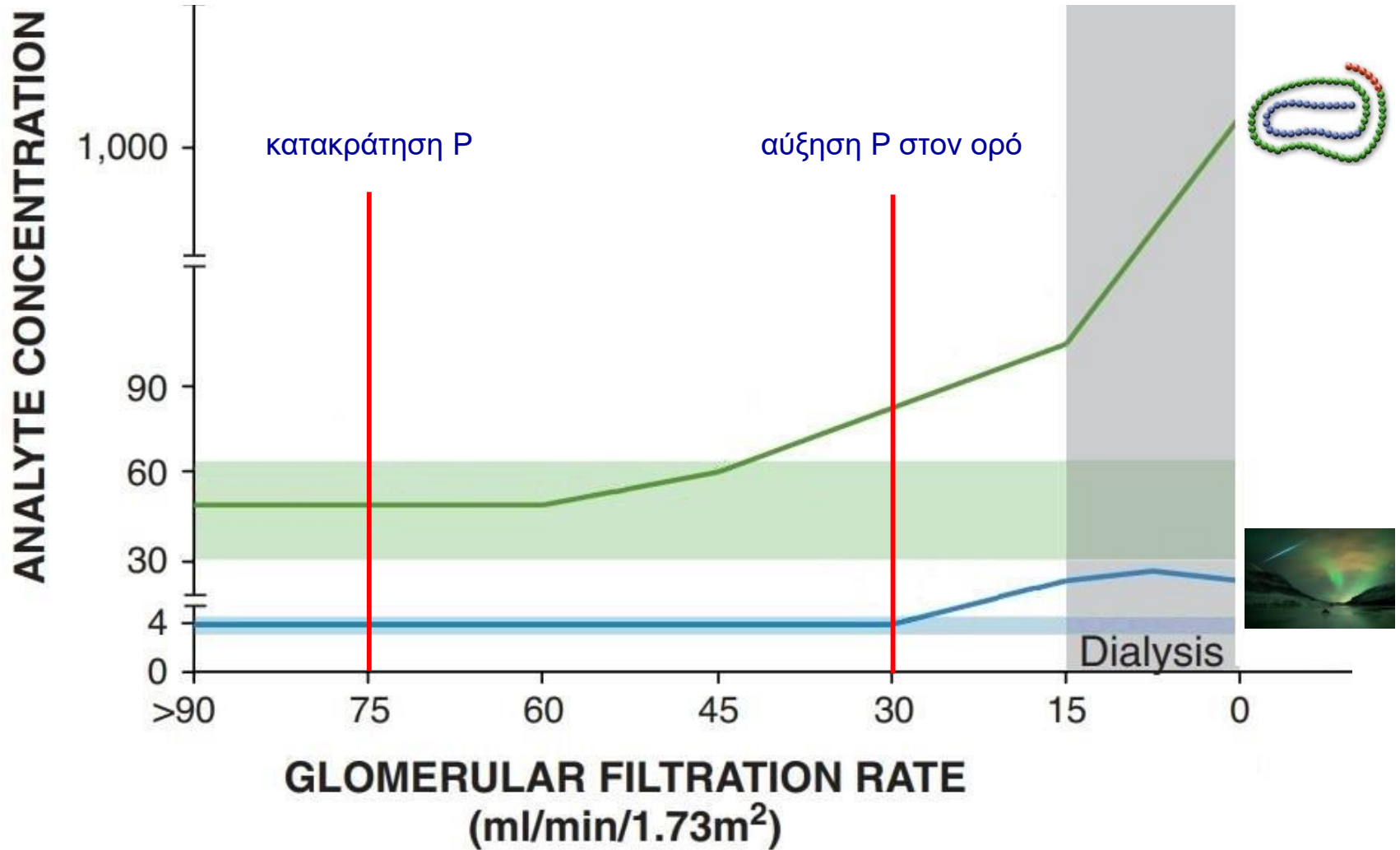
# Trade off hypothesis



# Trade off hypothesis

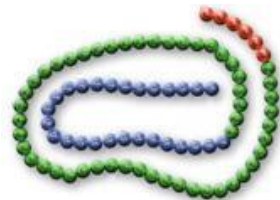


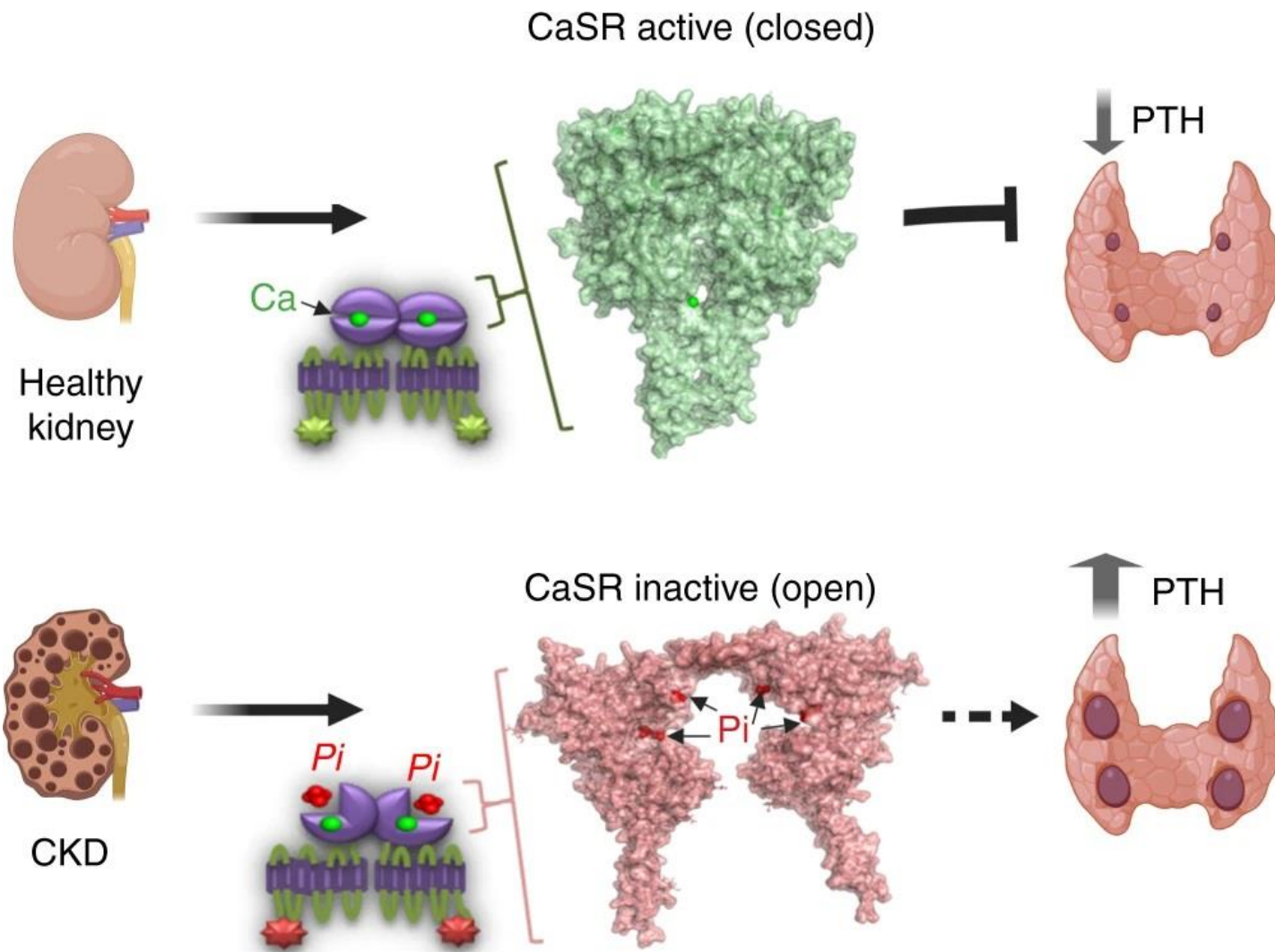
# Trade off hypothesis





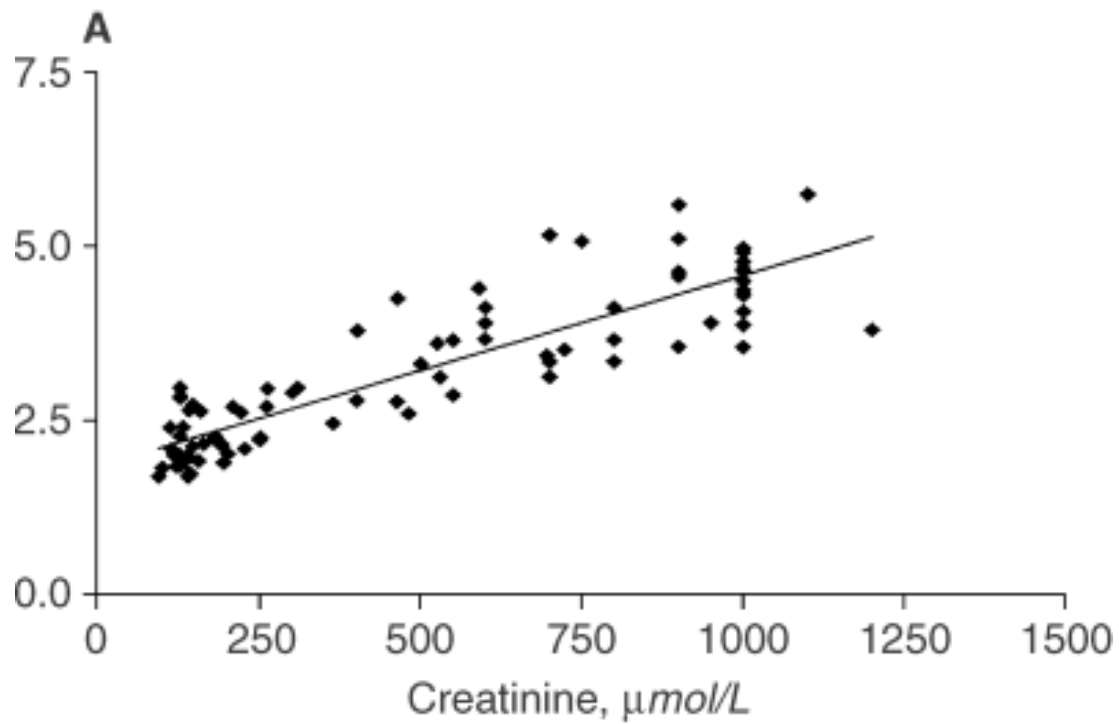
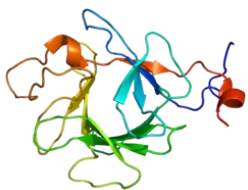


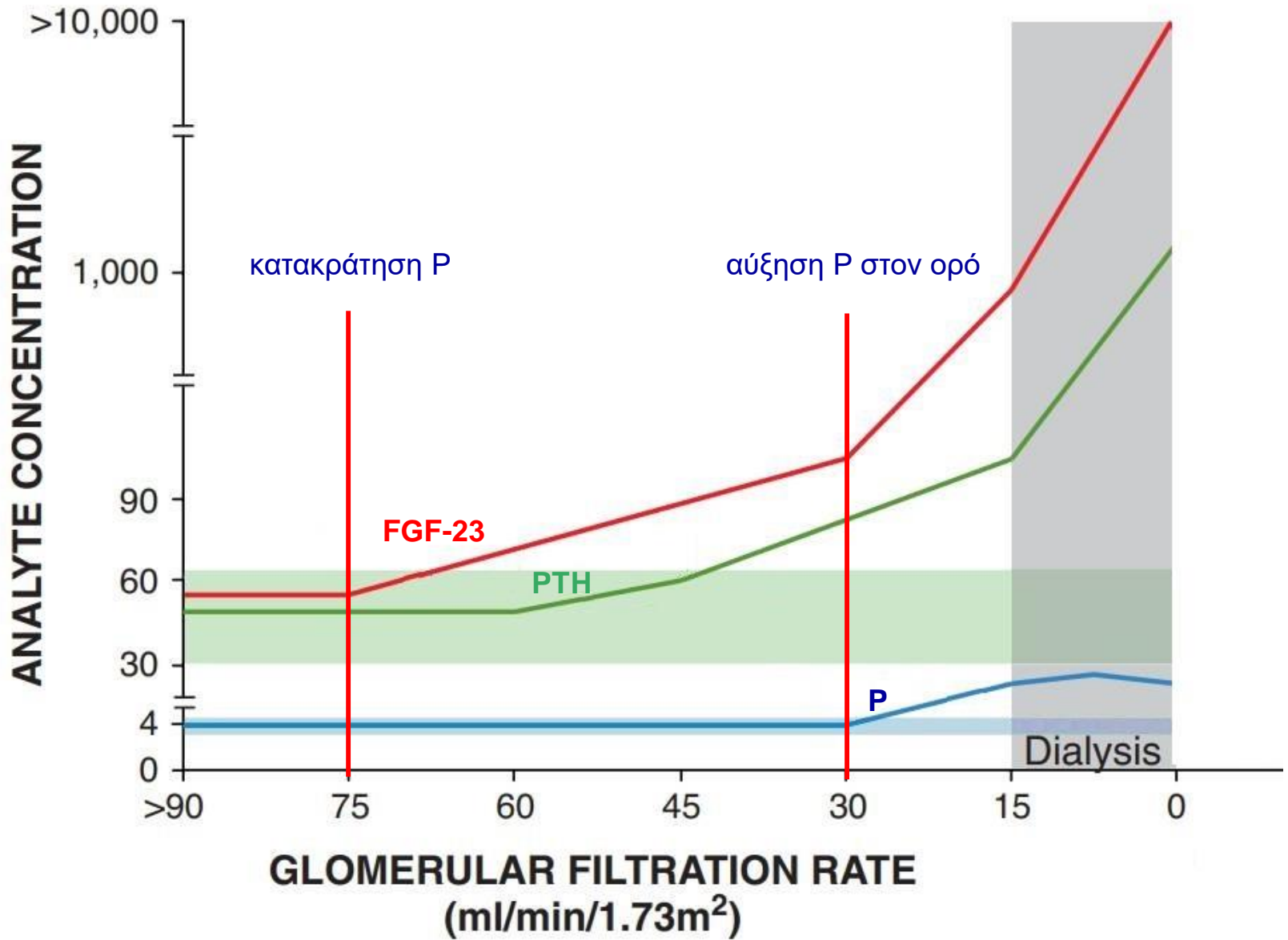


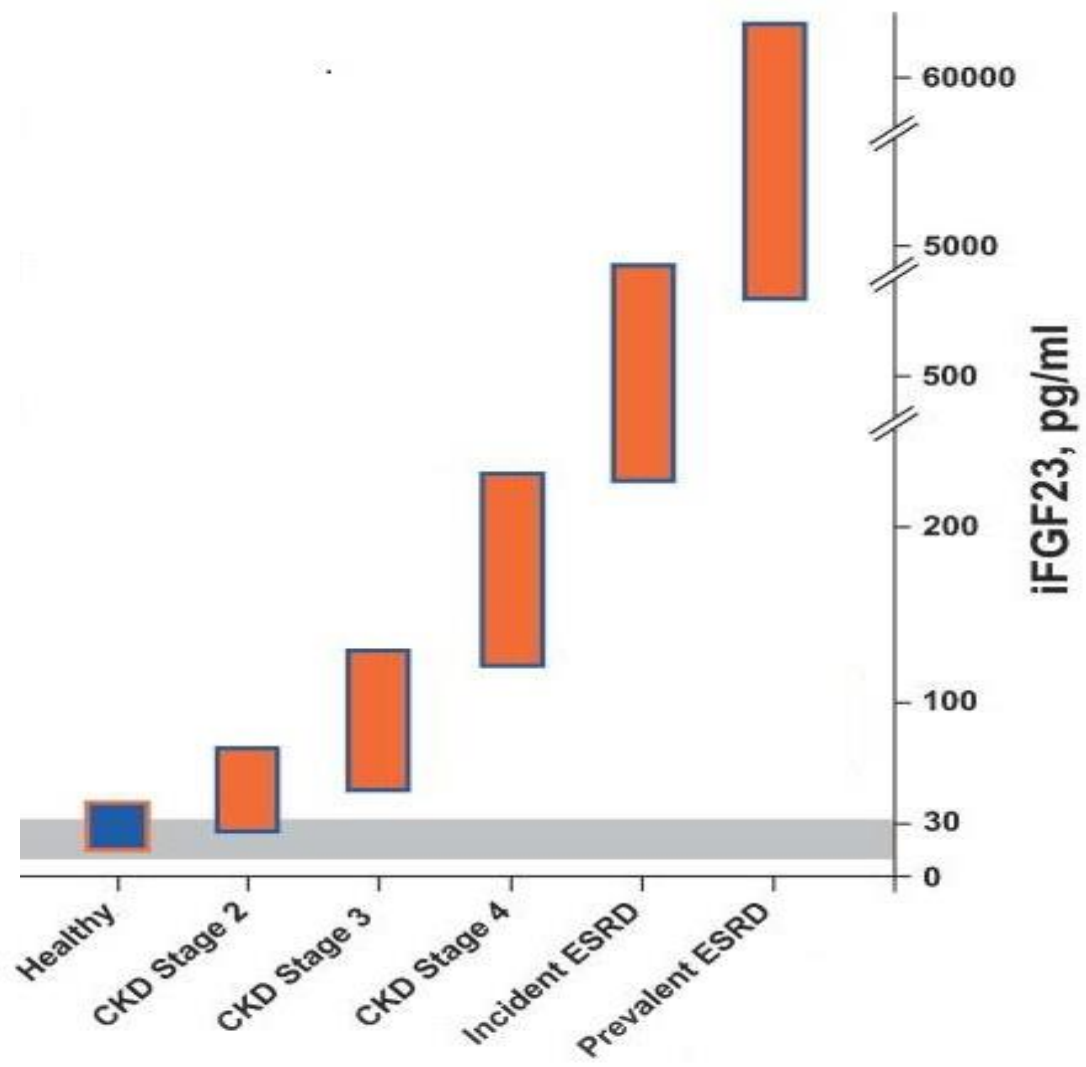


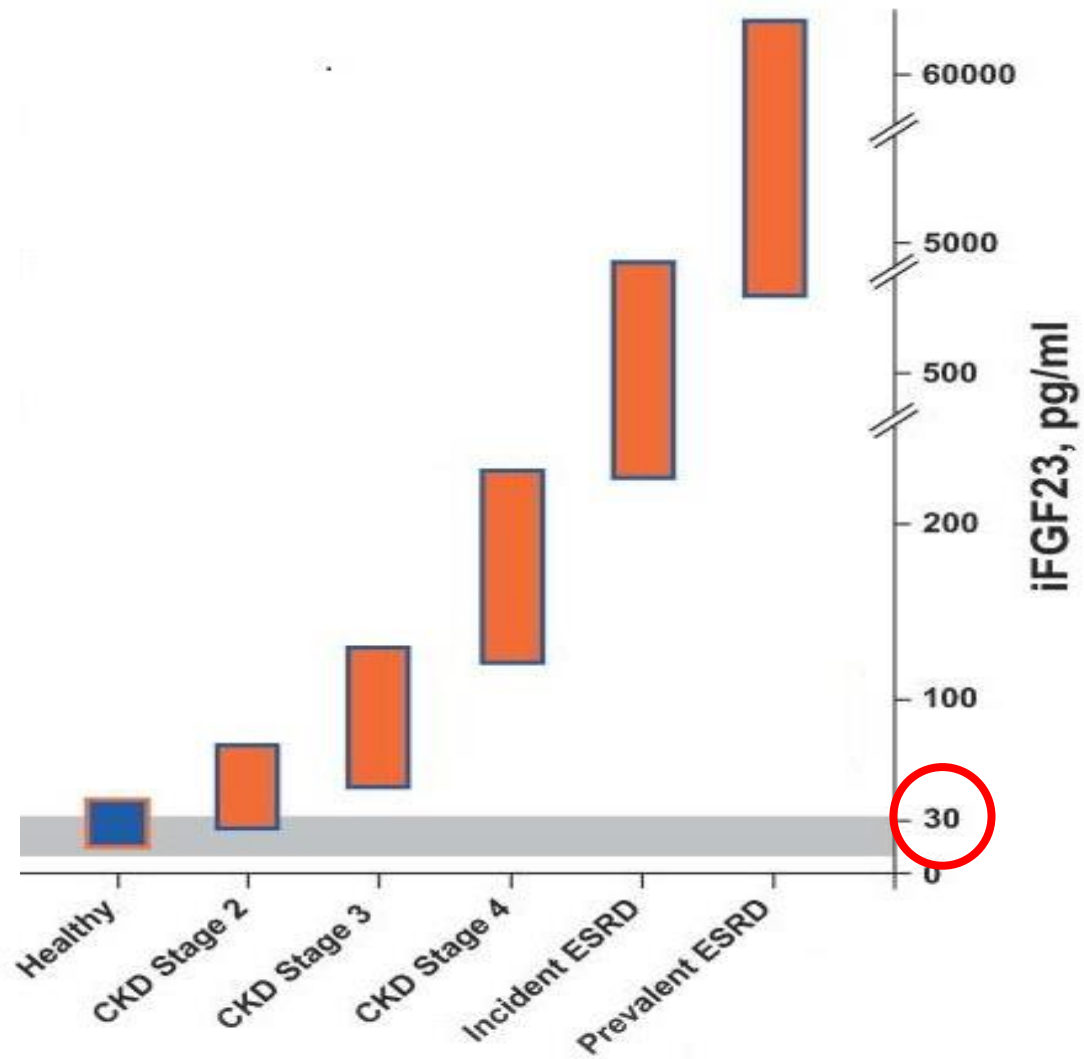


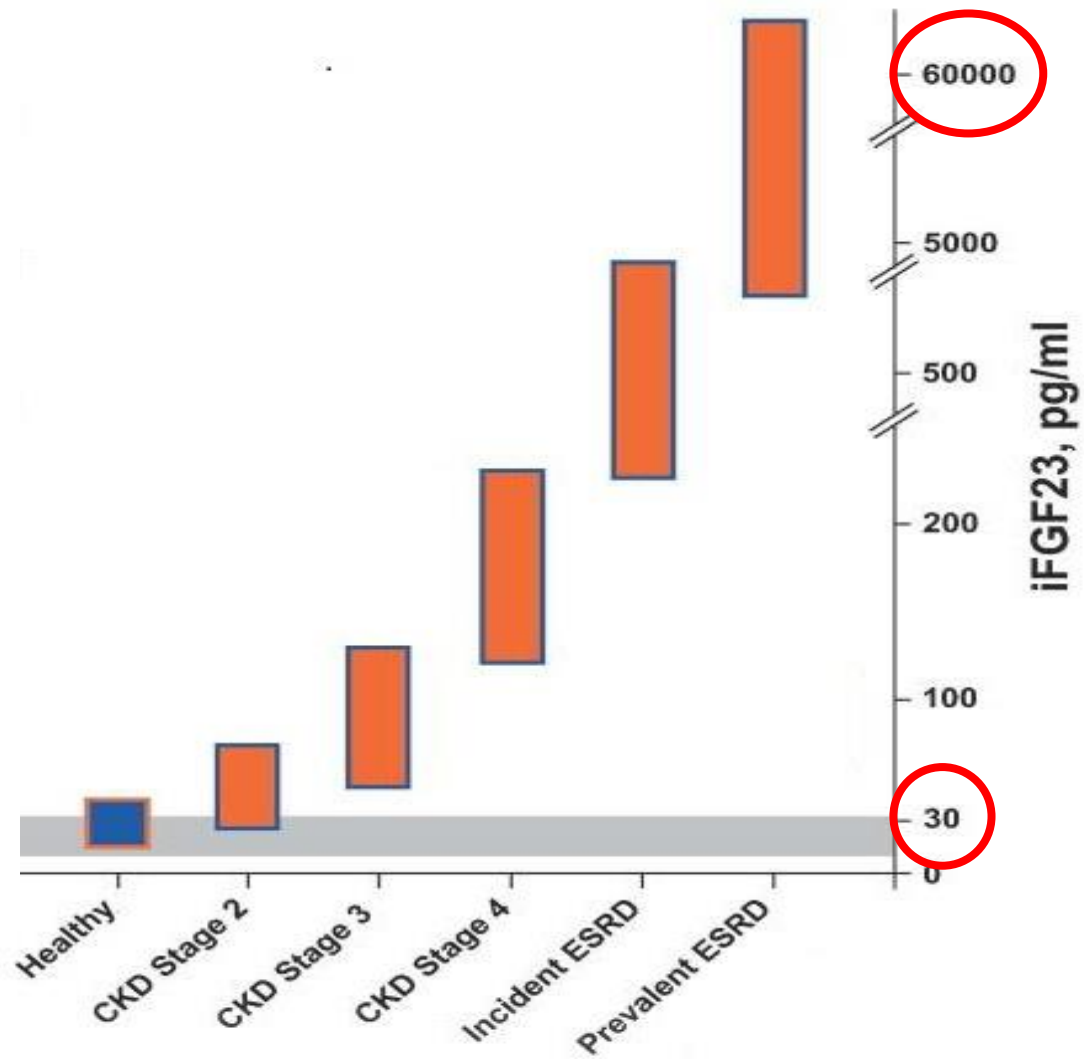
**Prof. Papagianni: keep an eye on FGF-23!**



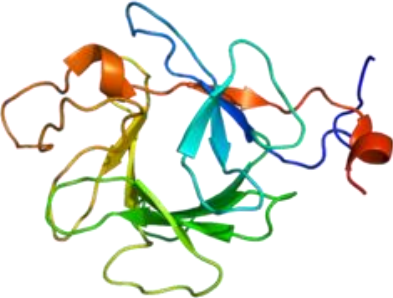


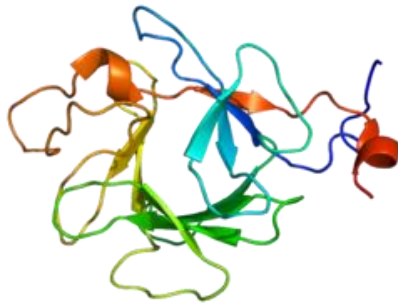


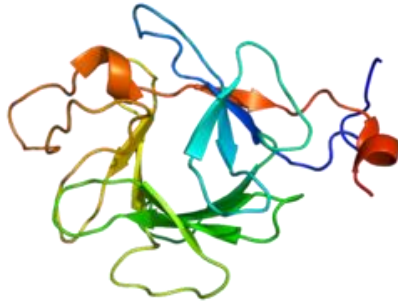


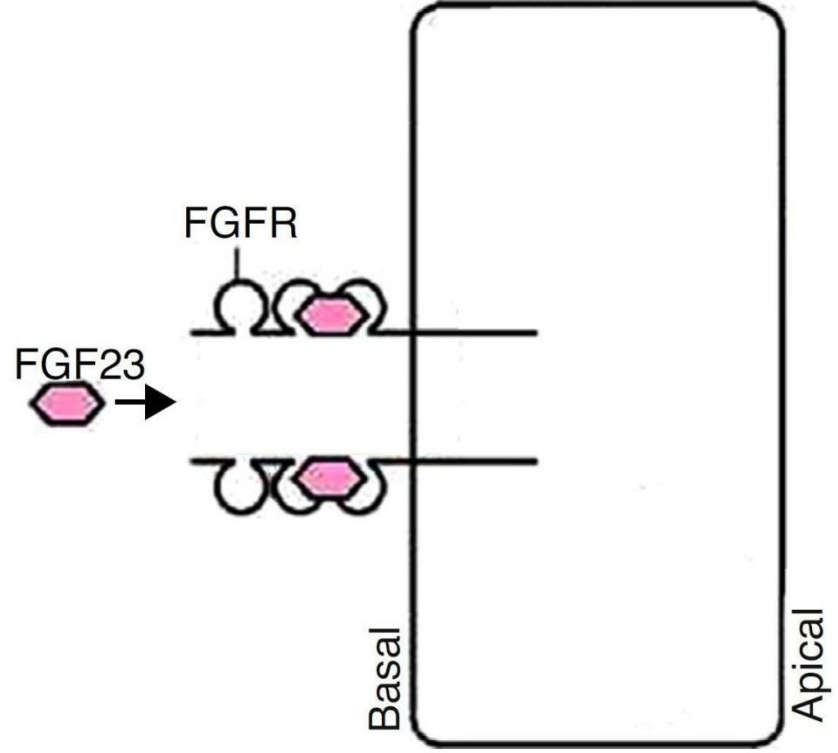


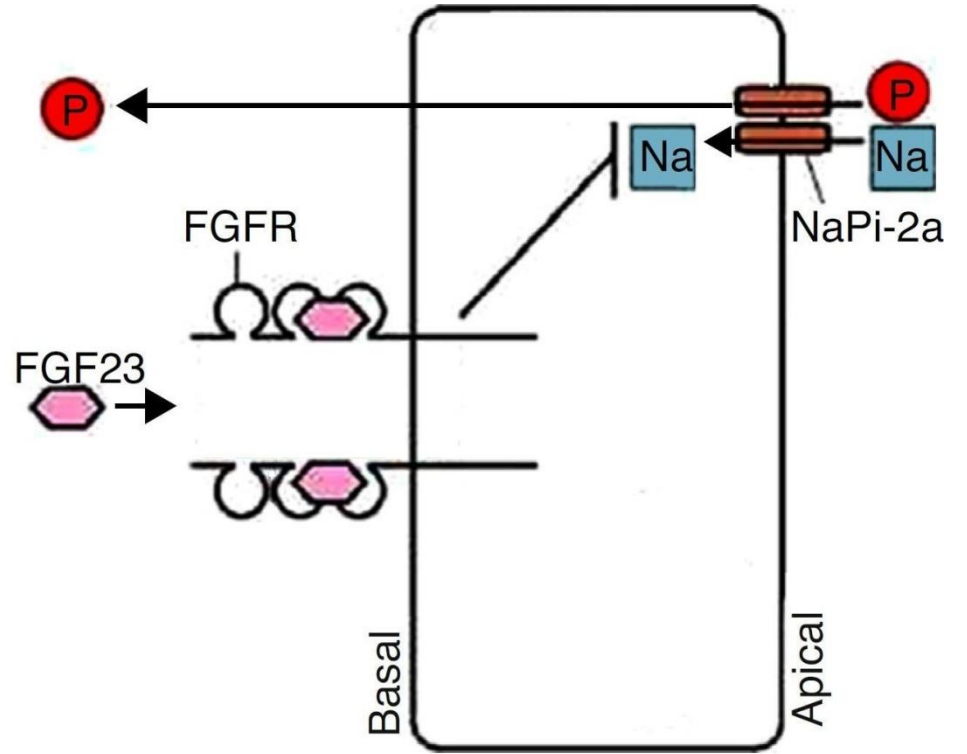


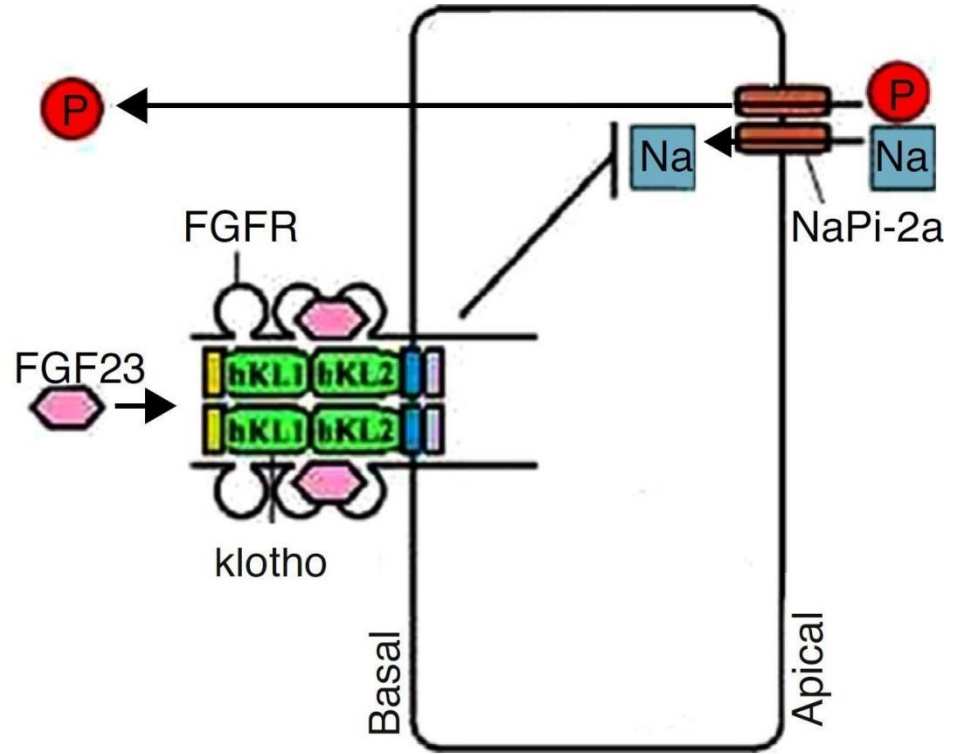


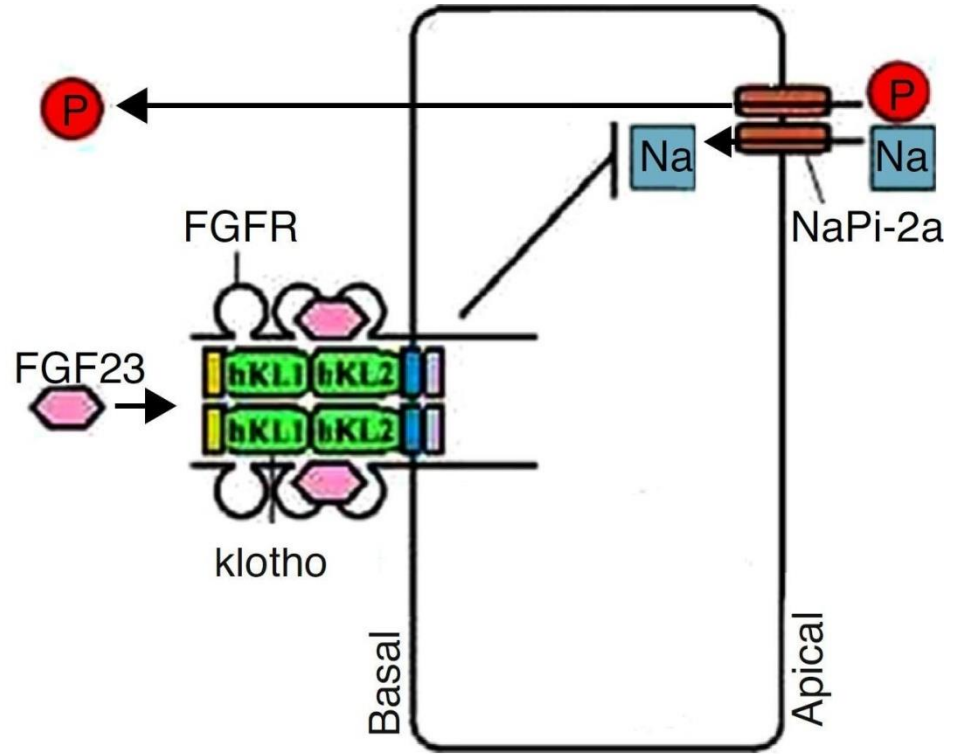


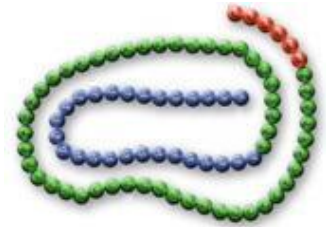
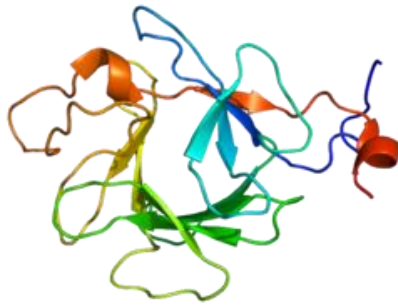




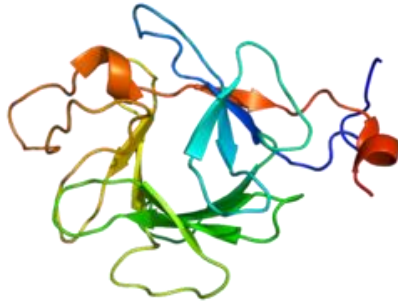


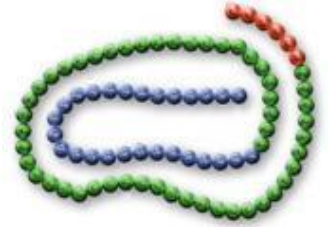
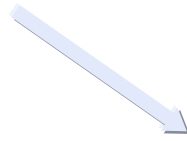
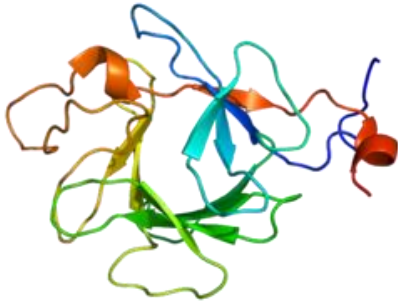


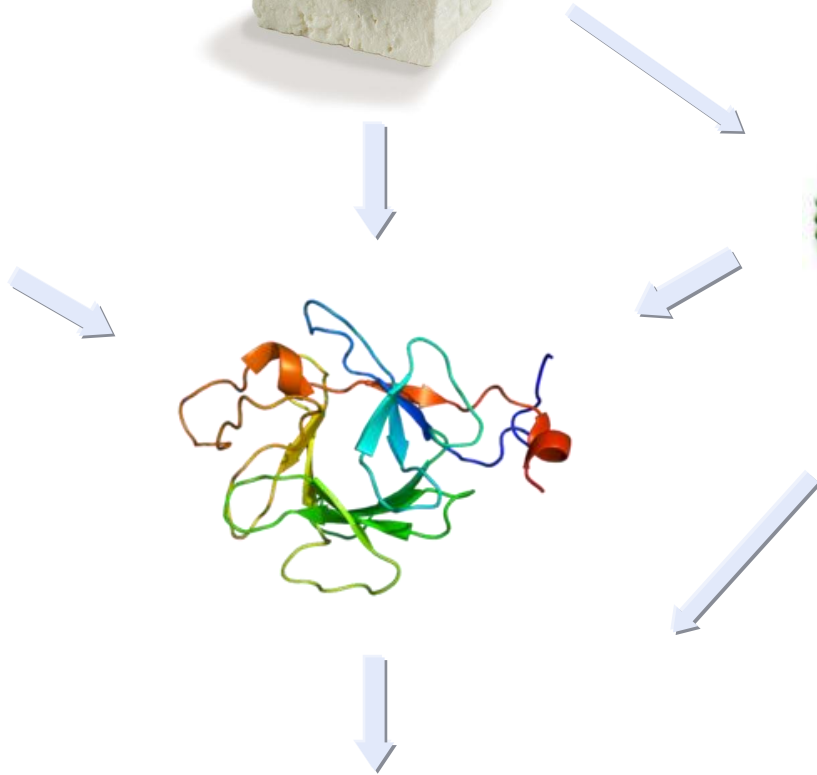
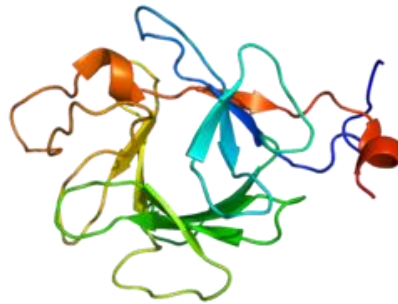
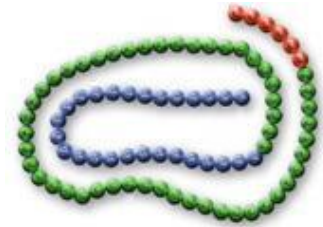


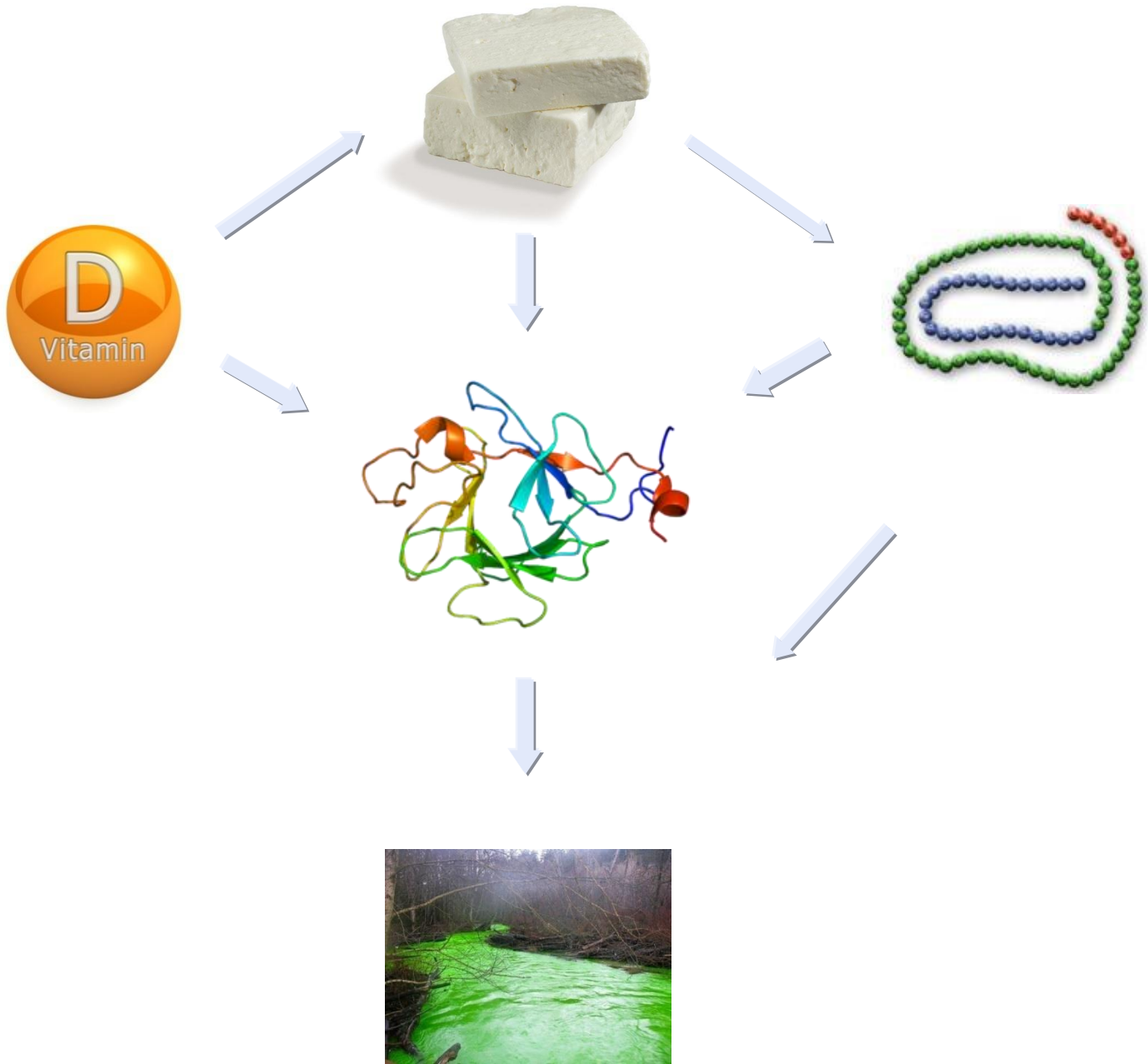


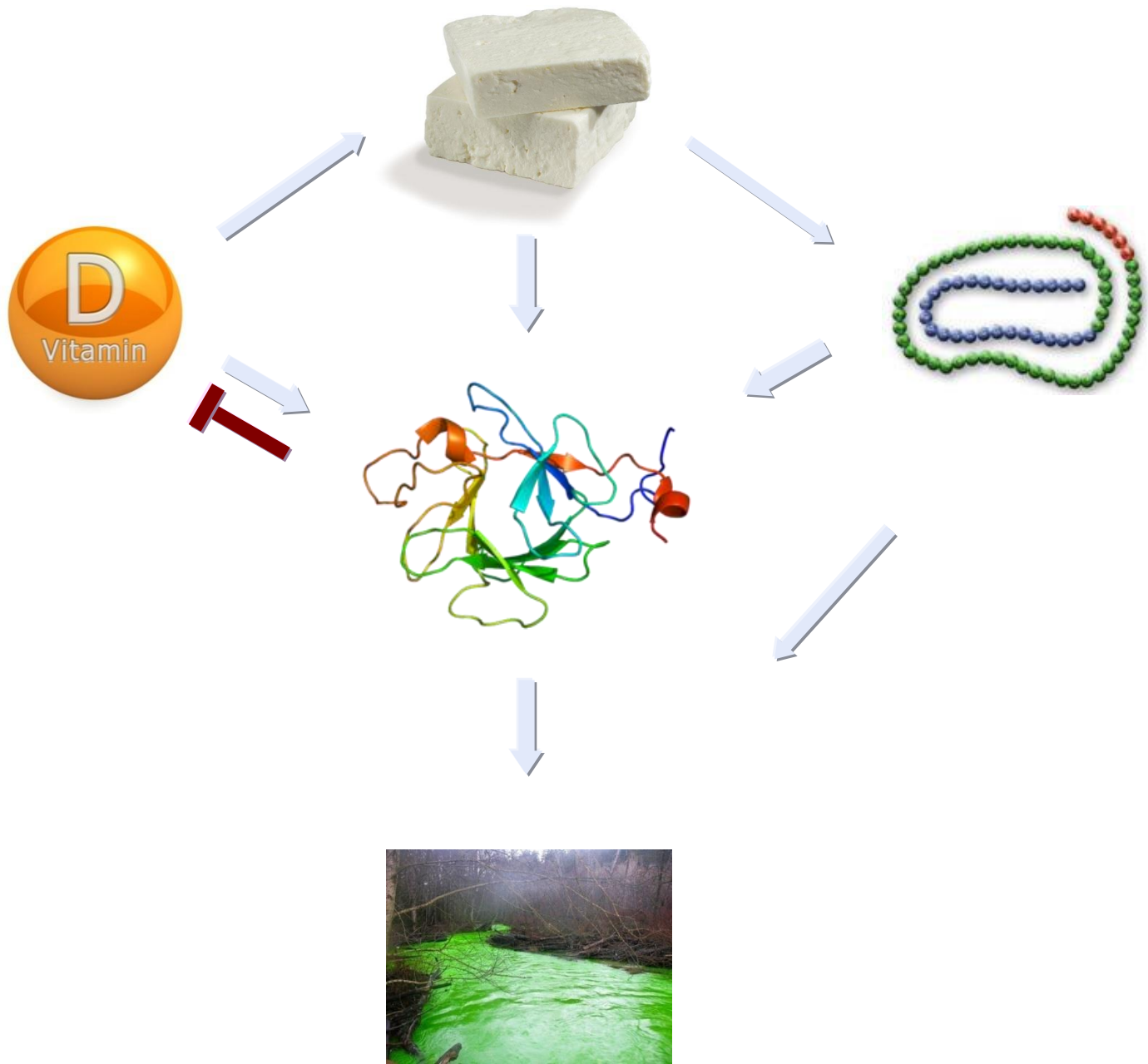


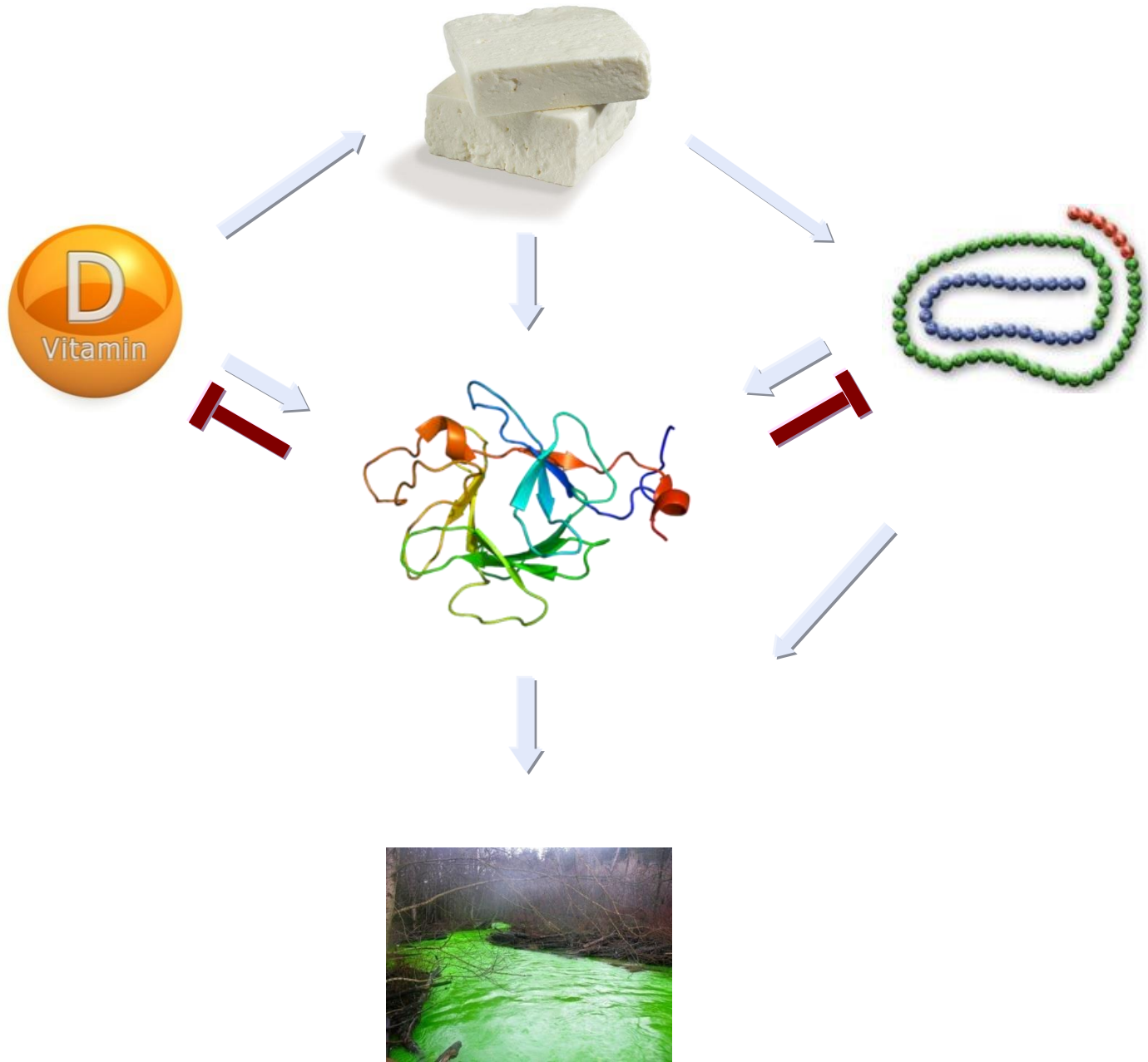




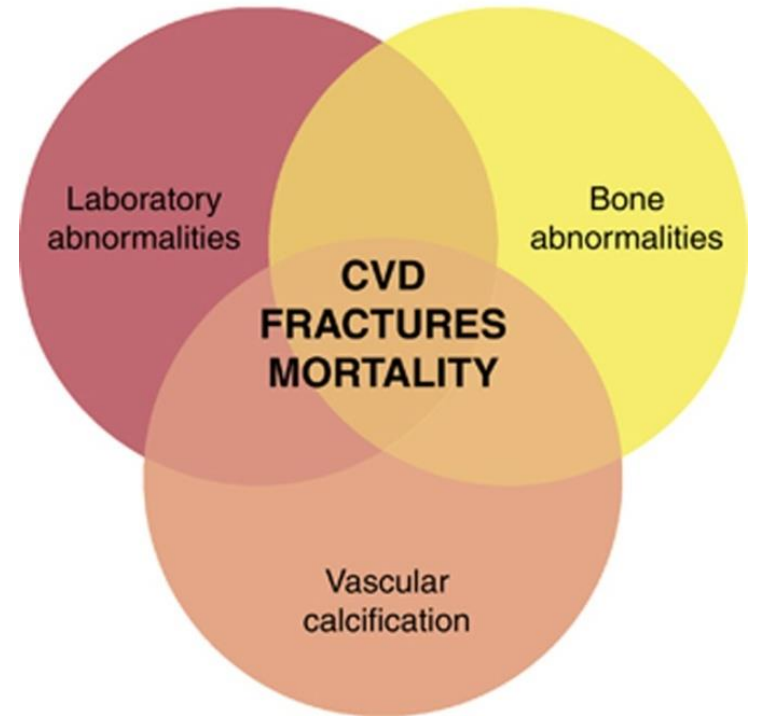




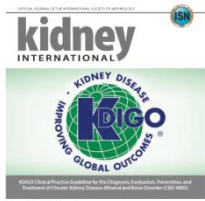




**Chronic kidney disease—  
mineral and bone disorder**

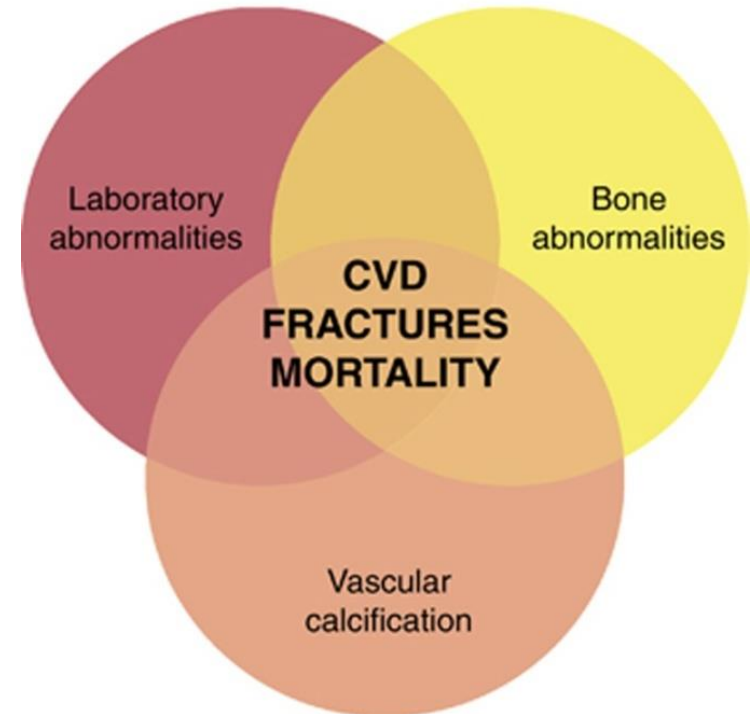


# Νεφρική οστεοδυστροφία



**Διαταραχή των οστών  
και των μετάλλων  
στη χρόνια νεφρική νόσο**

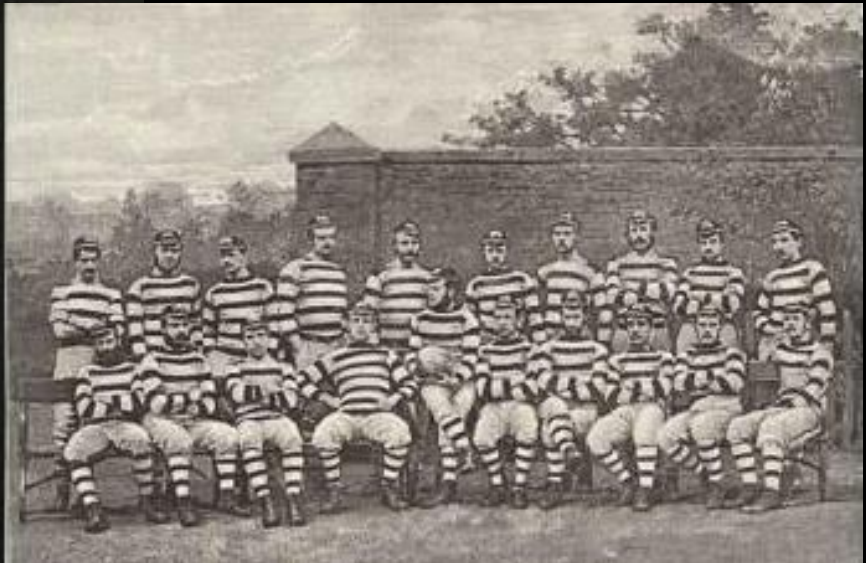
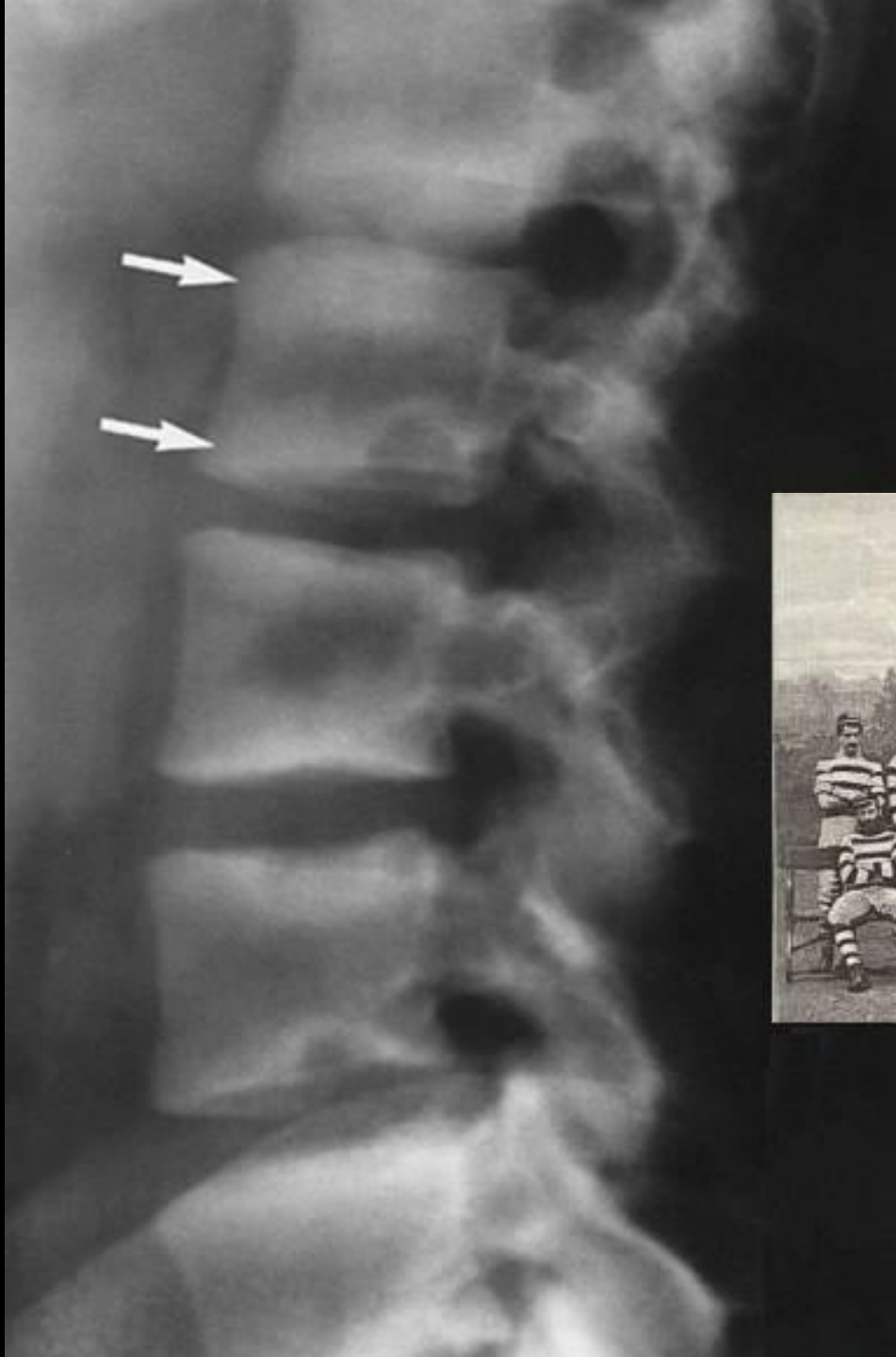
**Chronic kidney disease—  
mineral and bone disorder**





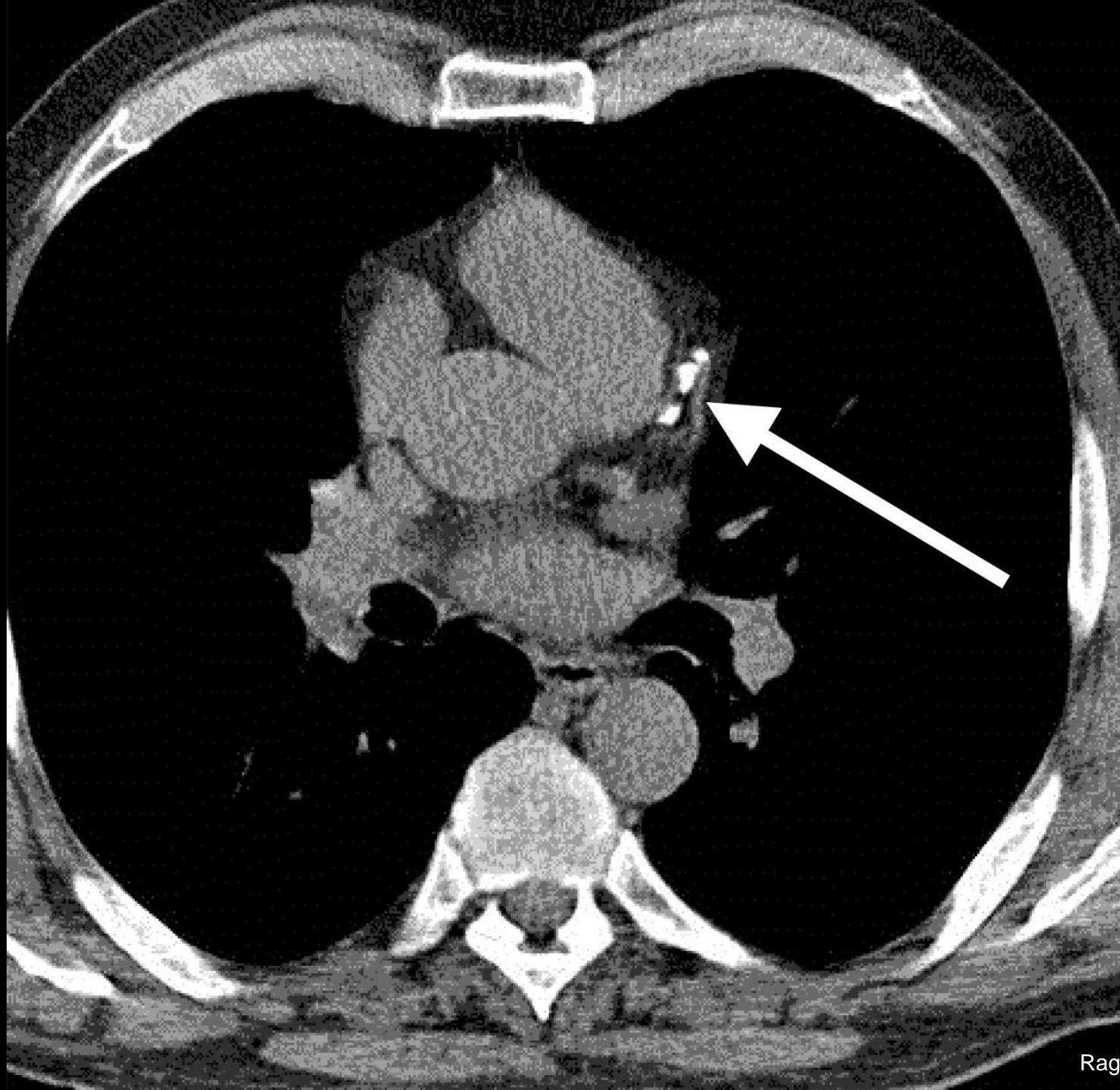


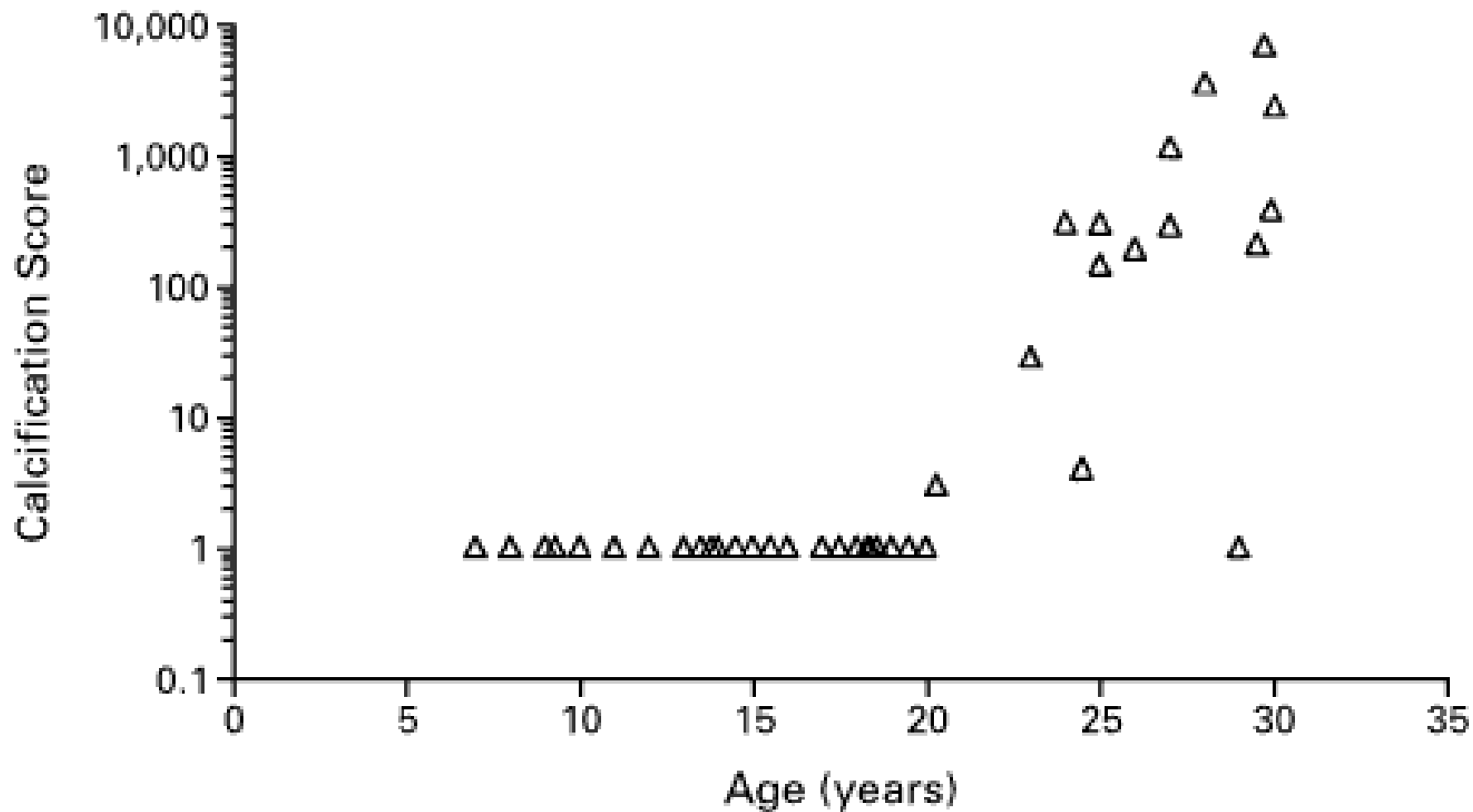


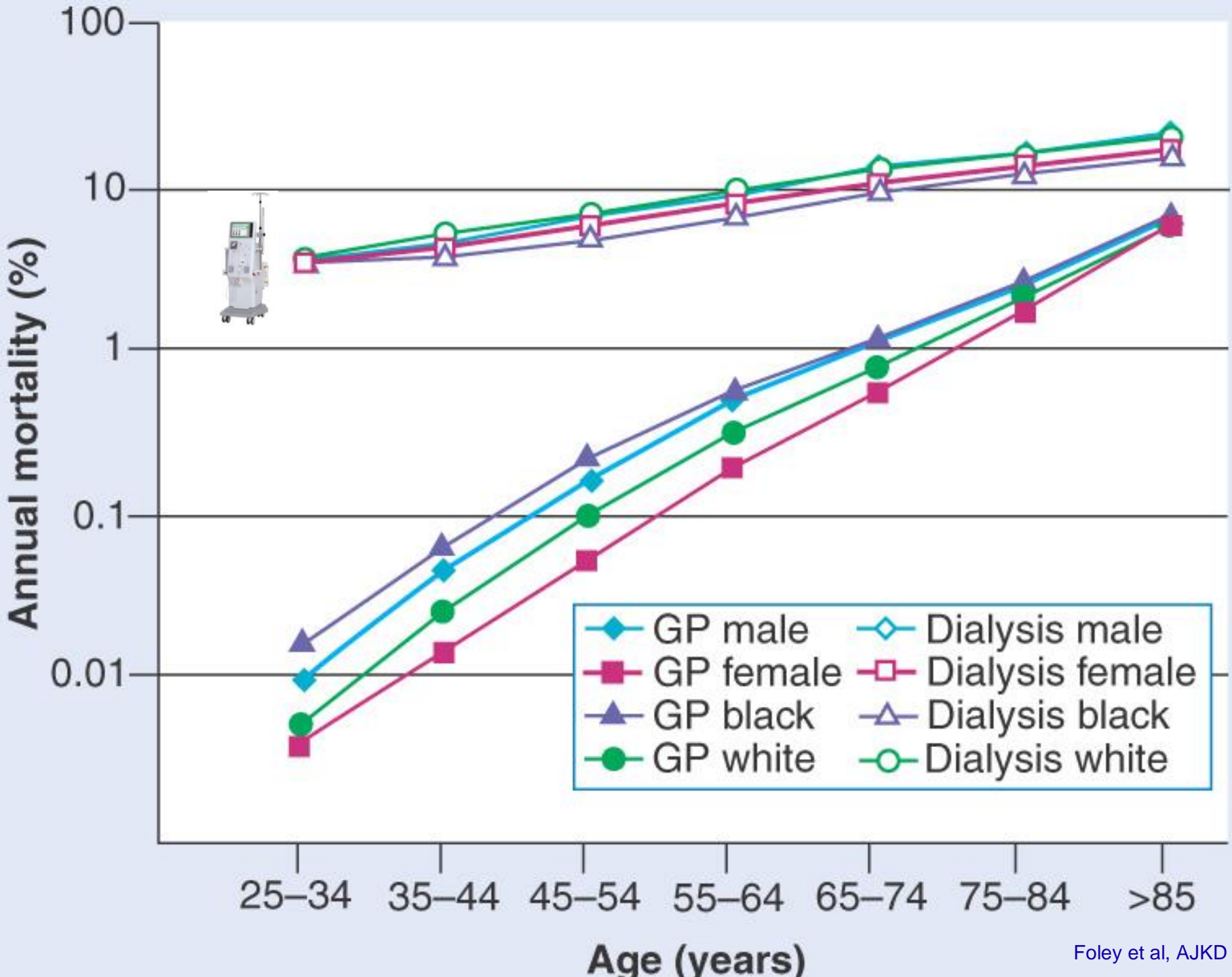




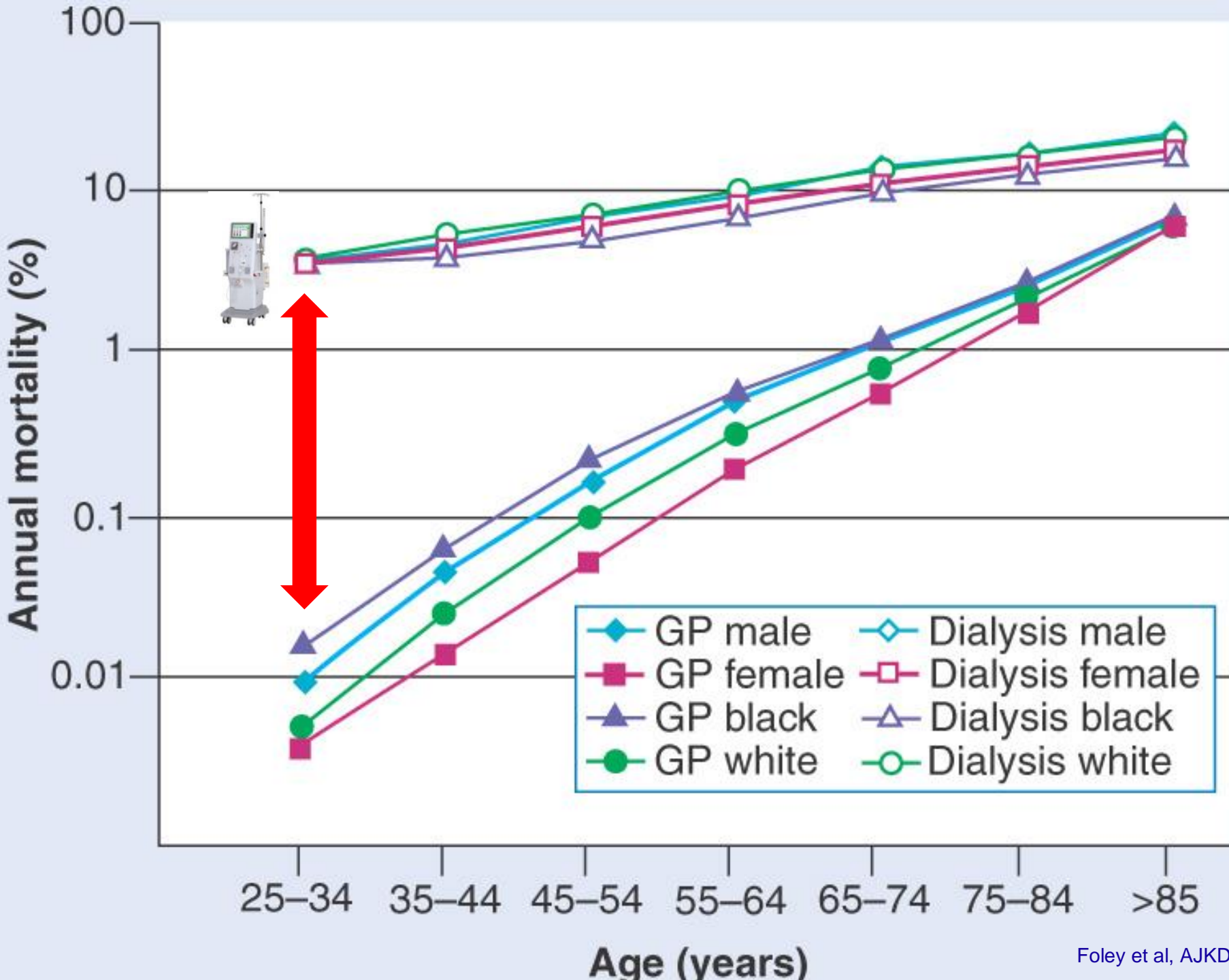








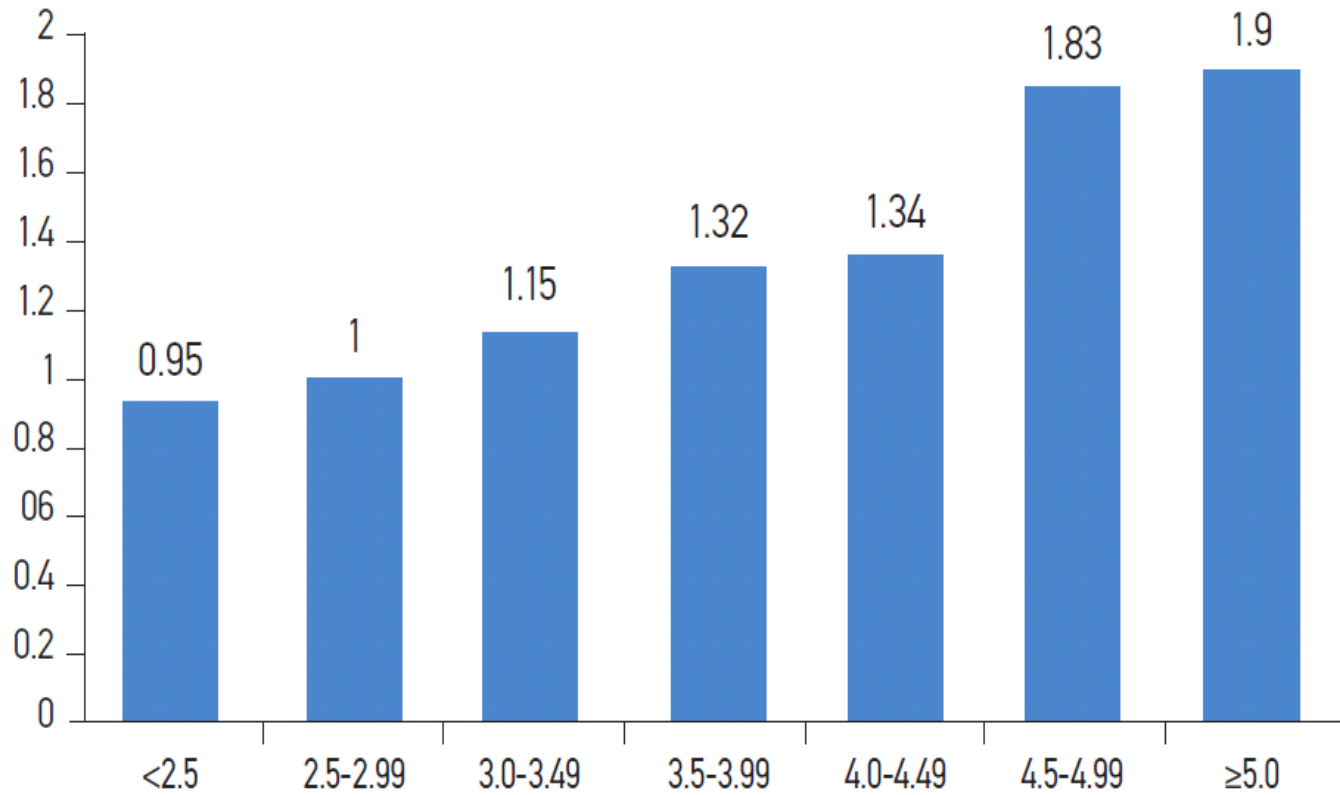


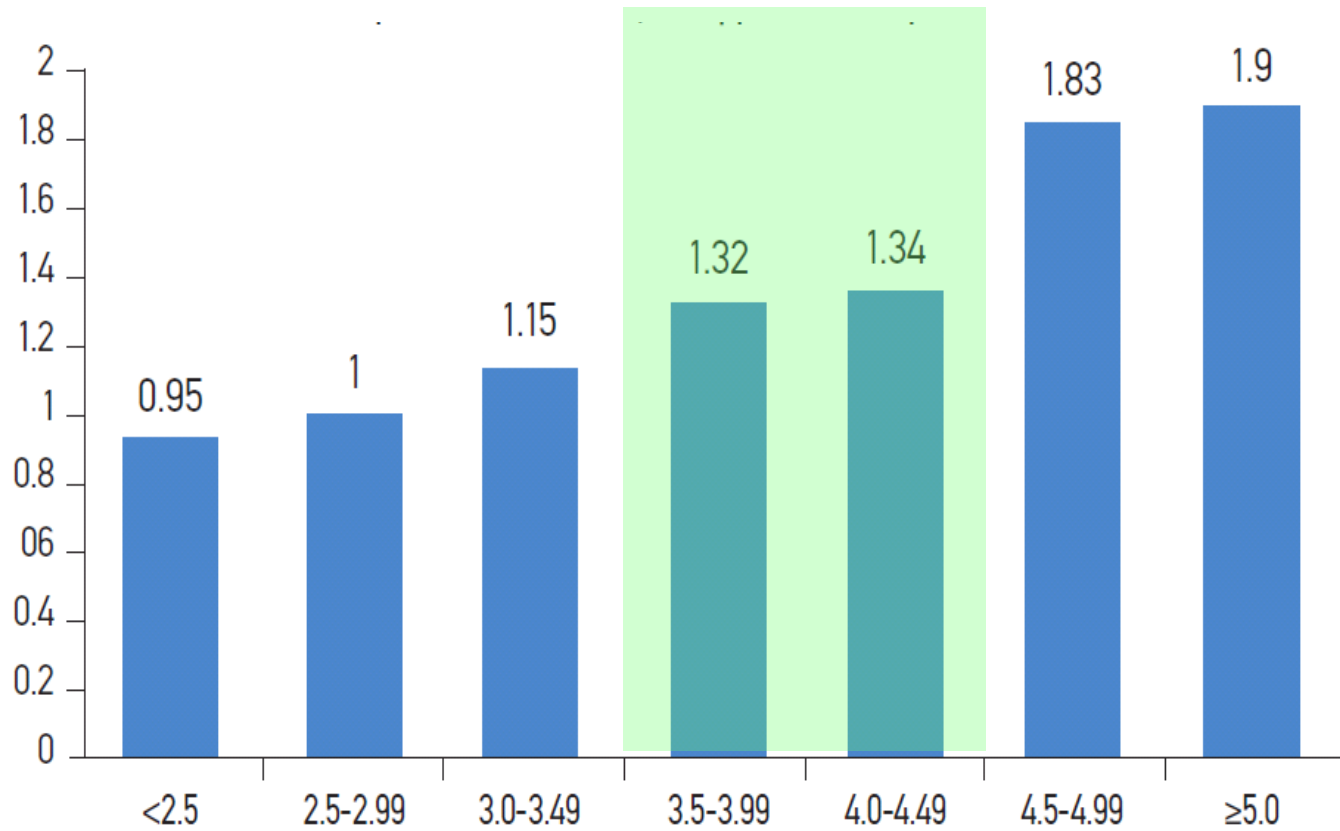


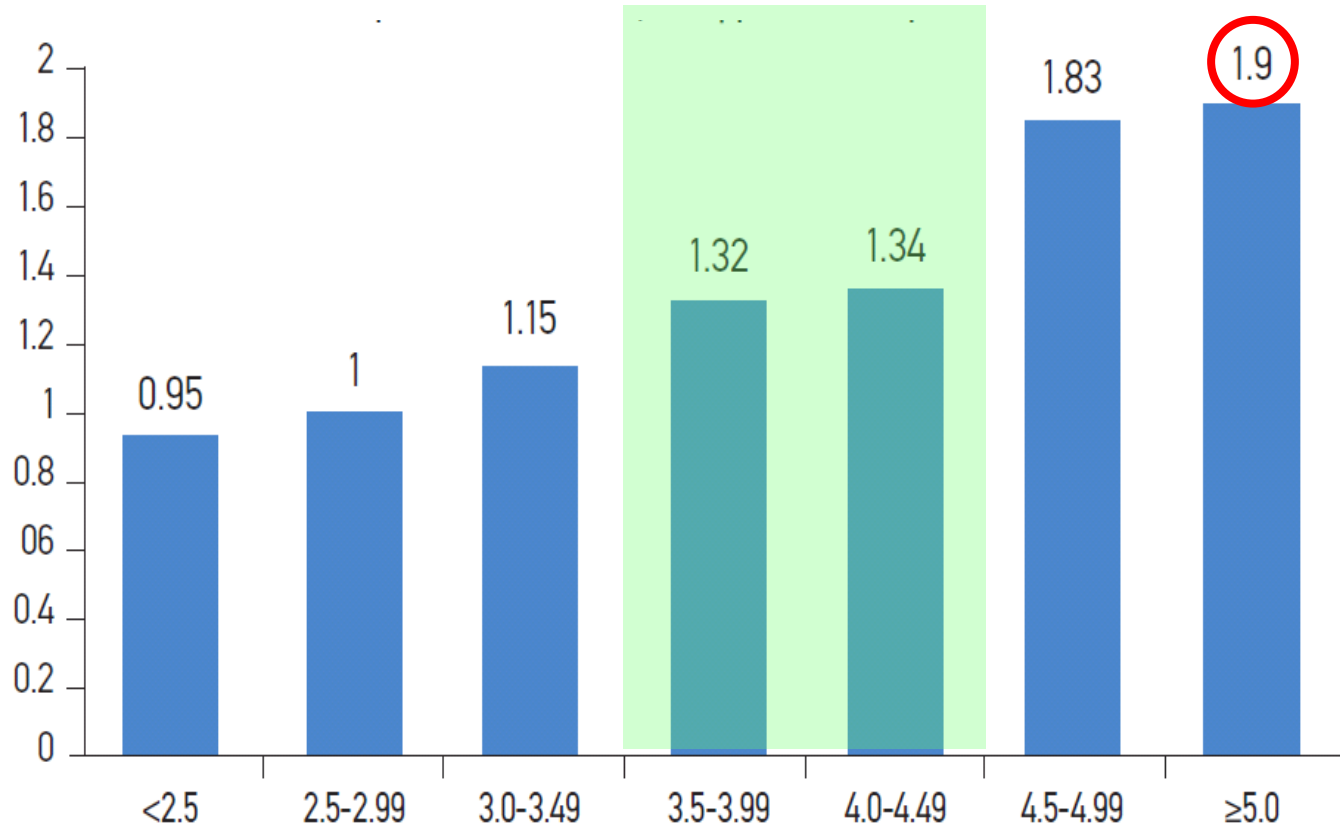


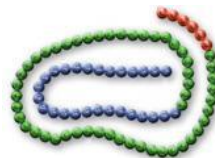
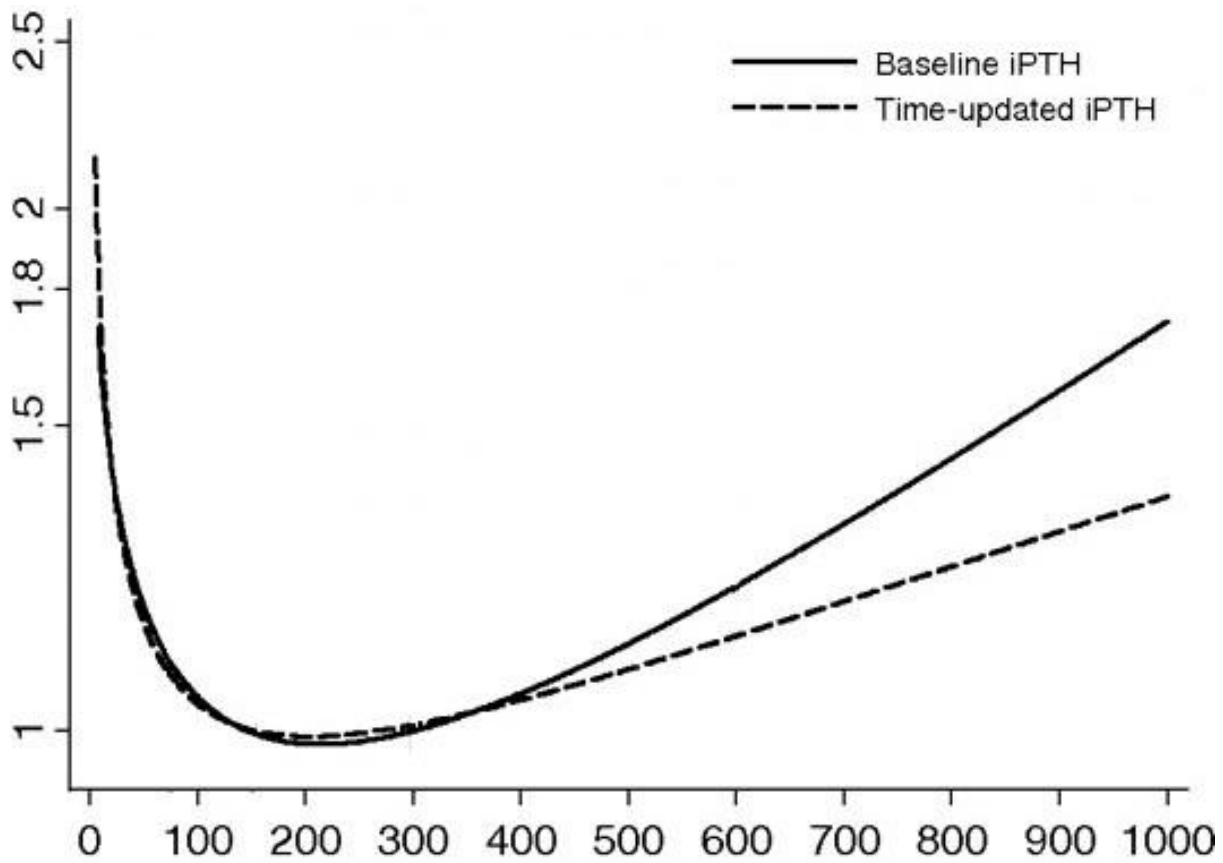
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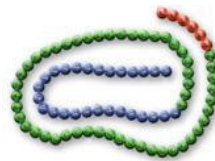
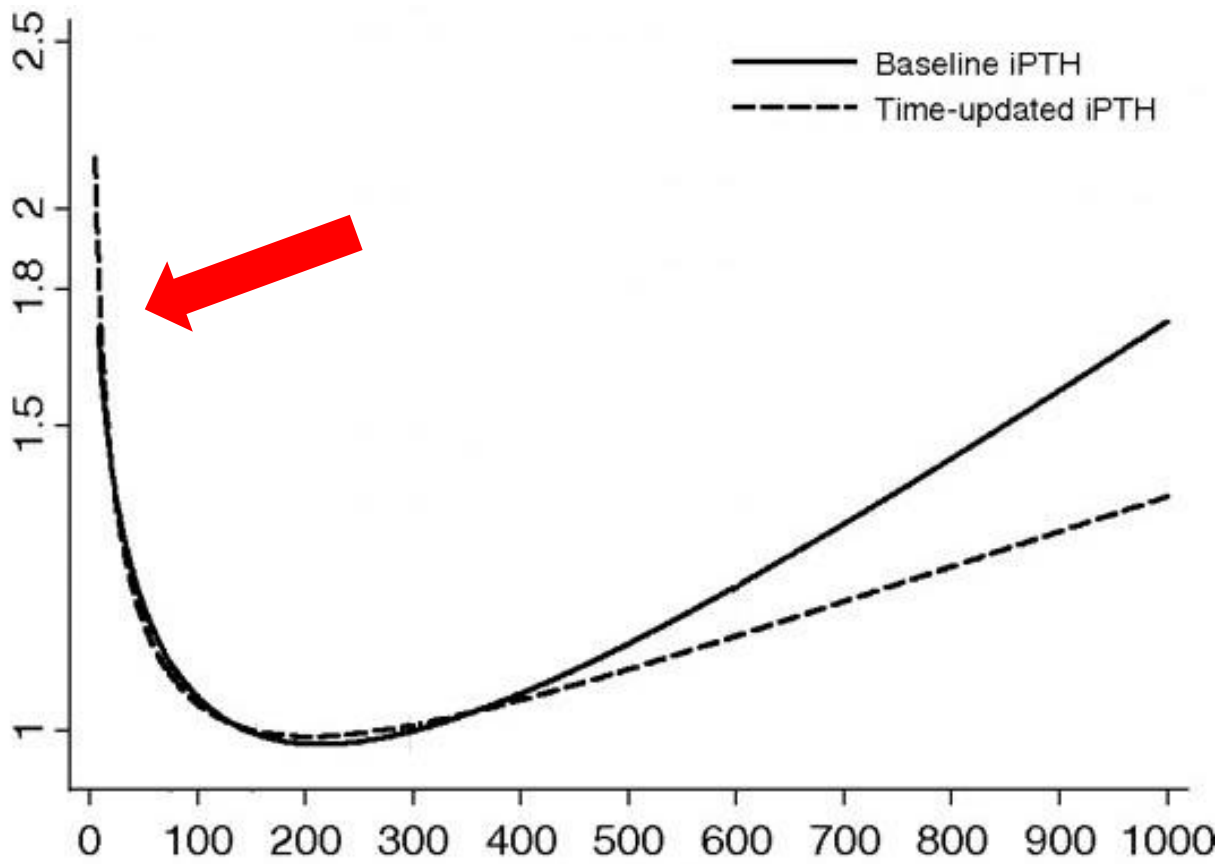


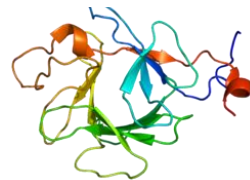
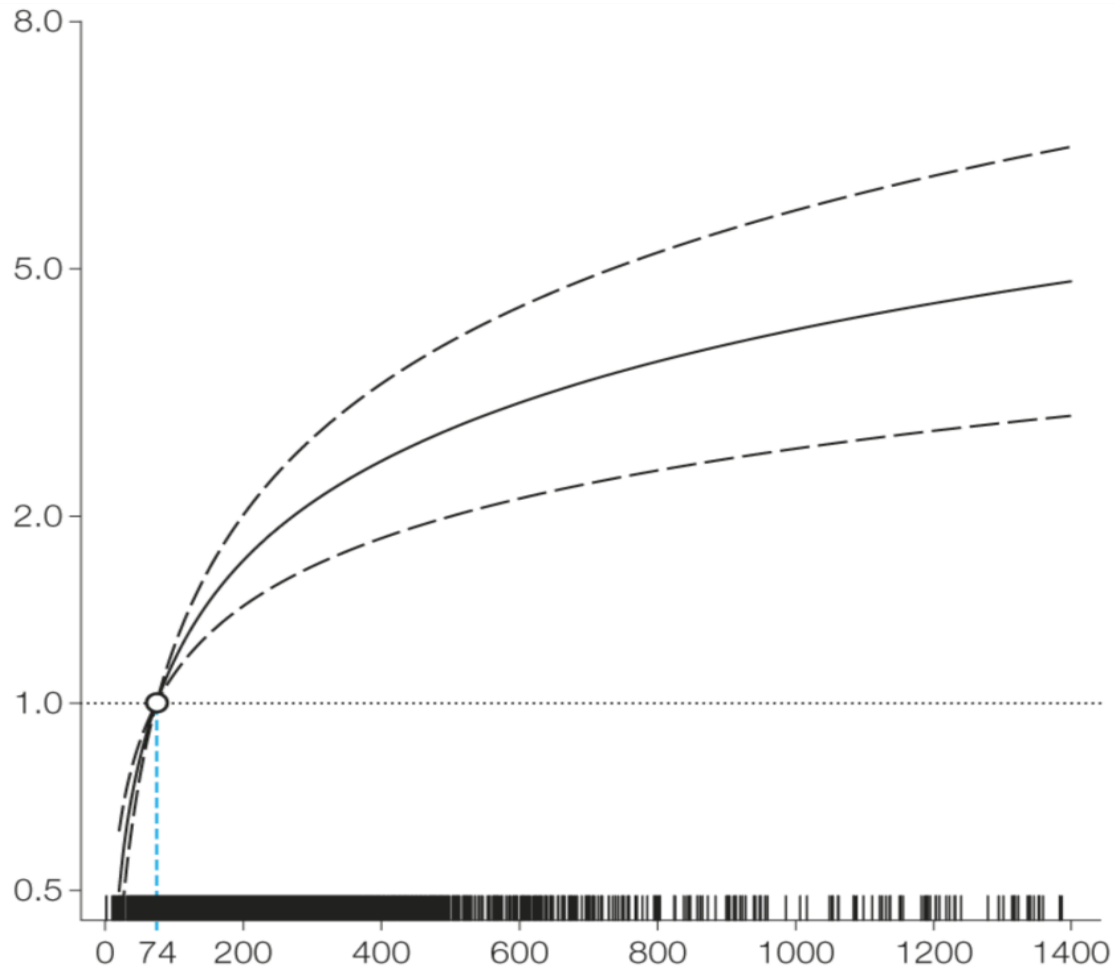




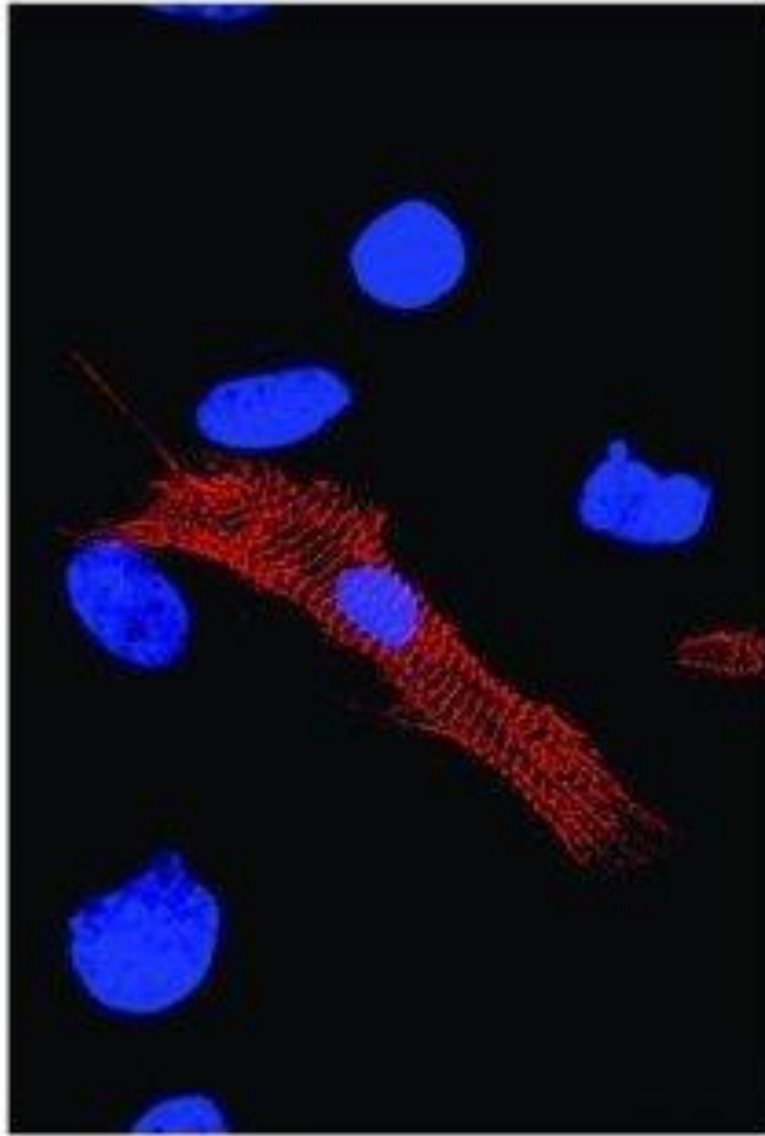




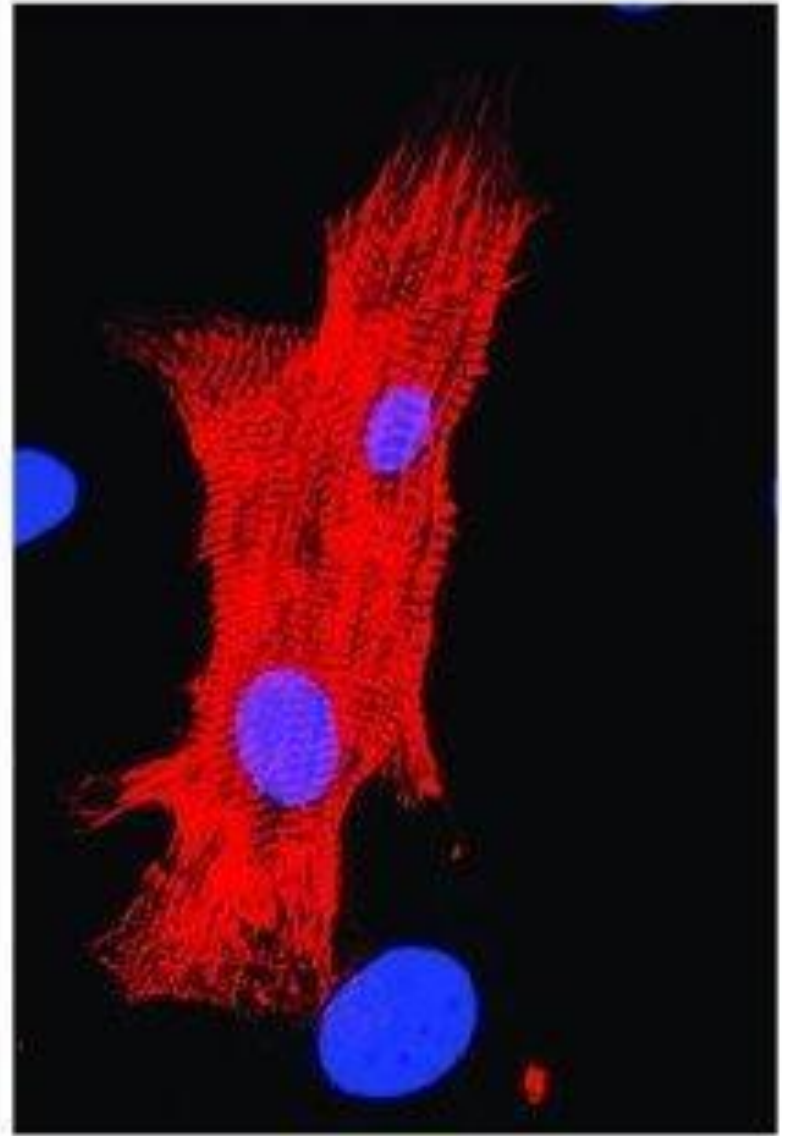




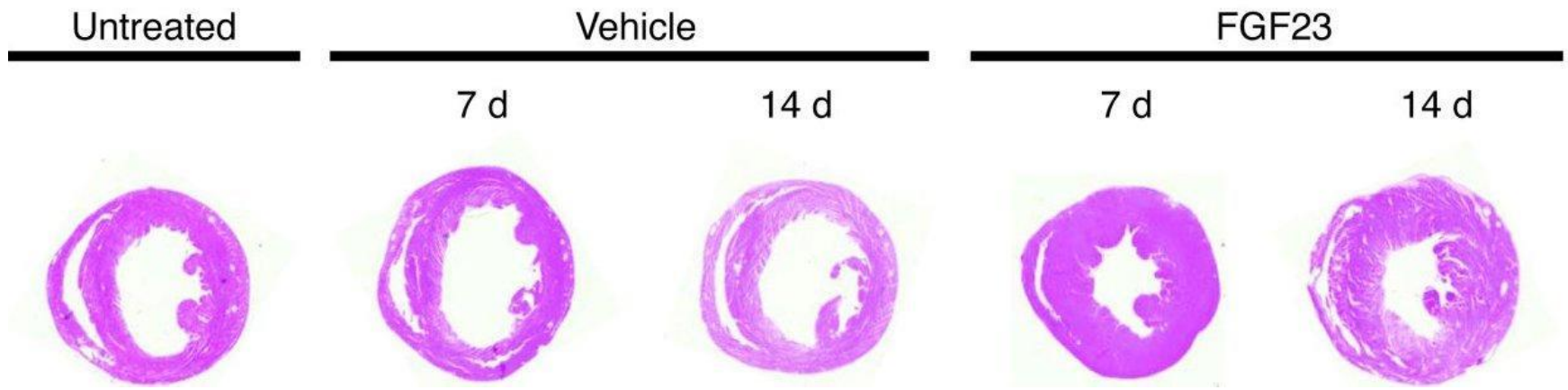


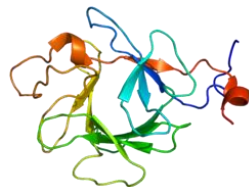
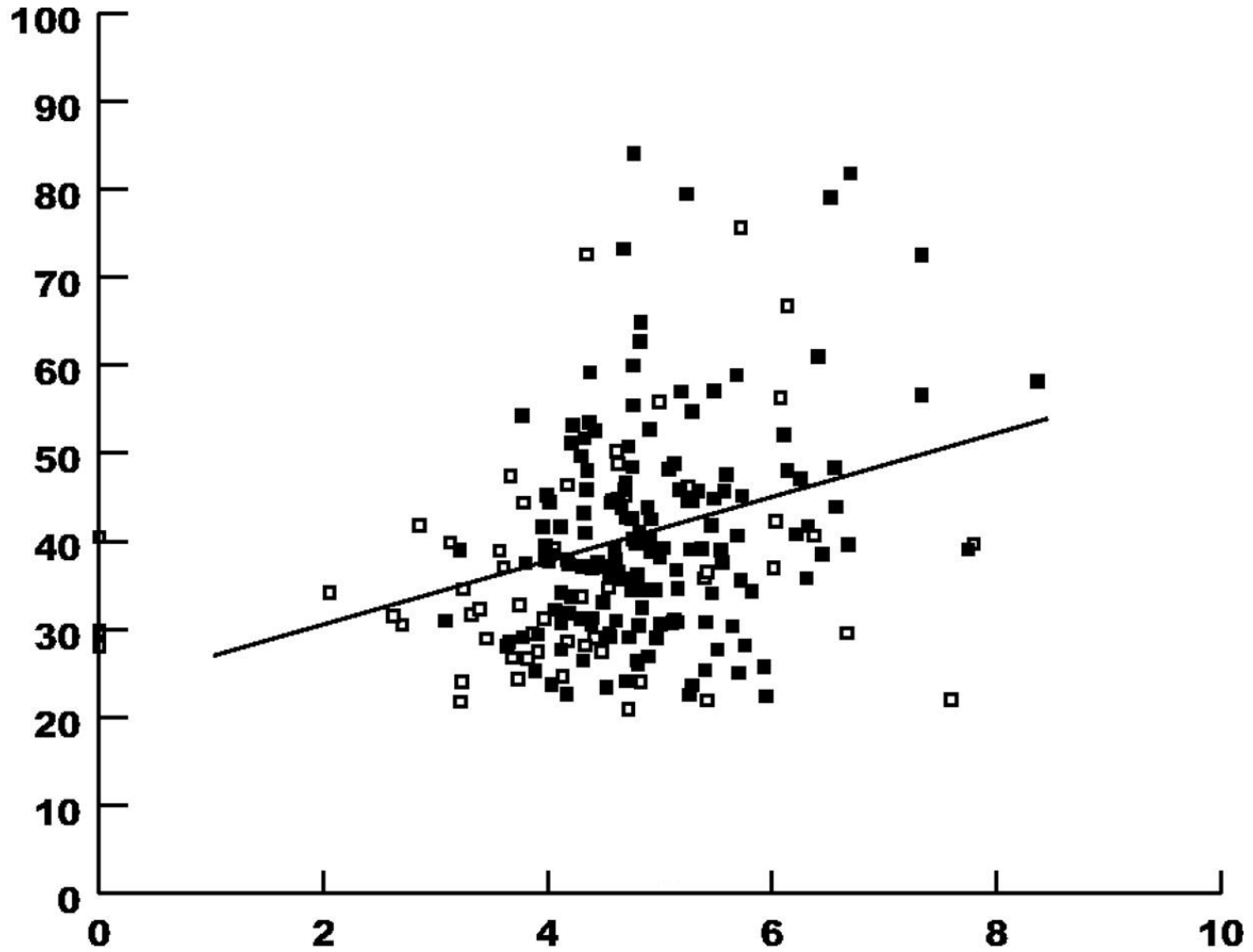
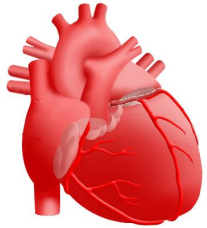


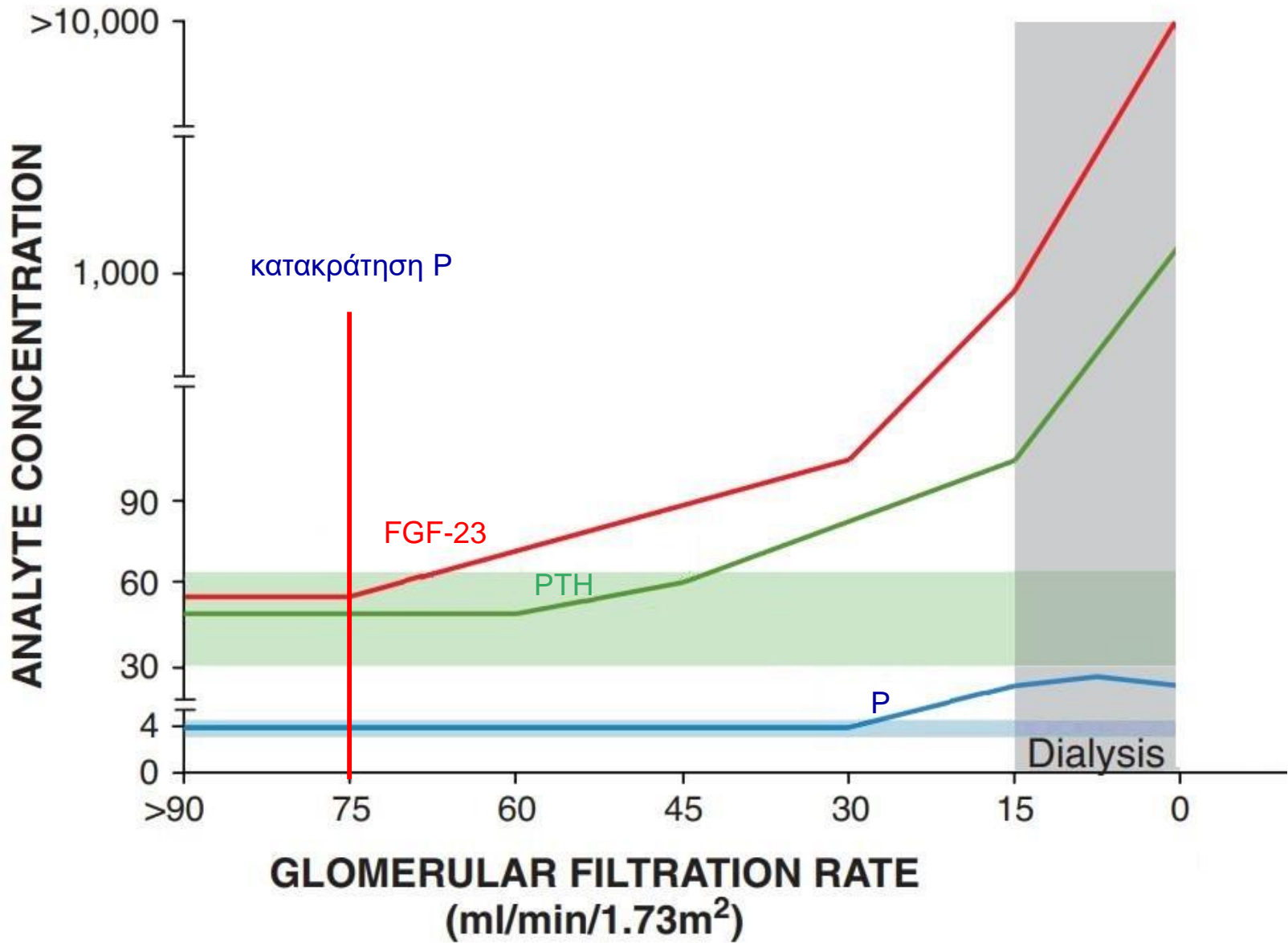
Control



FGF23



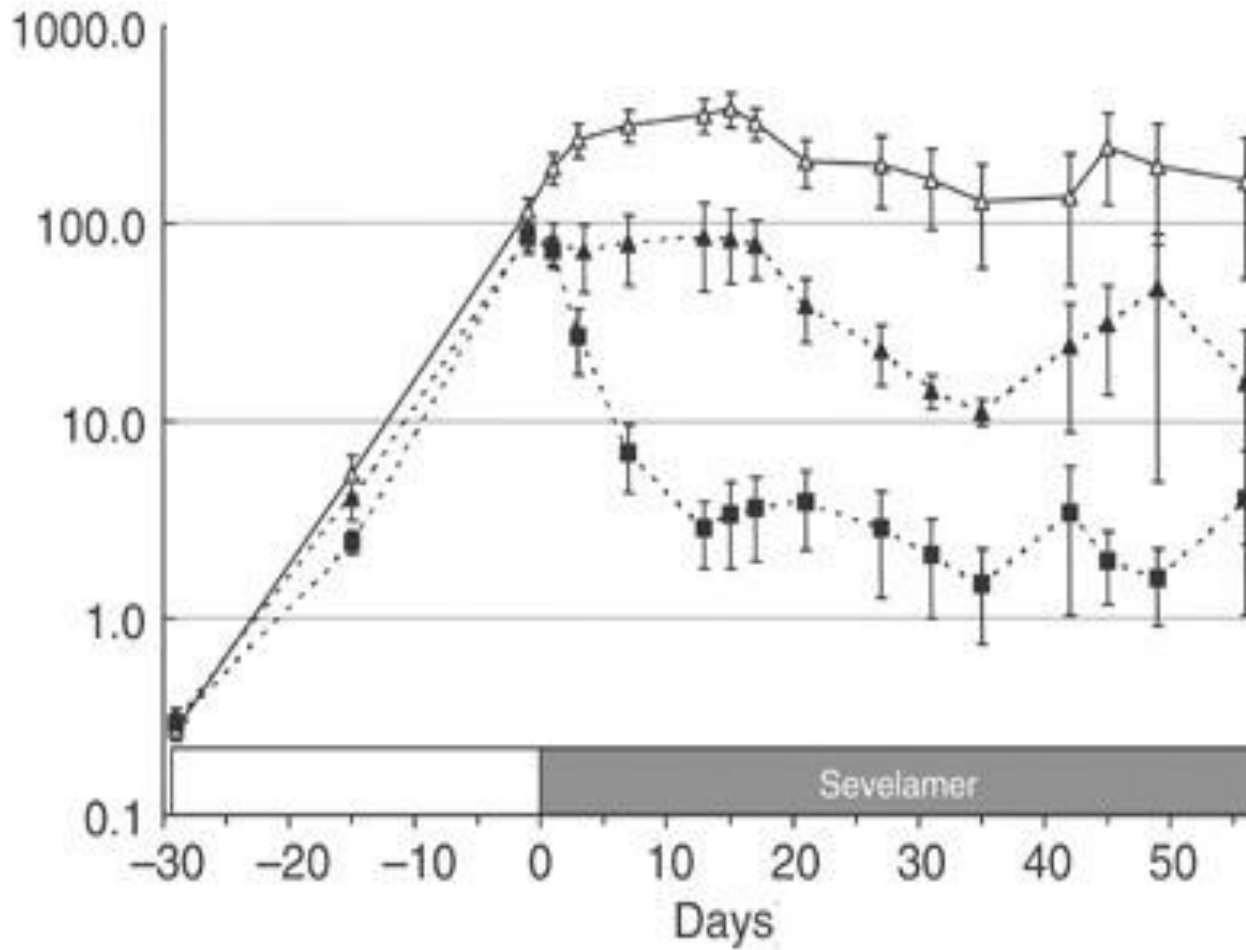
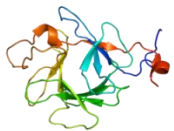




# **Prevention and Control of Phosphate Retention/ Hyperphosphatemia in CKD-MBD: What Is Normal, When to Start, and How to Treat?**

# Prevention and Control of Phosphate Retention/ Hyperphosphatemia in CKD-MBD: What Is Normal, When to Start, and How to Treat?





PLACEBO

REVELA 800

REVELA 800

REVELA 800

REVELA 800

**Phosphate binders**

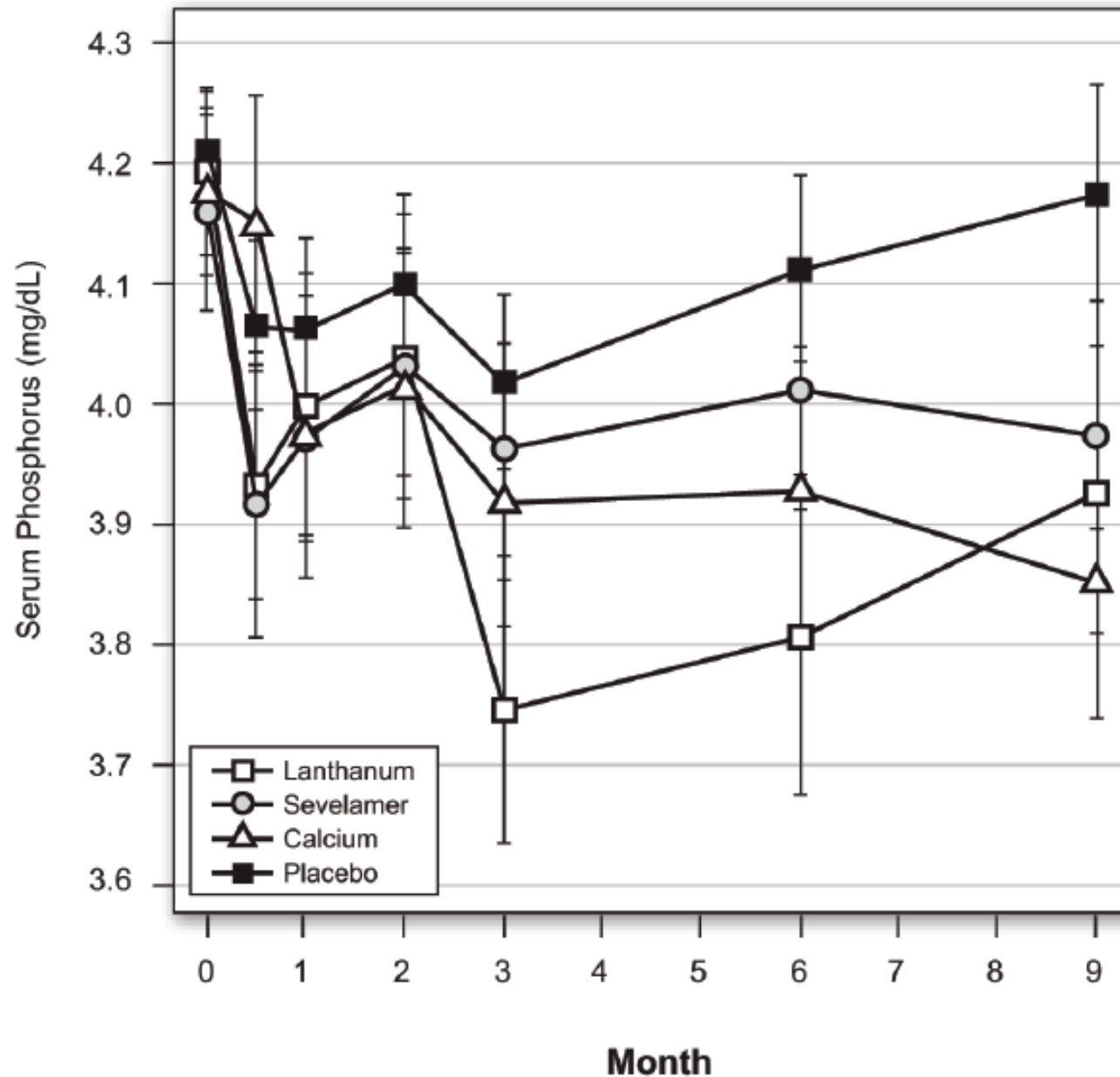
**in chronic kidney disease patients?**

**A clear 'No' at the moment,**

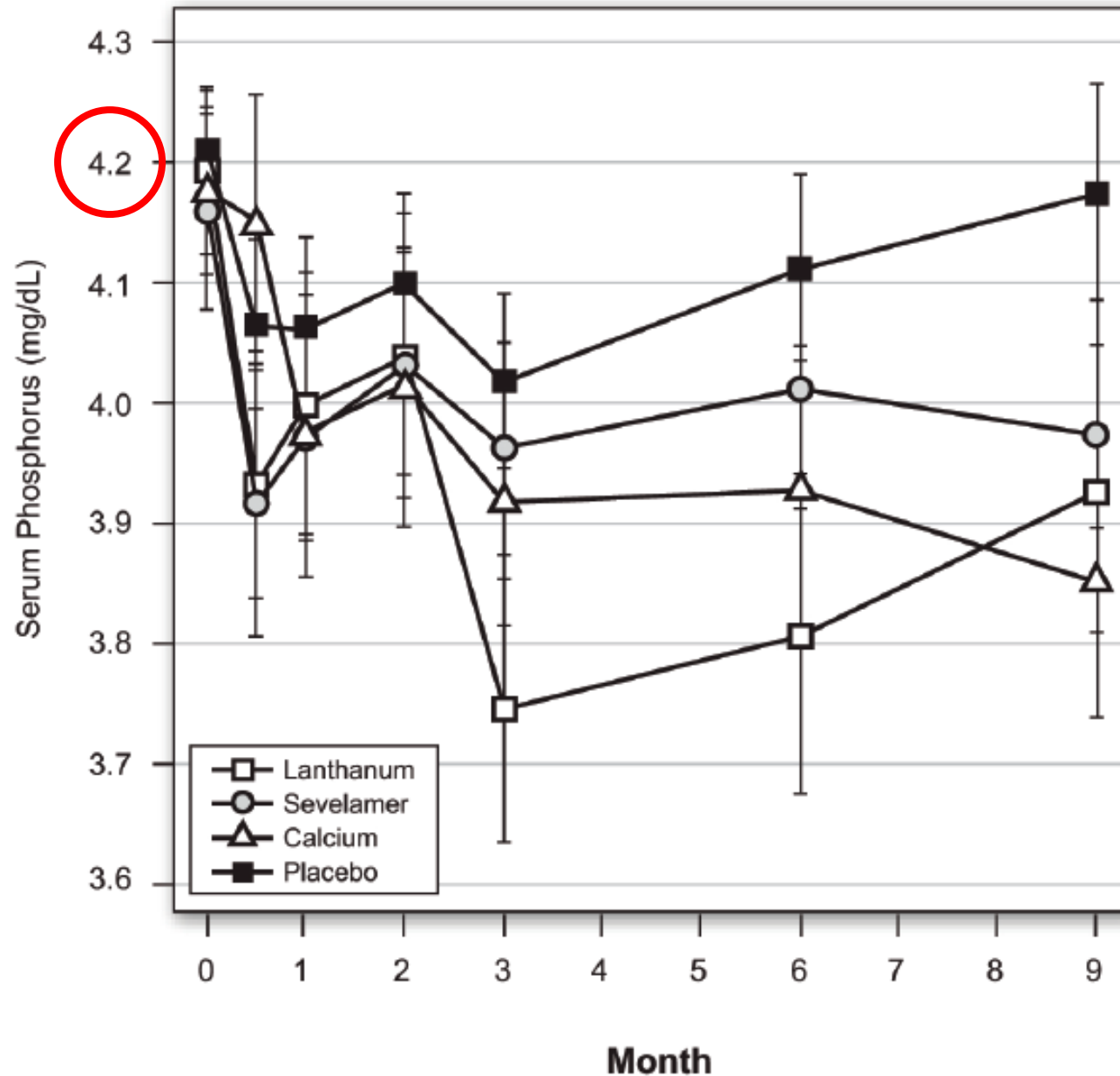
**but stay tuned**



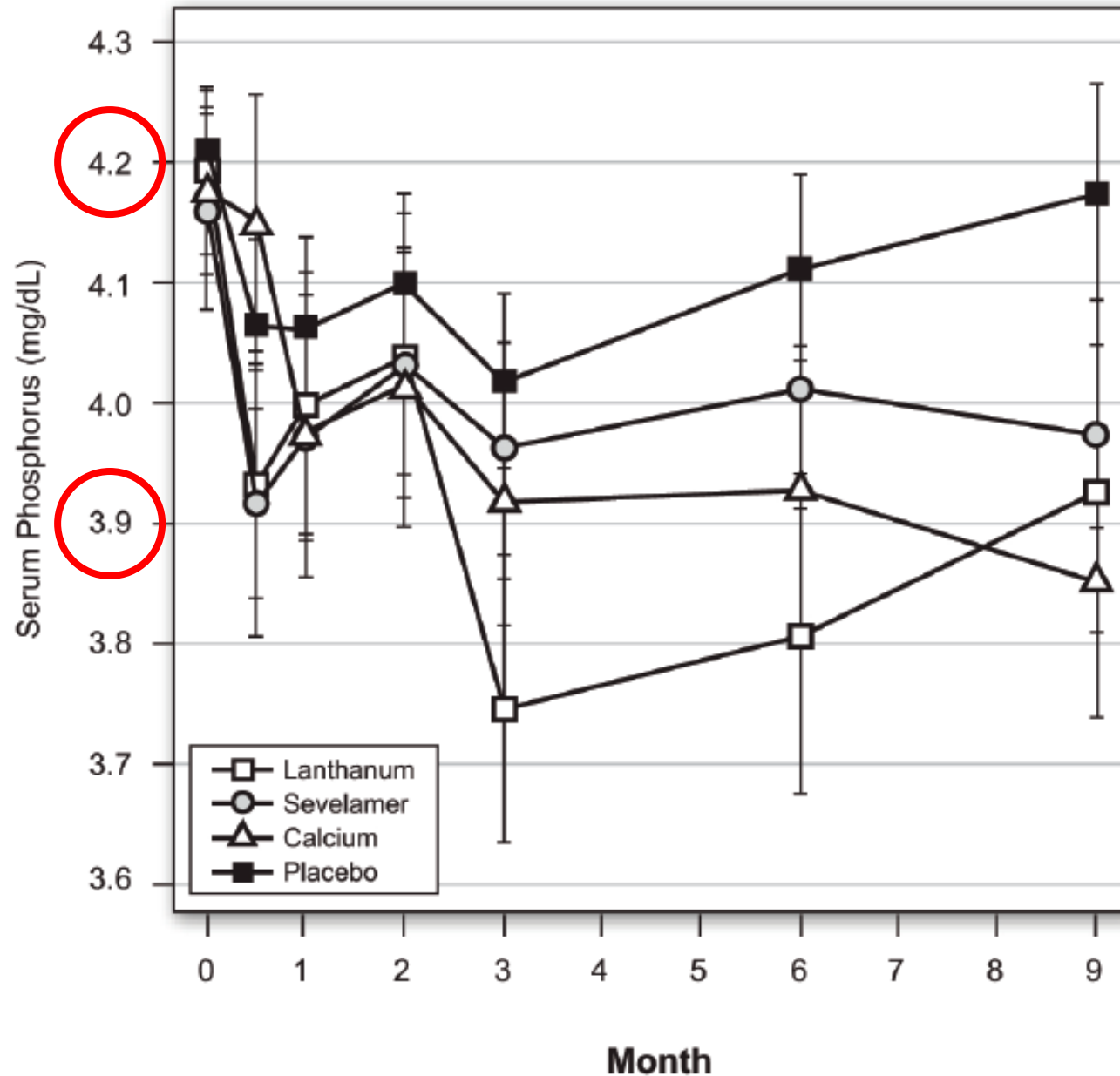
# Effects of Phosphate Binders in Moderate CKD



# Effects of Phosphate Binders in Moderate CKD

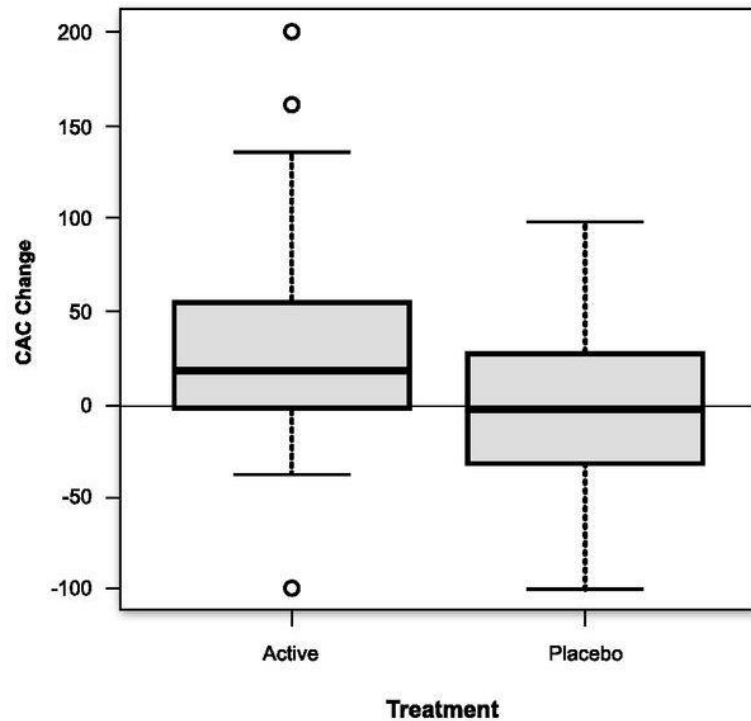


# Effects of Phosphate Binders in Moderate CKD

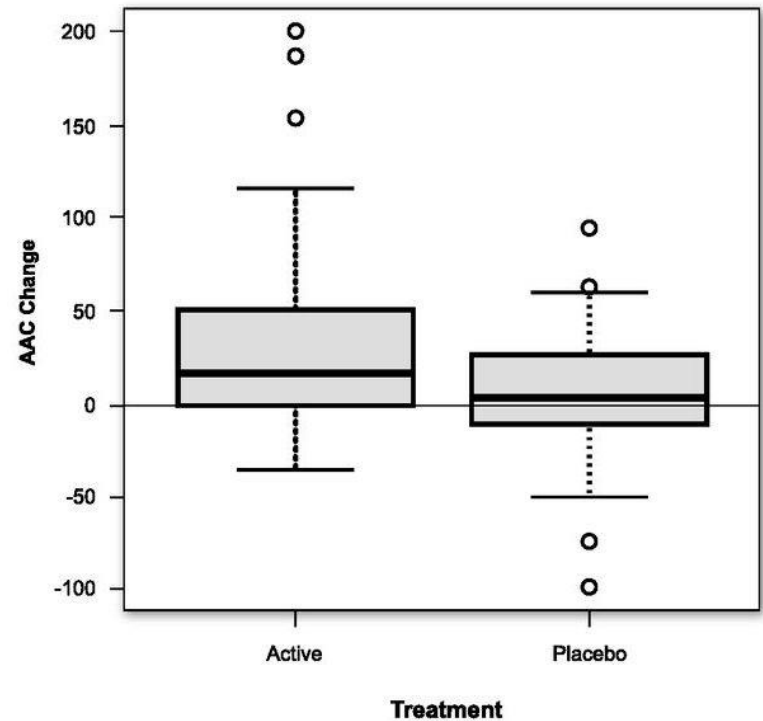


# Effects of Phosphate Binders in Moderate CKD

## Change in Coronary Artery Calcium Volume

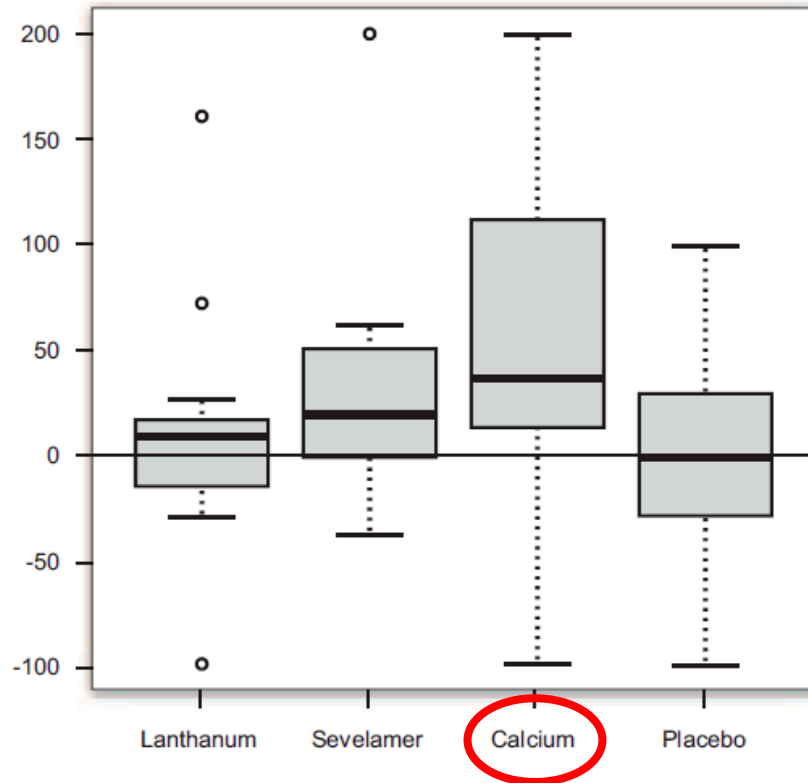


## Change in Abdominal Aorta Calcium Volume

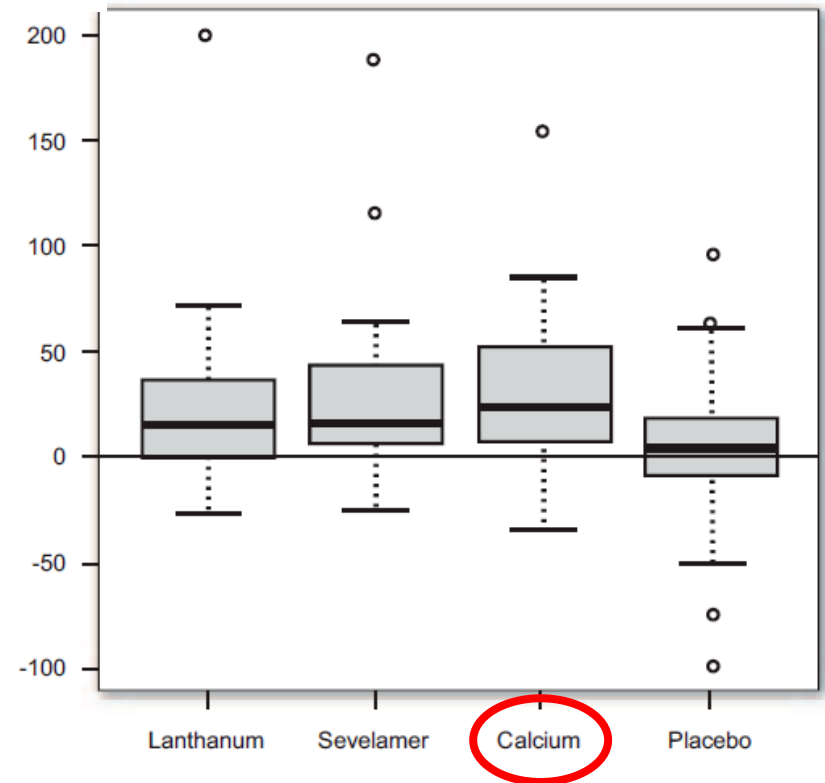


# Effects of Phosphate Binders in Moderate CKD

## Change in Coronary Artery Calcium Volume

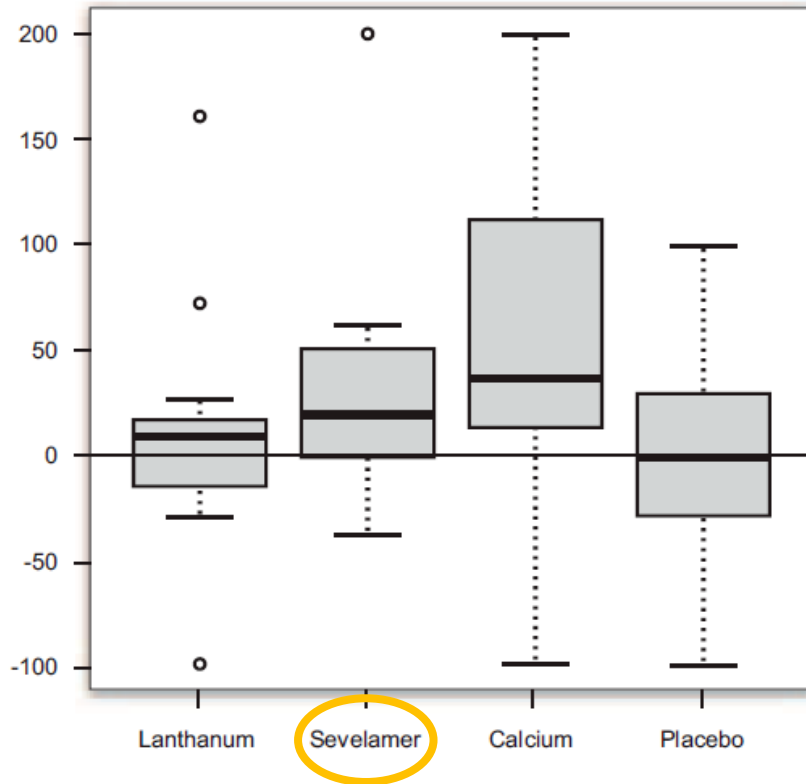


## Change in Abdominal Aorta Calcium Volume

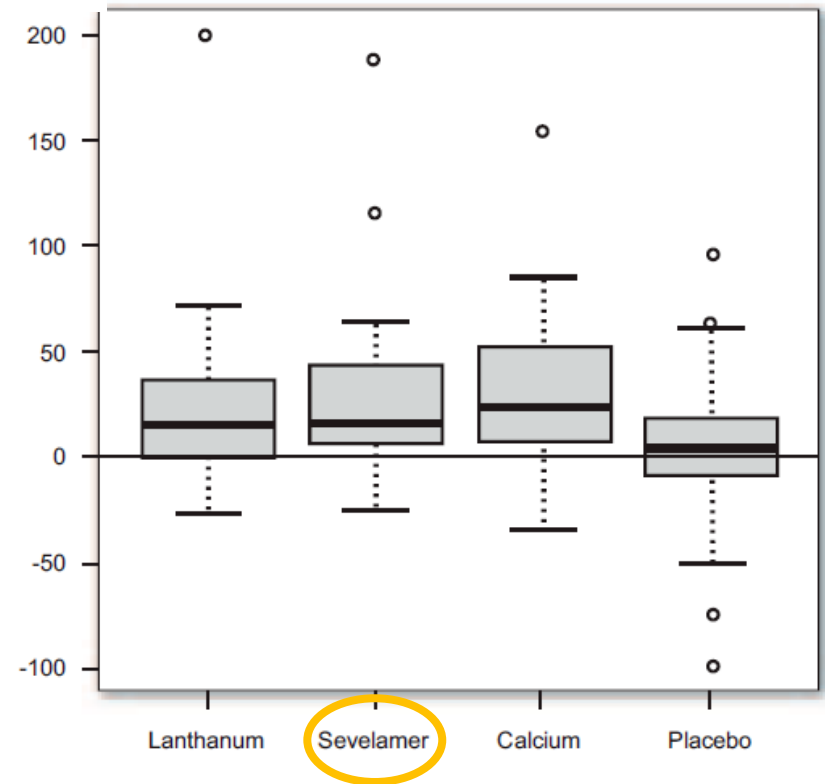


# Effects of Phosphate Binders in Moderate CKD

## Change in Coronary Artery Calcium Volume

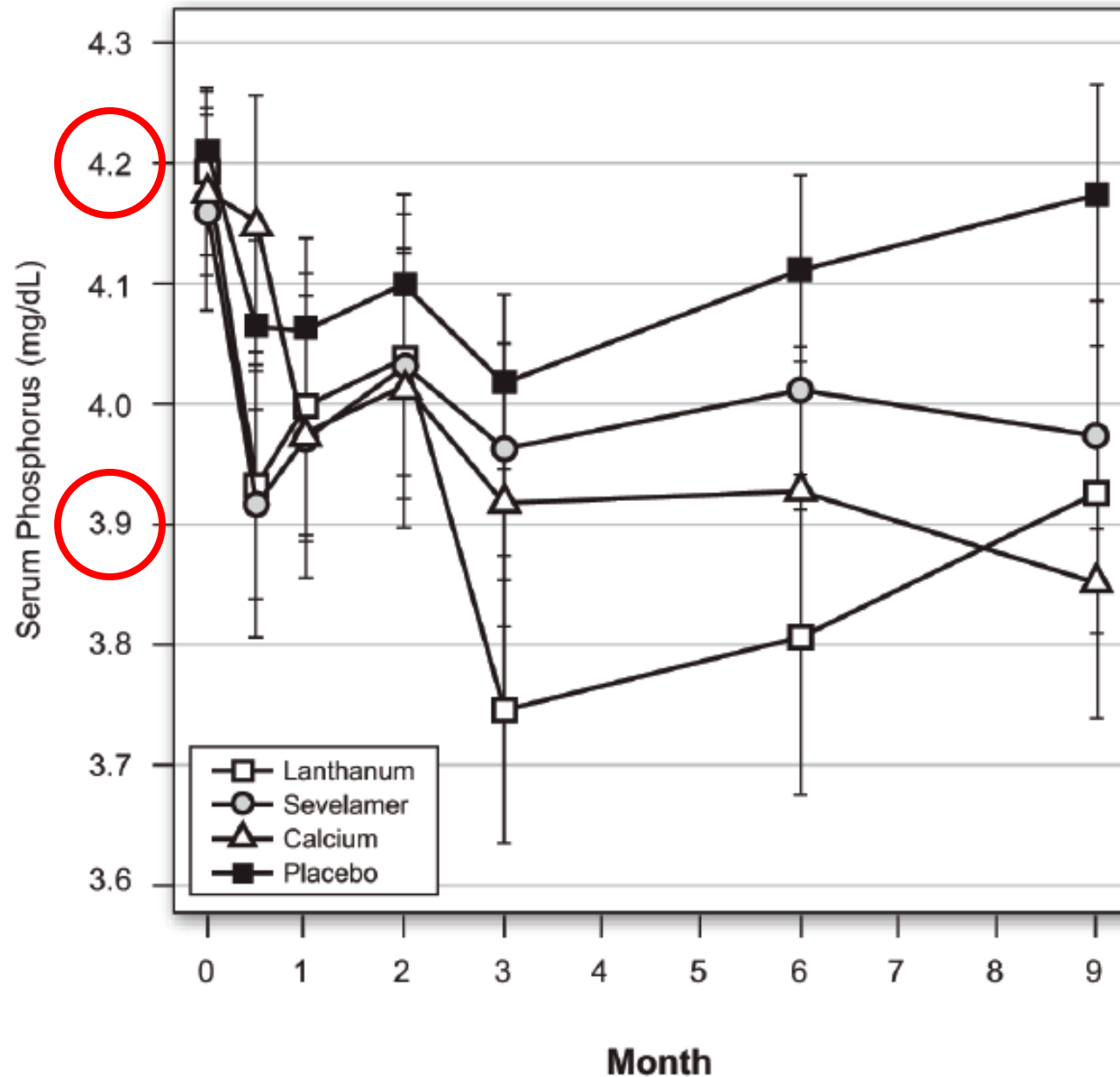


## Change in Abdominal Aorta Calcium Volume





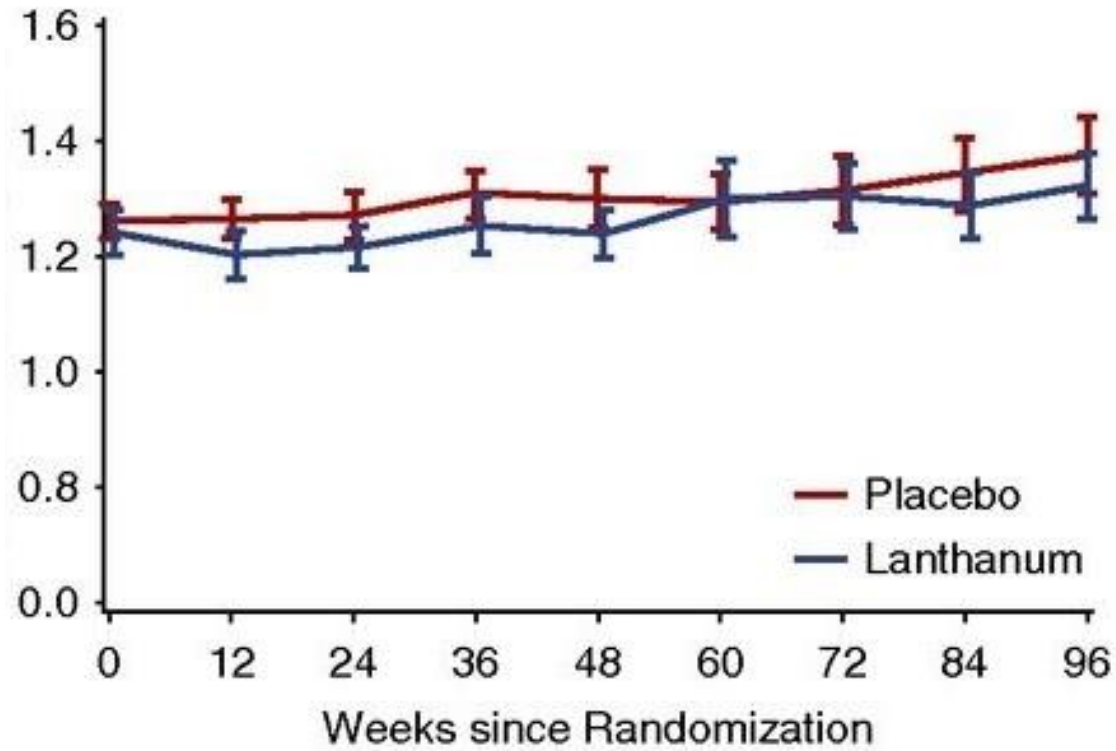
# Effects of Phosphate Binders in Moderate CKD



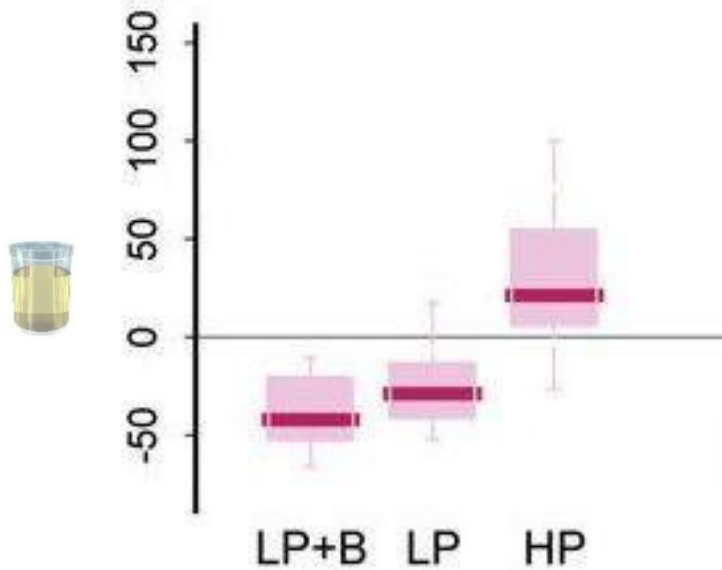




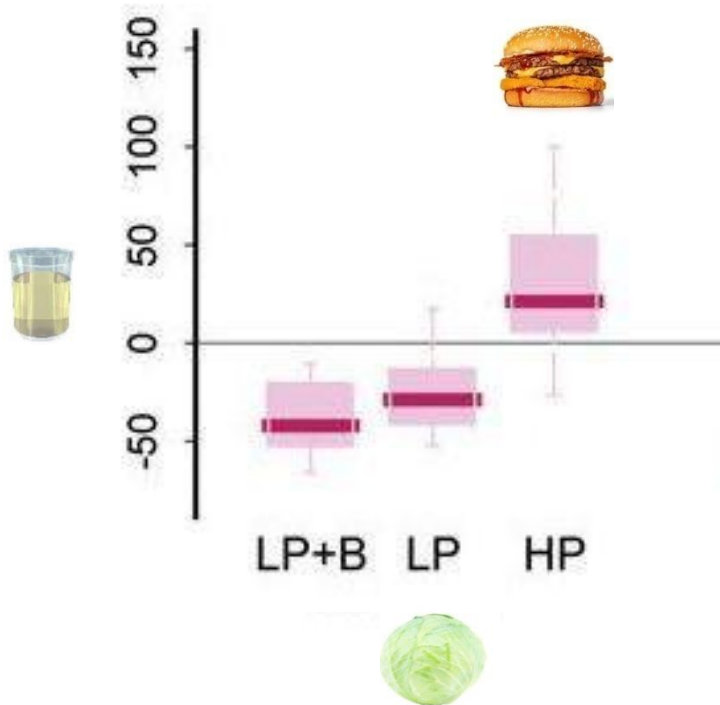
## Serum phosphate



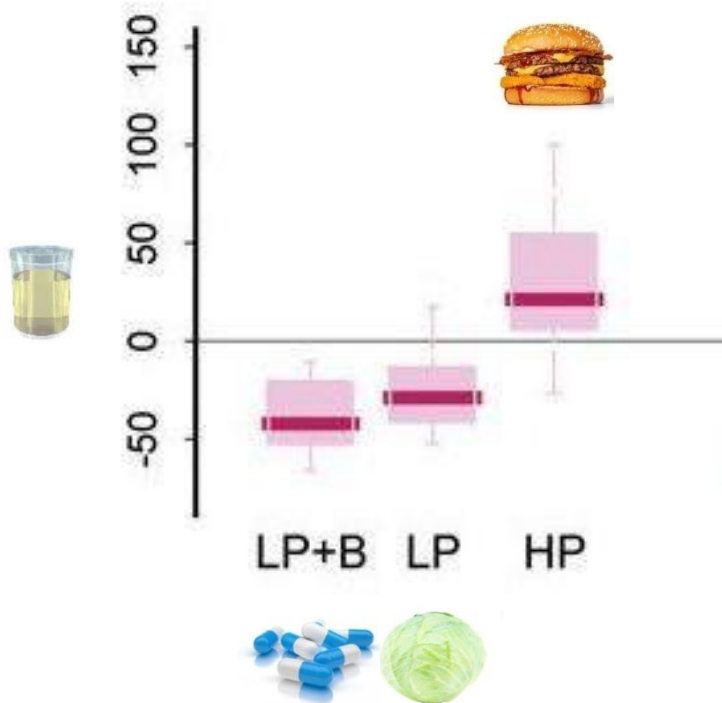
## Percentage change in Urinary Phosphate



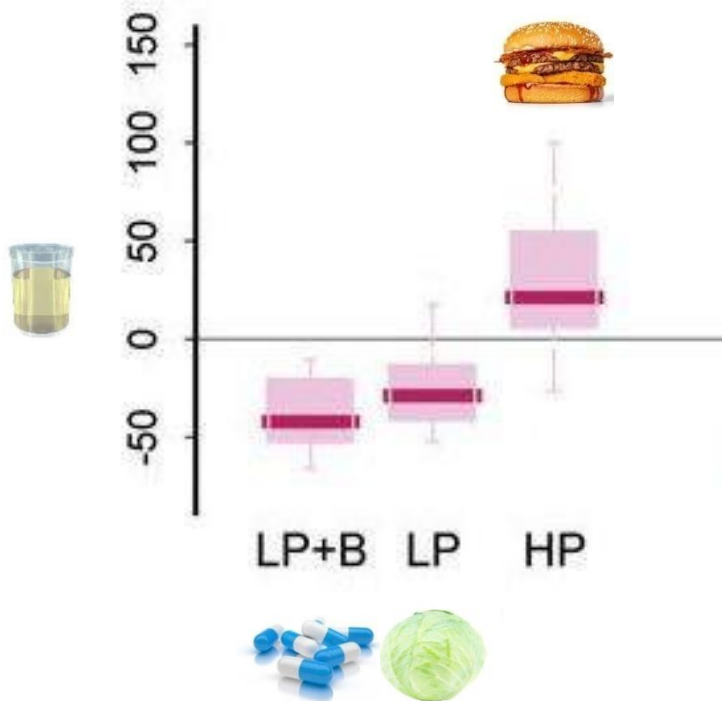
## Percentage change in Urinary Phosphate



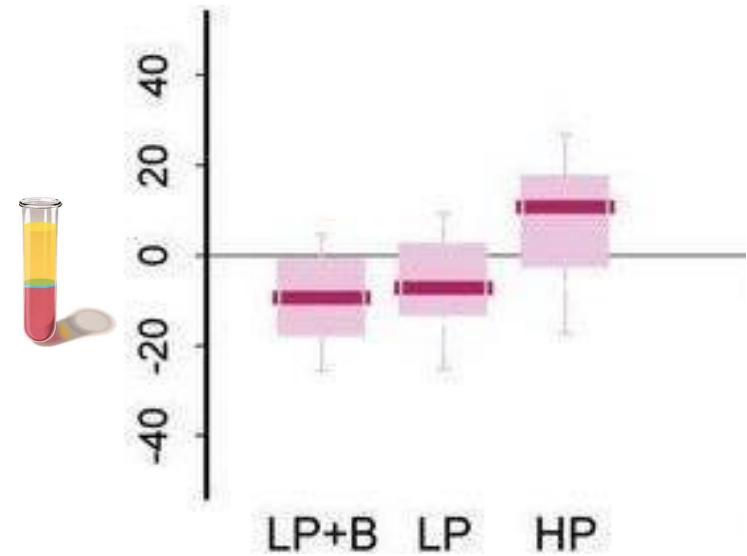
## Percentage change in Urinary Phosphate

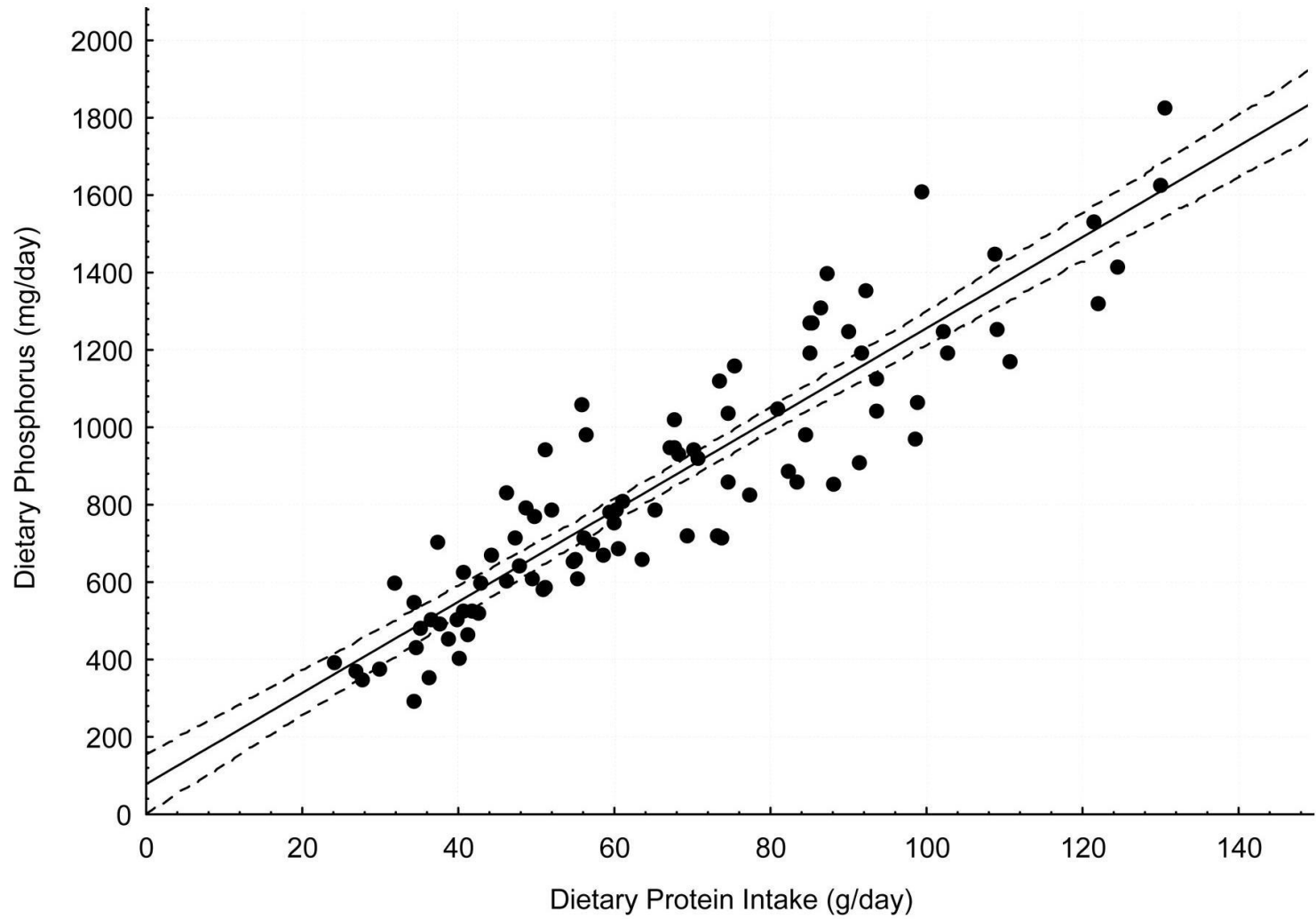


Percentage change in Urinary Phosphate



Percentage change in Serum Phosphate





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MCCANN-ERICKSON ATHENS





ναι στις πρωτεΐνες, όχι στα συντηρητικά!



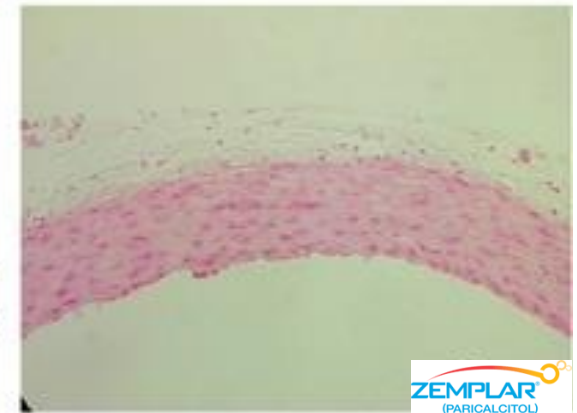
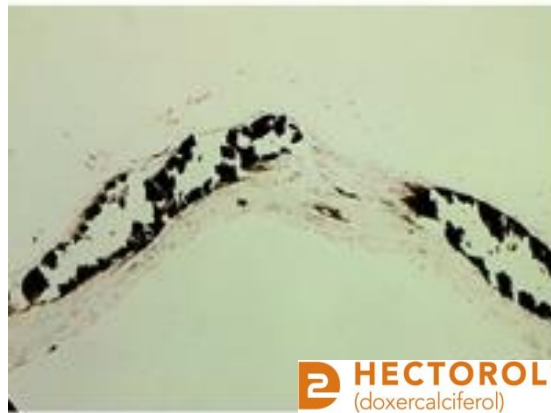
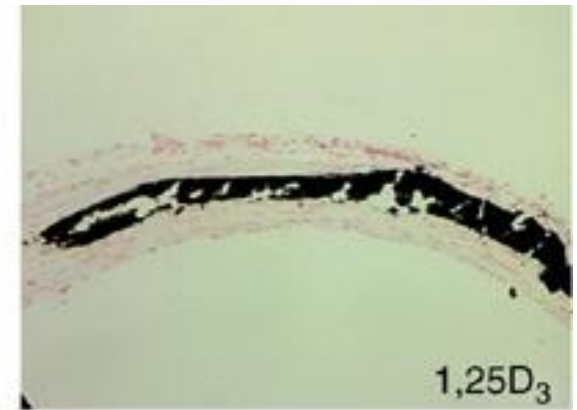
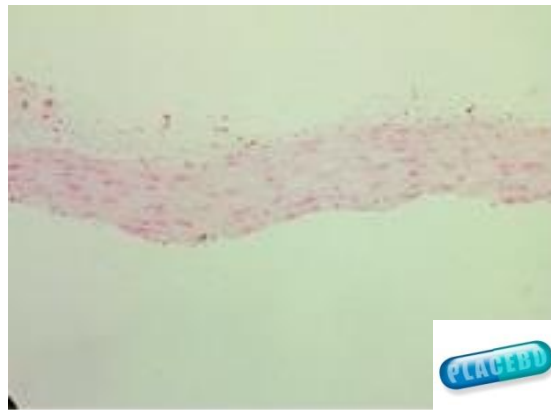
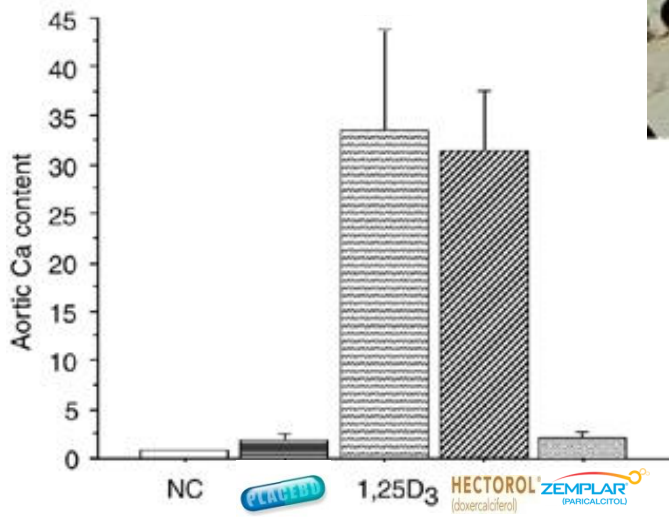
# Understanding Sources of Dietary Phosphorus in the Treatment of Patients with Chronic Kidney Disease

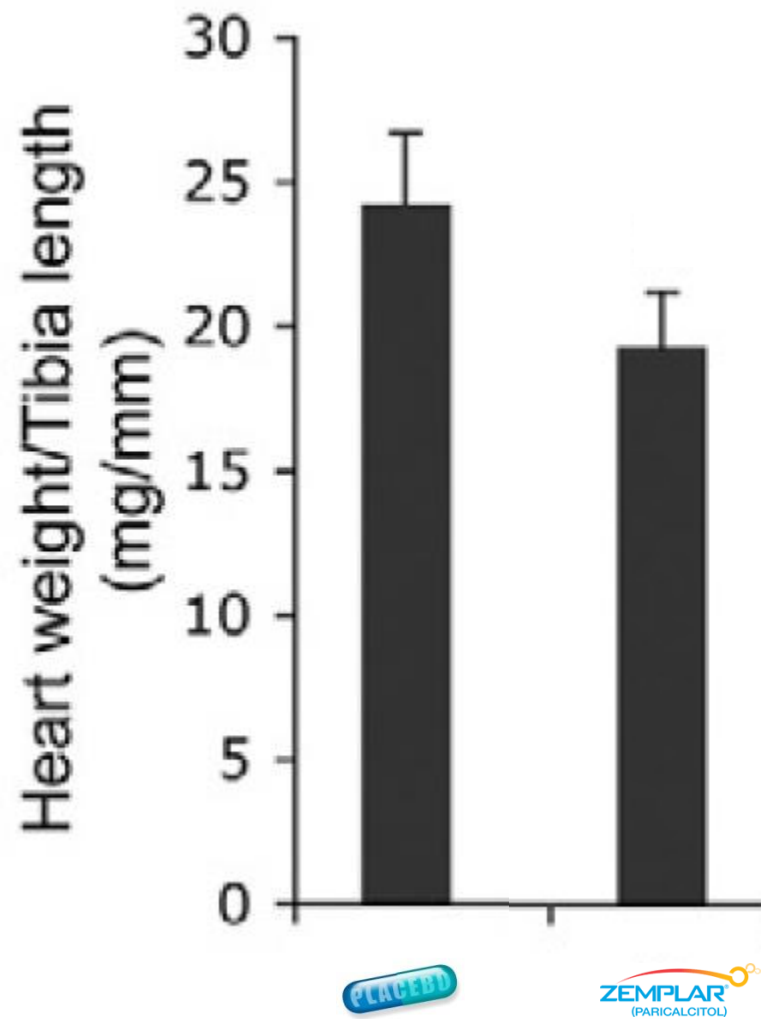


In CKD G3a–G5 not on dialysis we suggest  
calcitriol and vitamin D analogs  
**not** be **routinely** used

**Reserve** calcitriol and vitamin D analogs  
for **severe** and progressive hyperparathyroidism

In CKD G3a–G5 not on dialysis  
the optimal PTH level is not known.





PLACEBO



ZEMPLAR  
(PARICALCITOL)

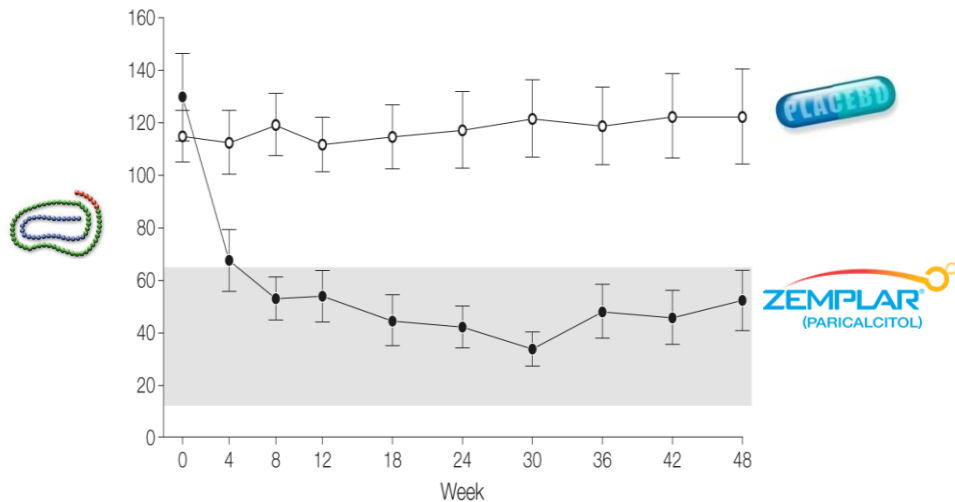
**Vitamin D Therapy and Cardiac Structure  
and Function in Patients  
With Chronic Kidney Disease**  
The PRIMO Randomized Controlled Trial

**Vitamin D Therapy and Cardiac Structure  
and Function in Patients  
With Chronic Kidney Disease**  
The PRIMO Randomized Controlled Trial



# Vitamin D Therapy and Cardiac Structure and Function in Patients With Chronic Kidney Disease

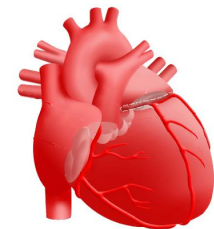
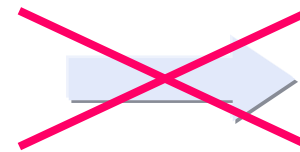
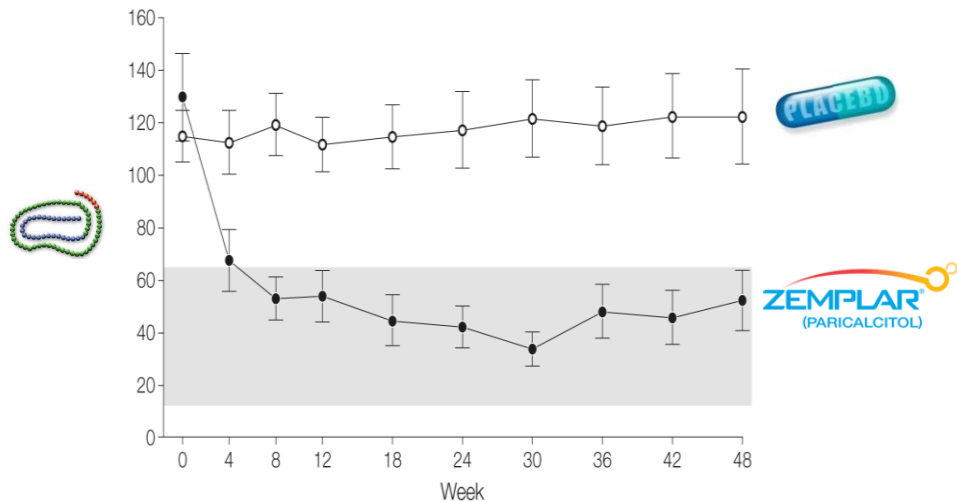
## The PRIMO Randomized Controlled Trial

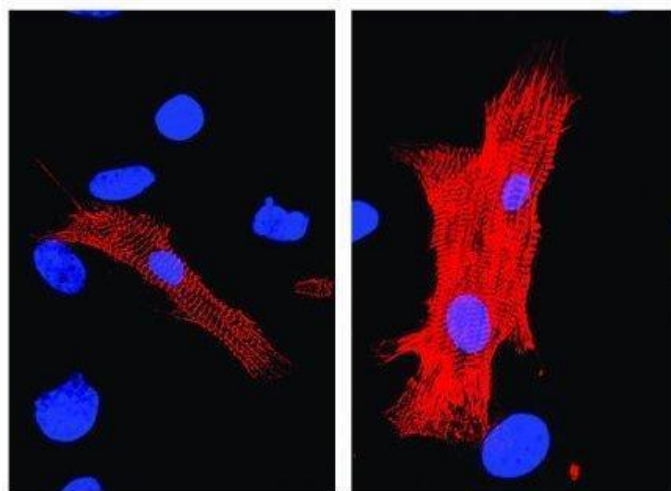




# Vitamin D Therapy and Cardiac Structure and Function in Patients With Chronic Kidney Disease

## The PRIMO Randomized Controlled Trial





Control

FGF23

Untreated

Vehicle

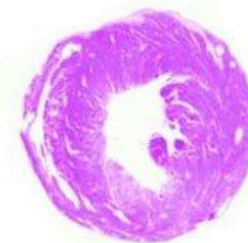
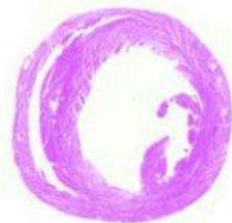
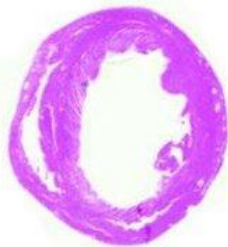
FGF23

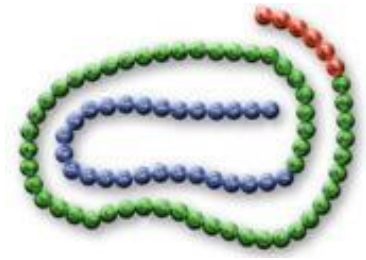
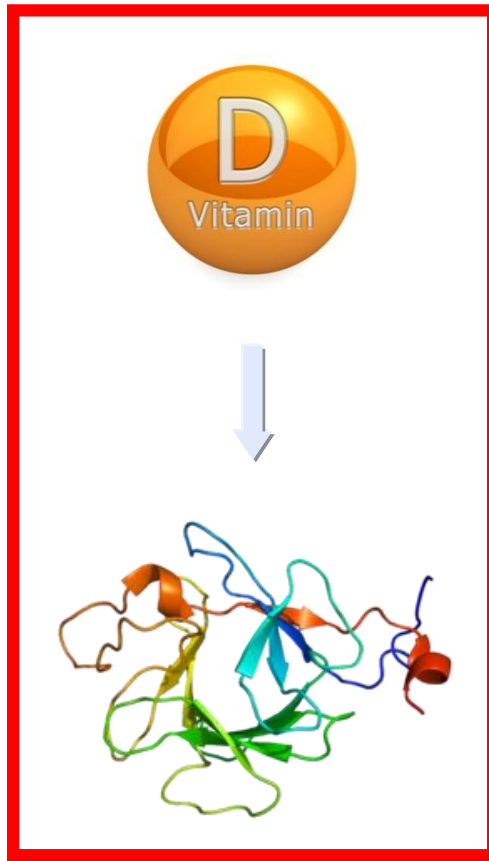
7 d

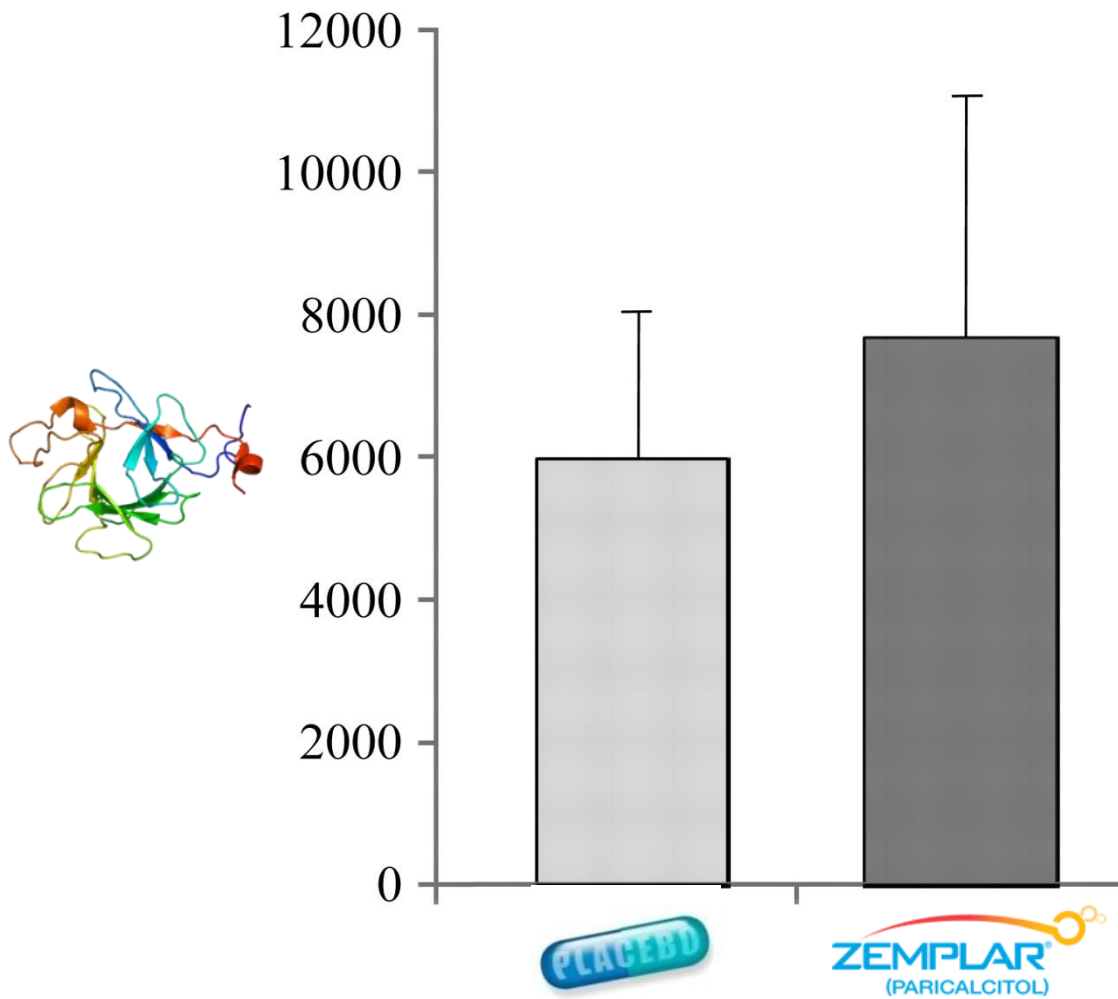
14 d

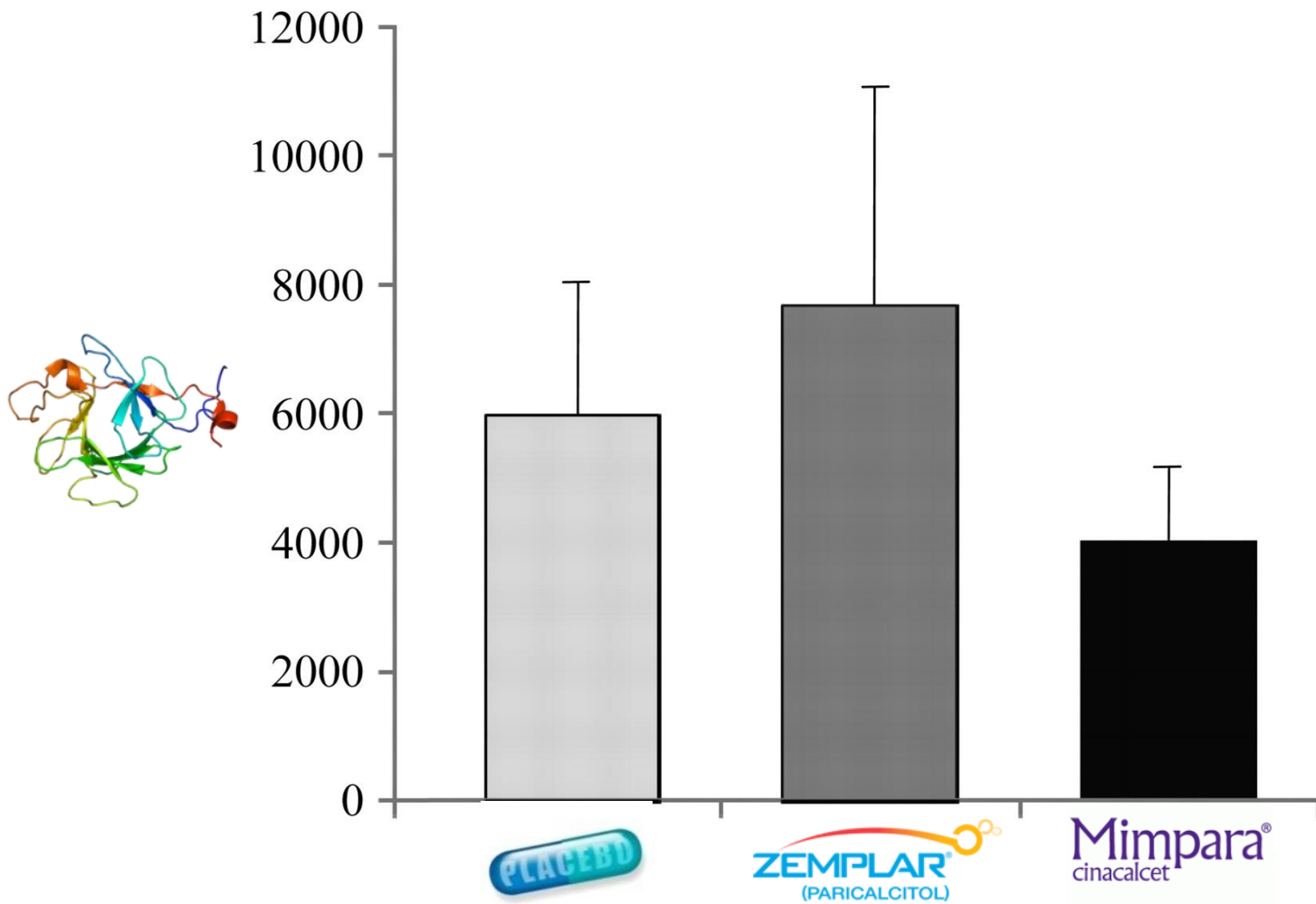
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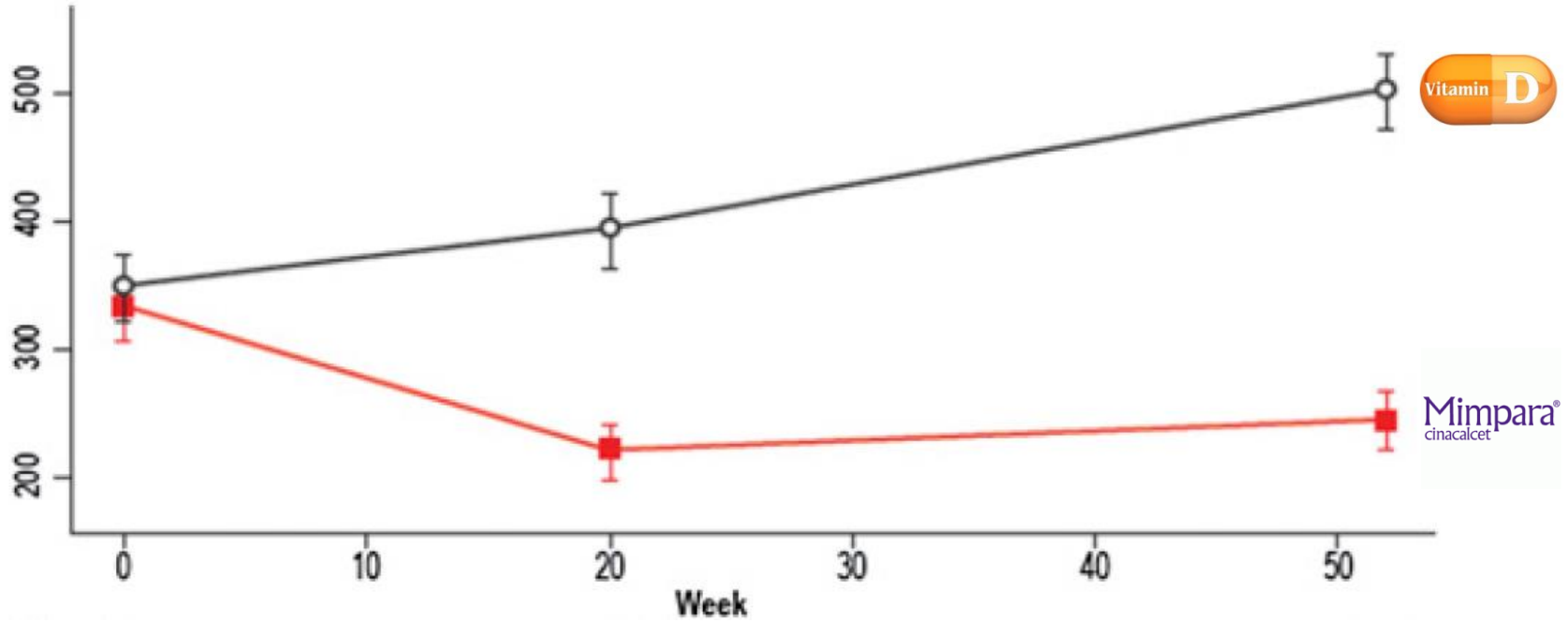
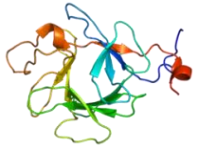
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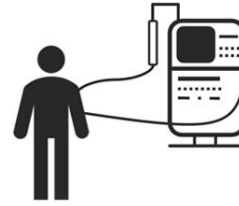




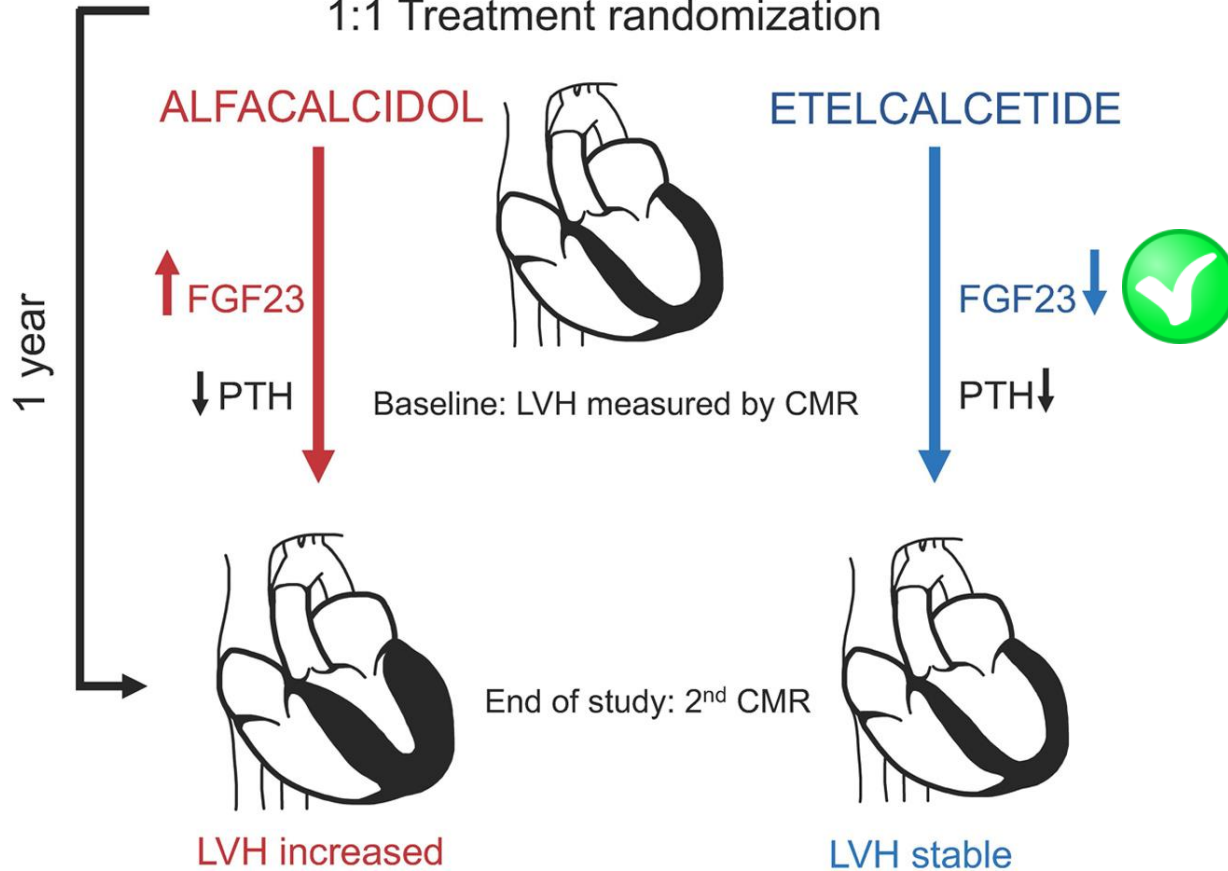




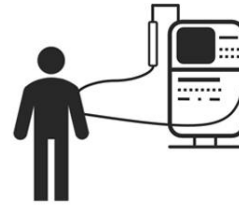
62 Hemodialysis patients with sHPT



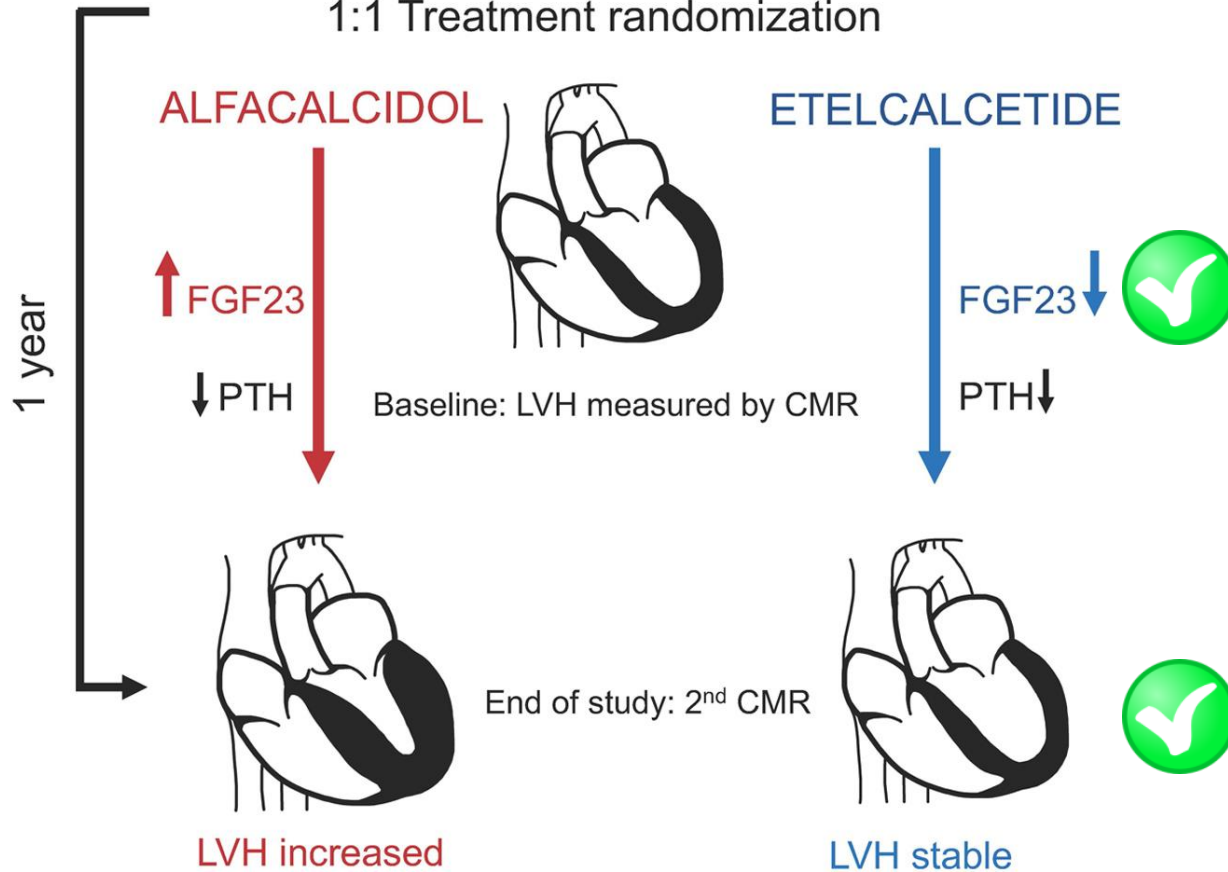
1:1 Treatment randomization



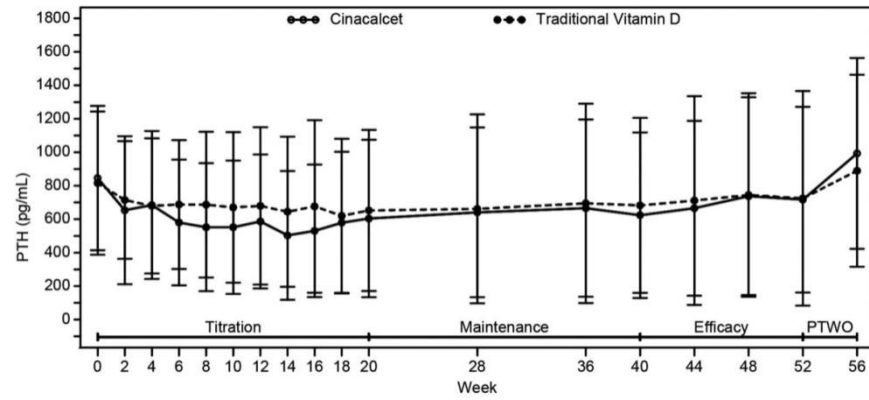
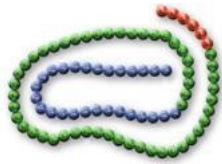
62 Hemodialysis patients with sHPT

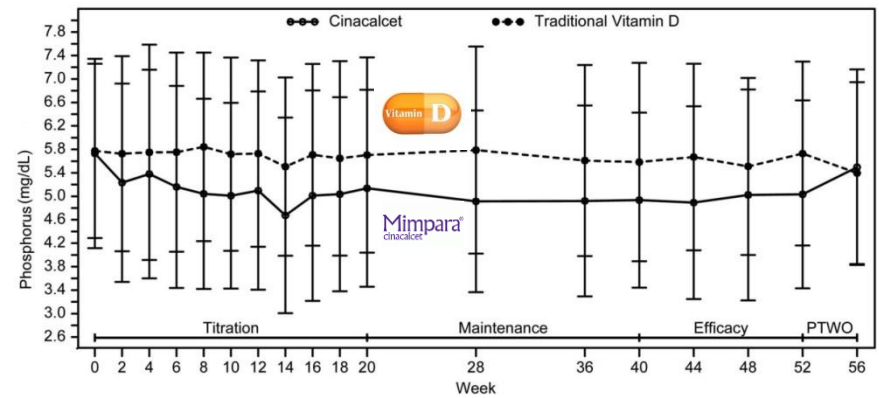
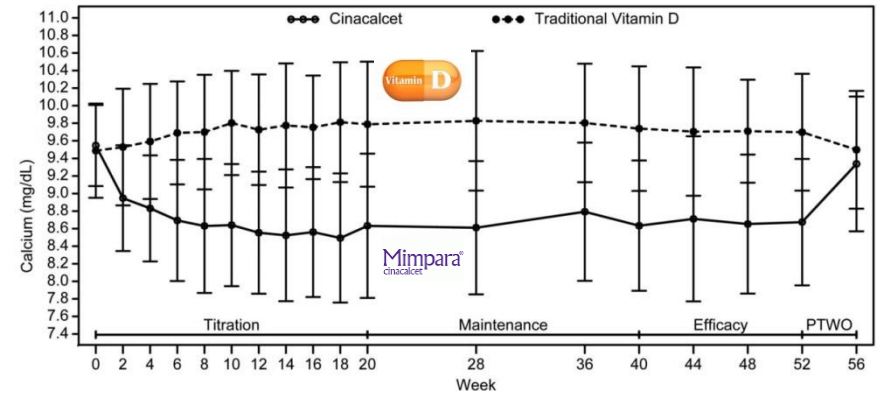
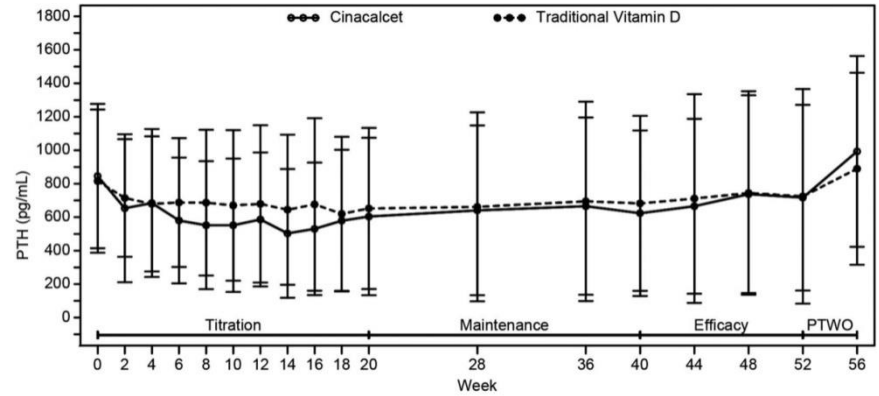
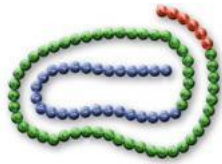


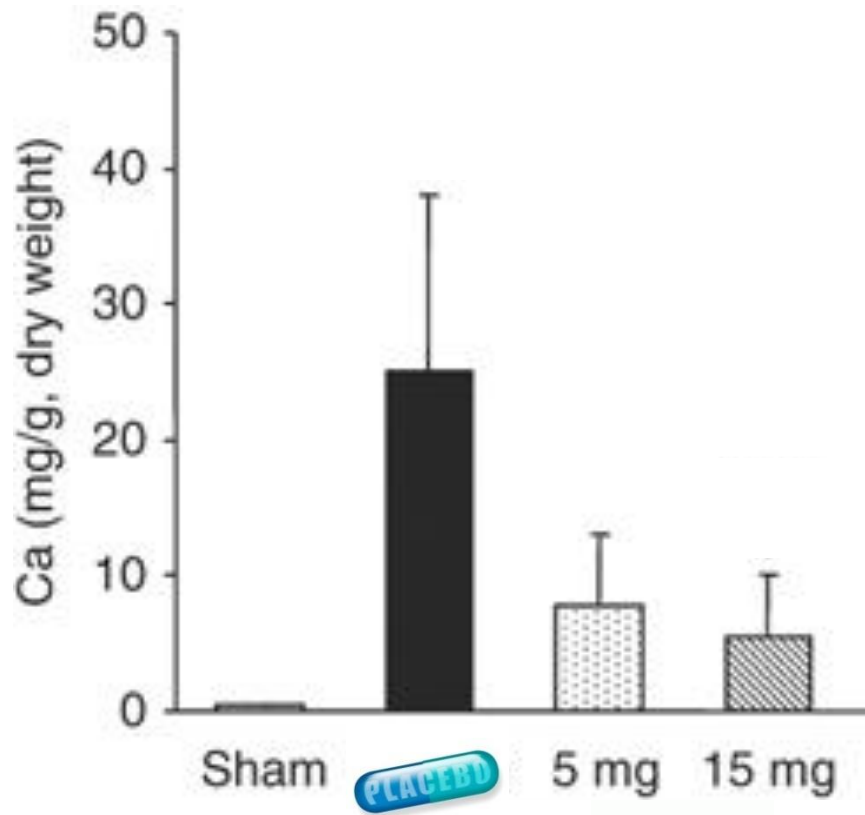
1:1 Treatment randomization



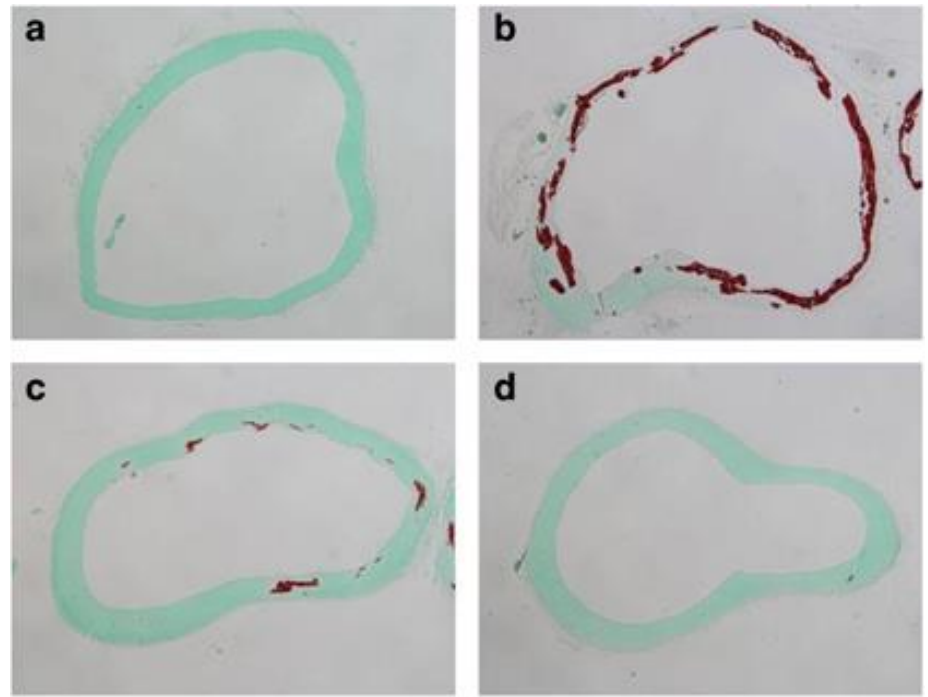


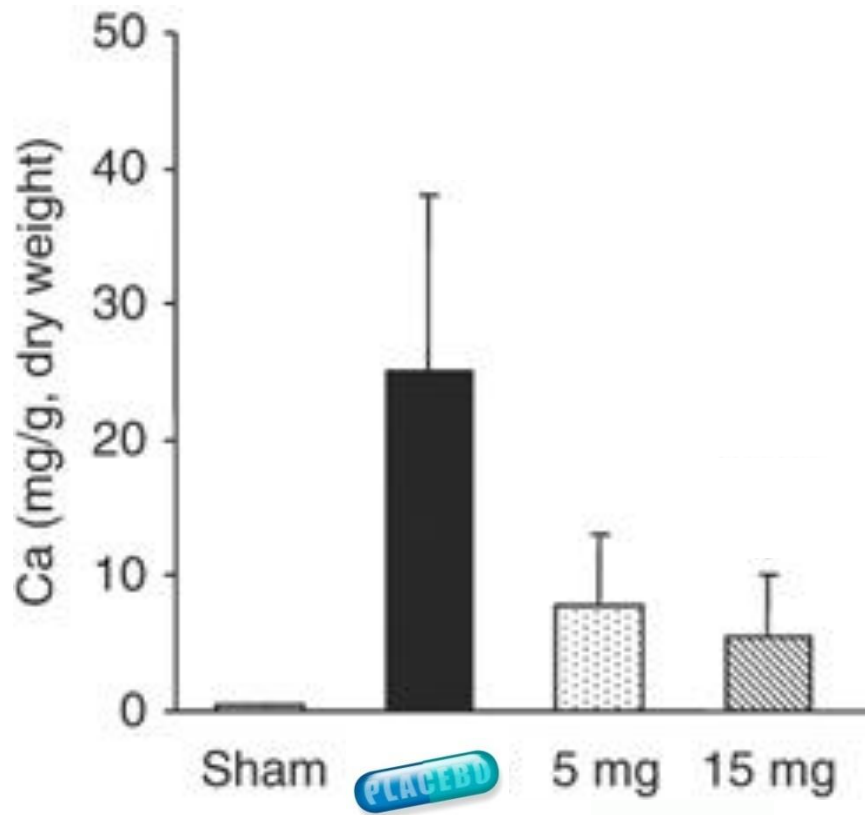




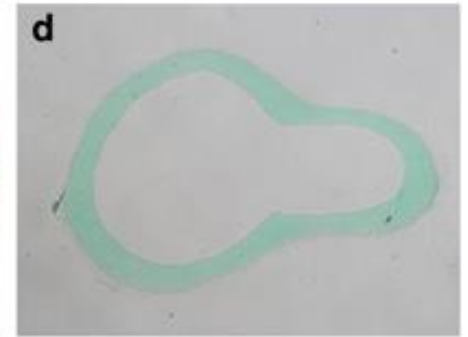


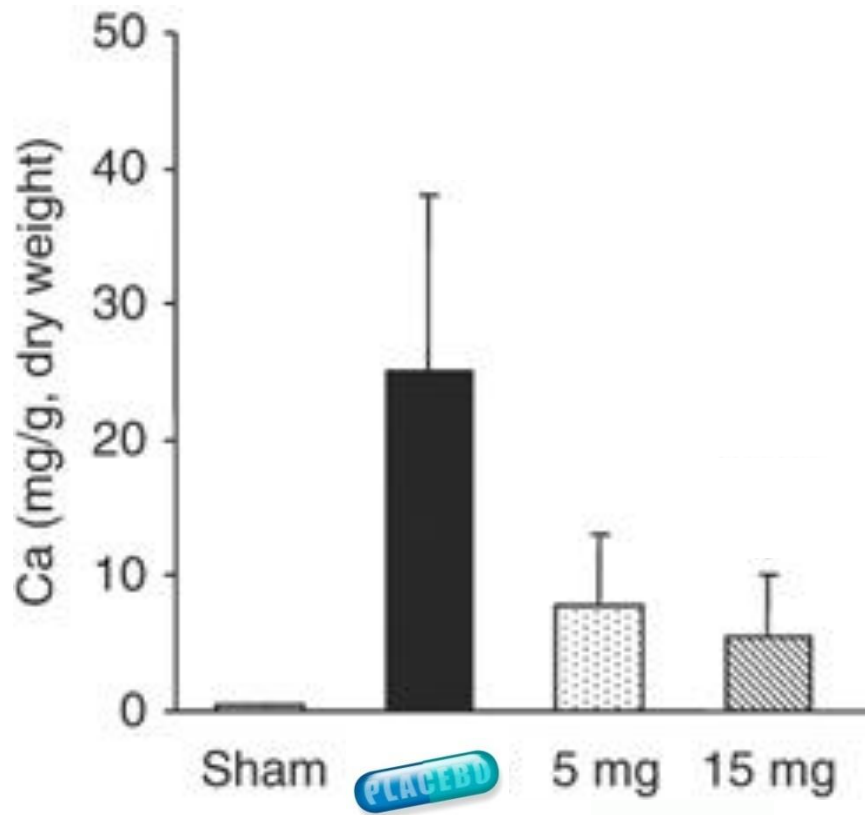
Mimpara<sup>®</sup>  
cinacalcet



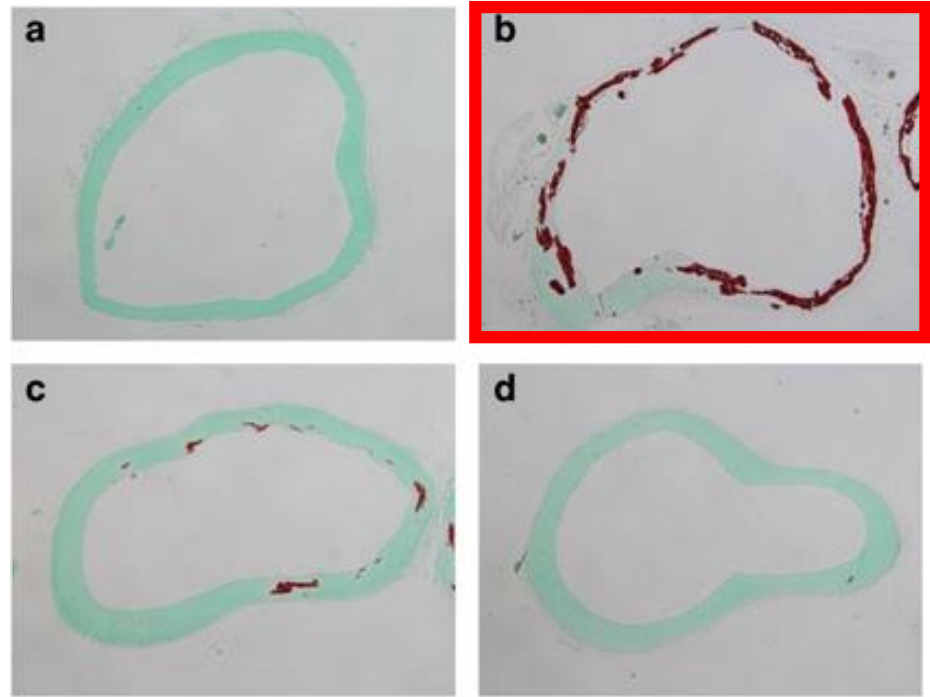


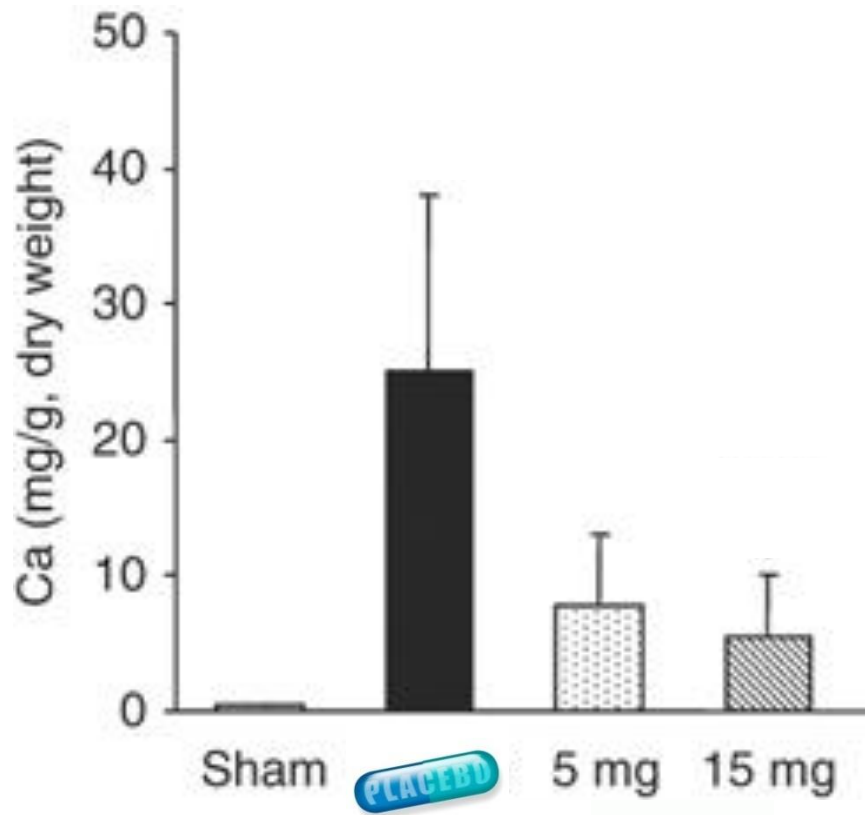
Mimpara<sup>®</sup>  
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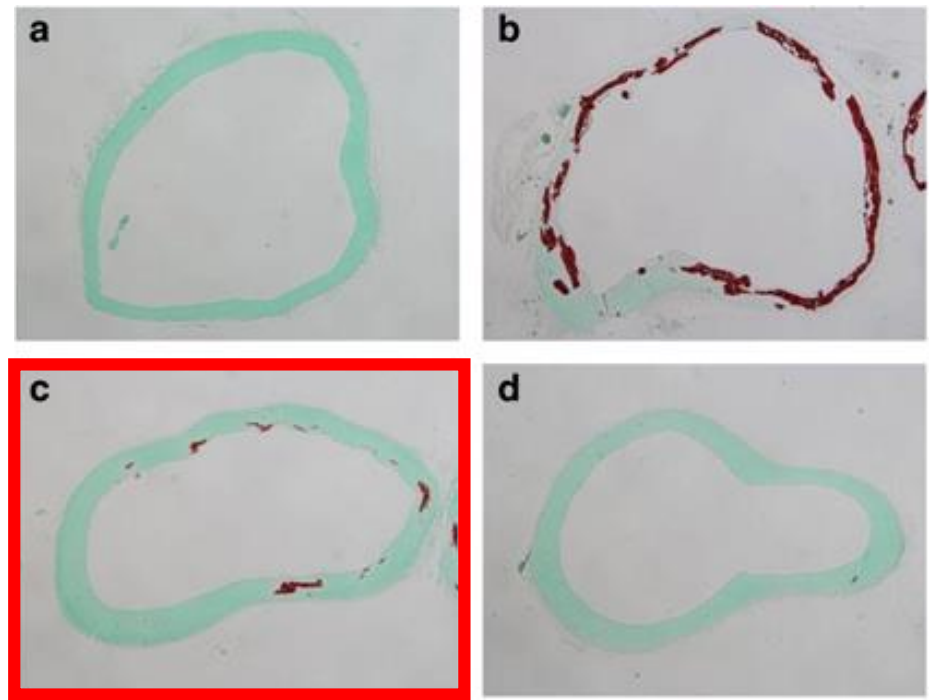


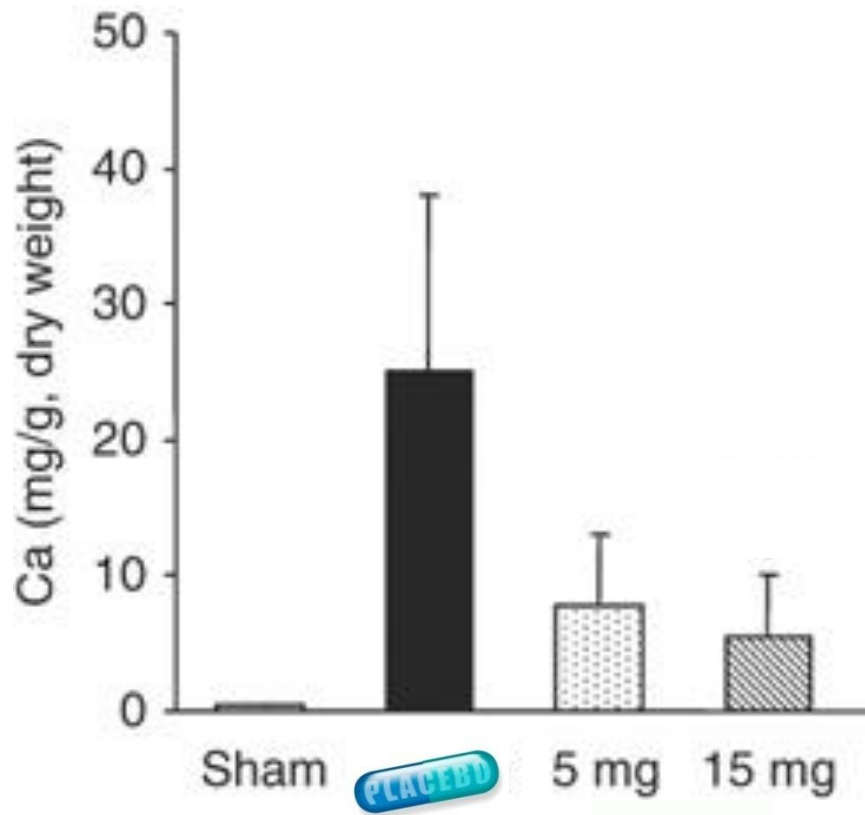
Mimpara<sup>®</sup>  
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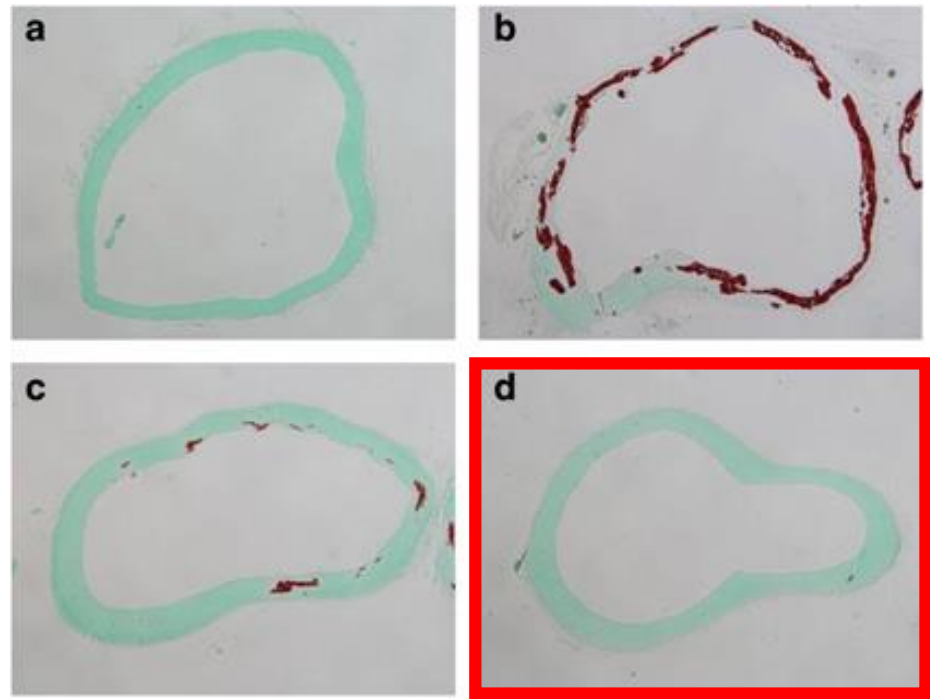


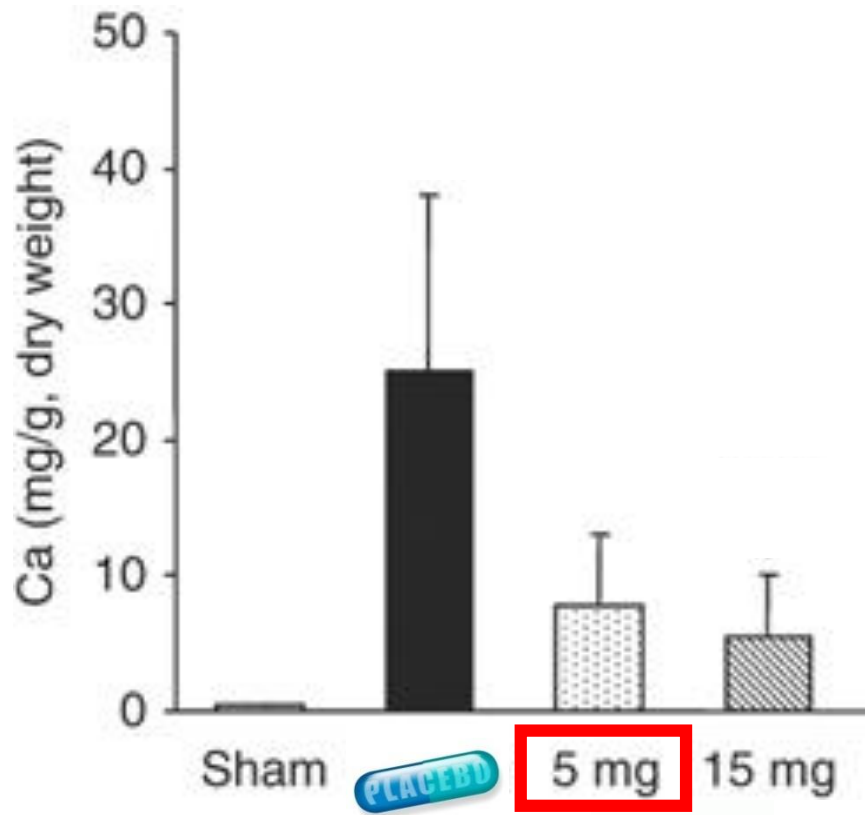
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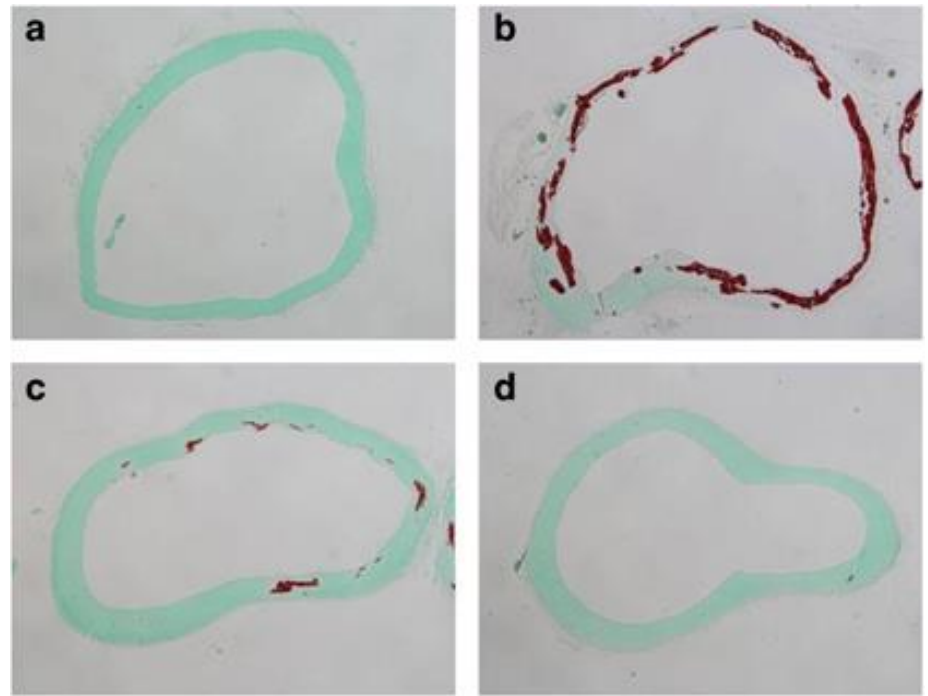


Mimpara<sup>®</sup>  
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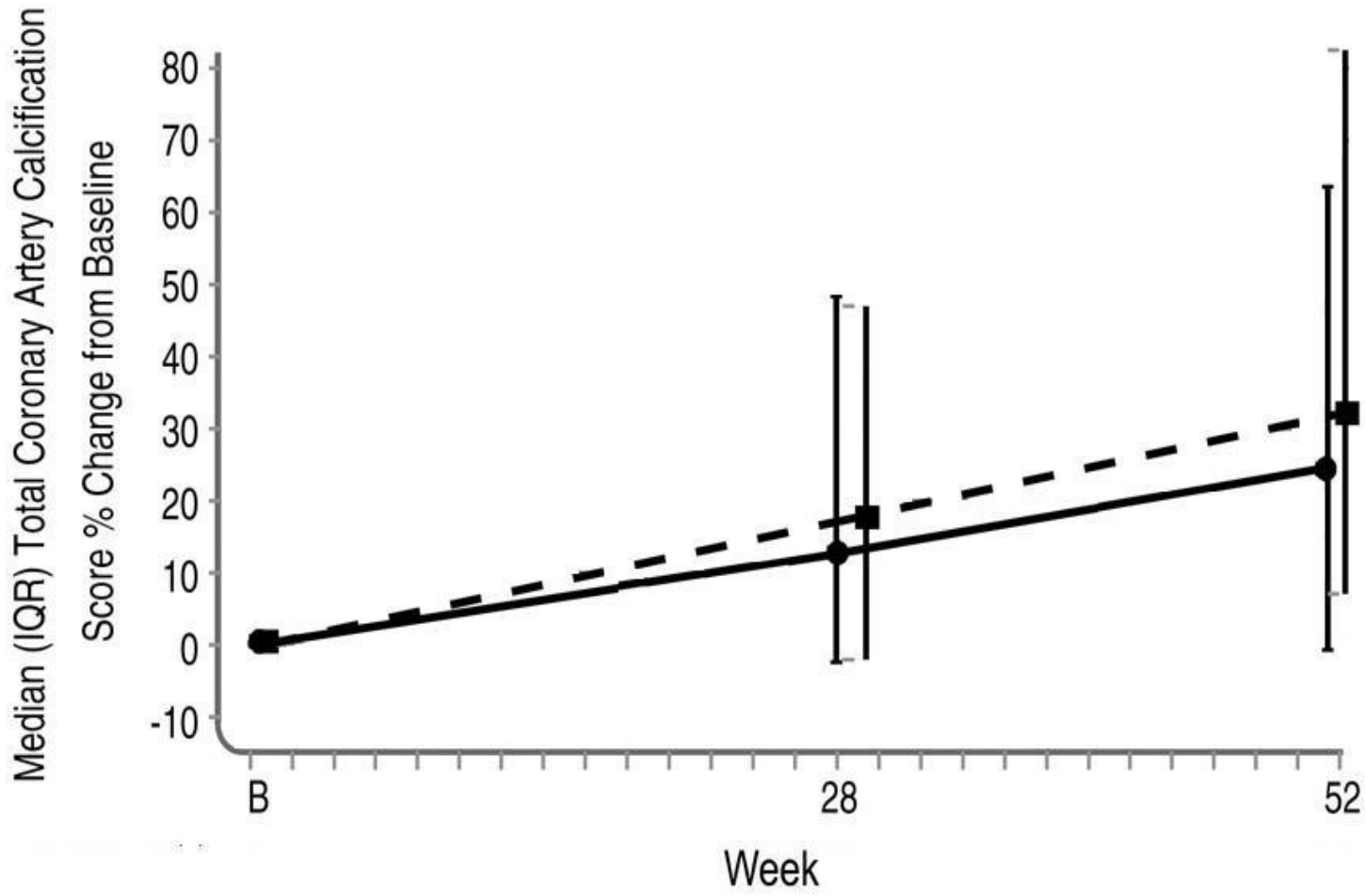




Mimpara<sup>®</sup>  
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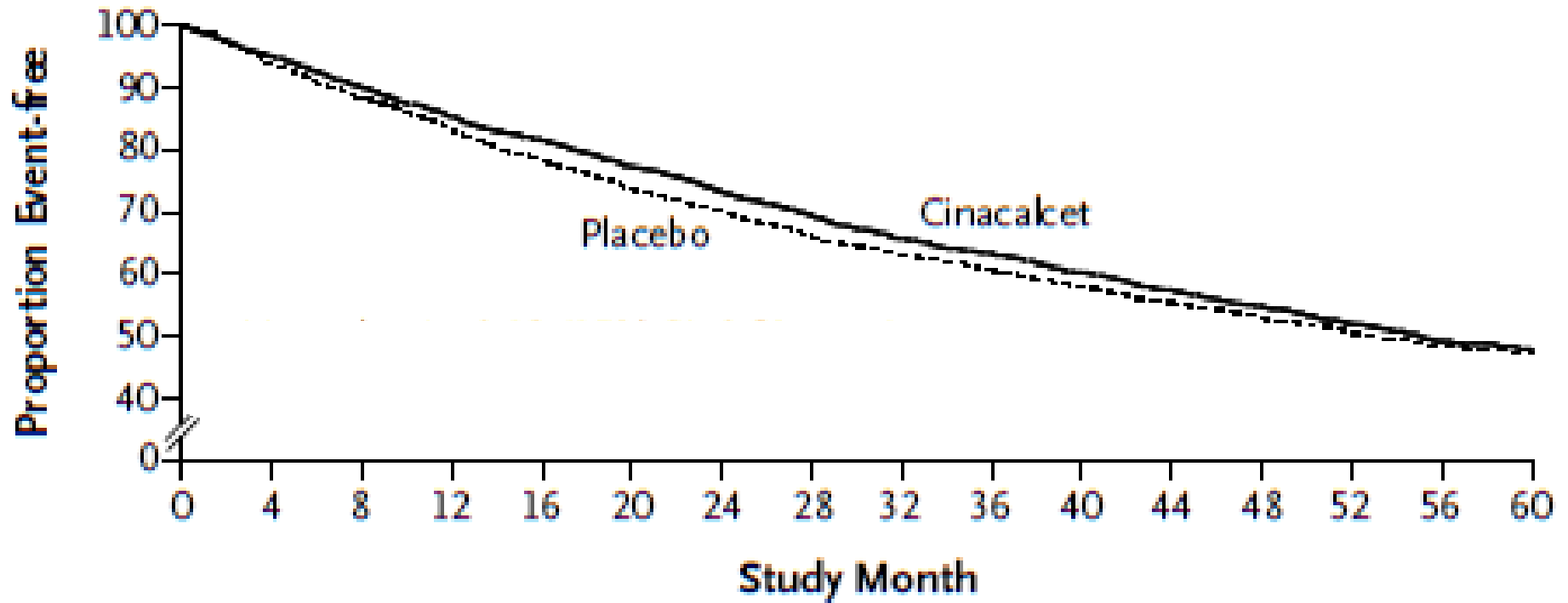






## Effect of Cinacalcet on Cardiovascular Disease in Patients Undergoing Dialysis

The EVOLVE Trial Investigators\*



2017:

In CKD 5D we suggest

**calcimimetics**, calcitriol or vitamin D analogs

or a combination

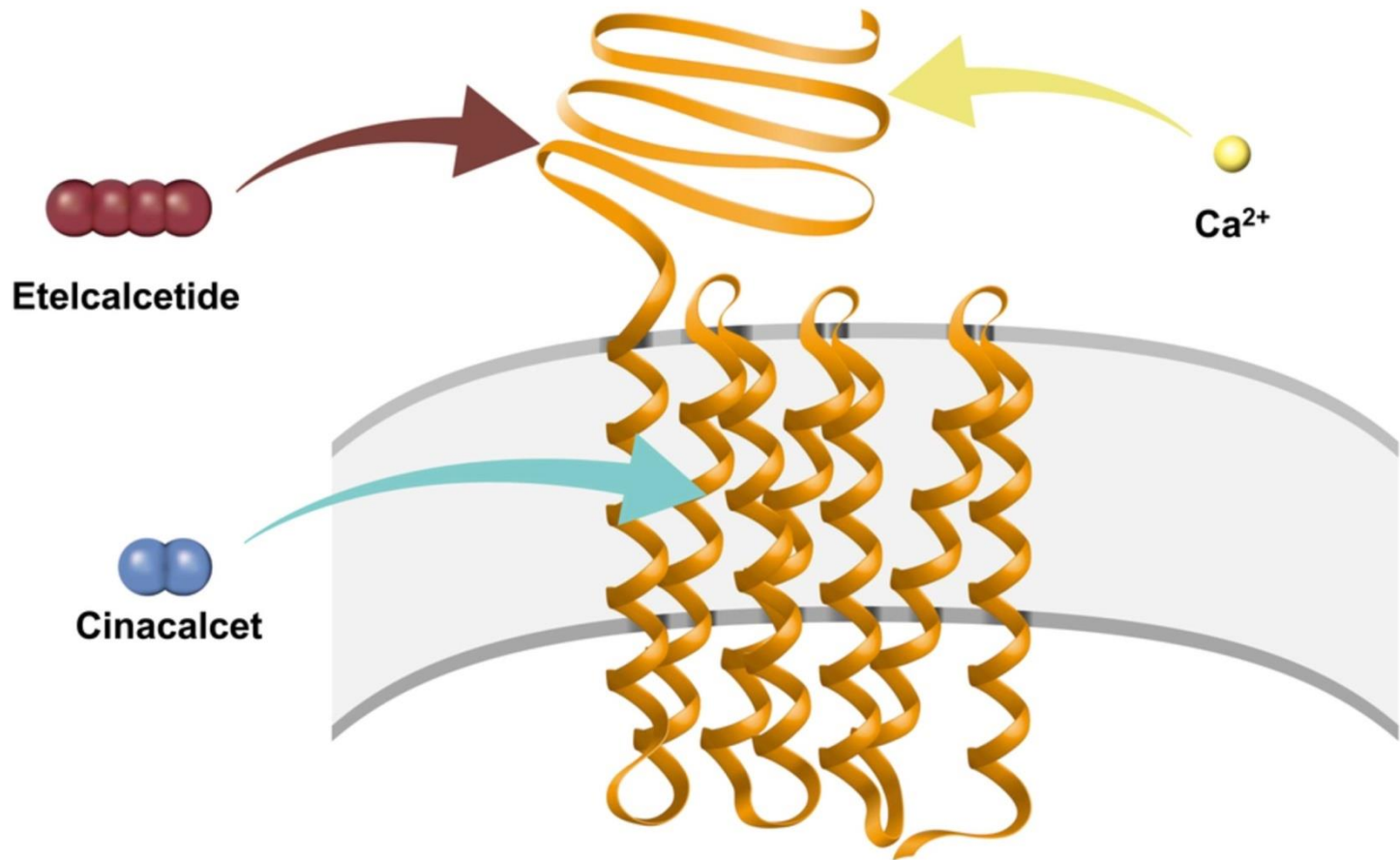
2009:

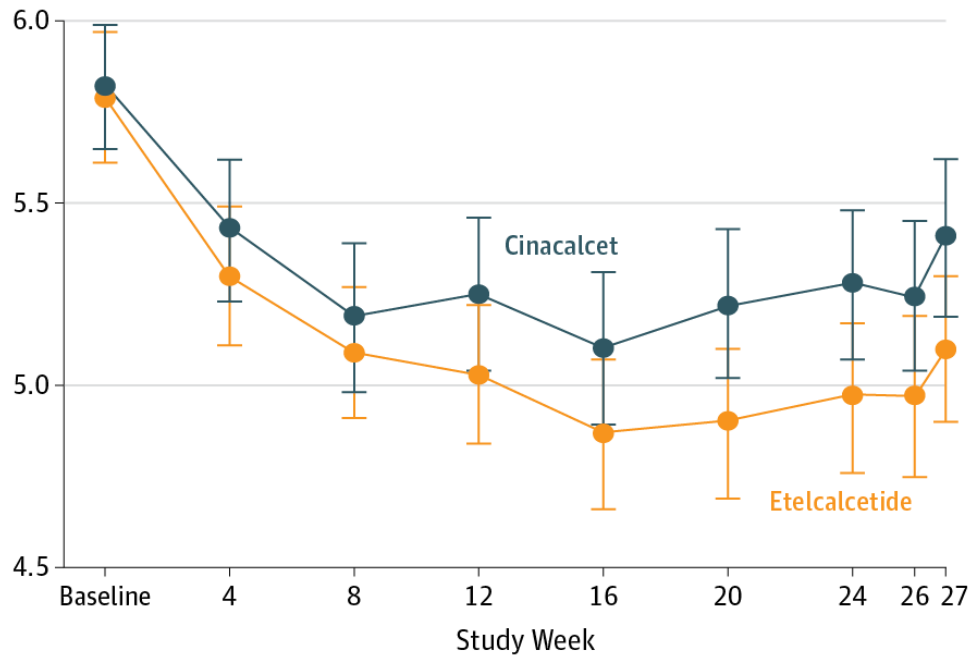
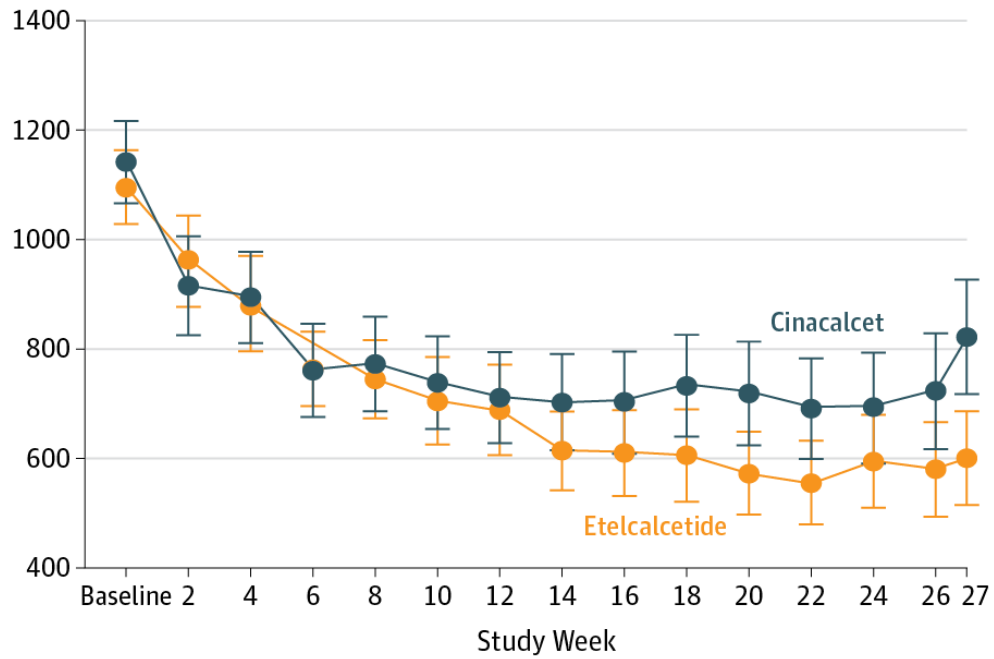
In CKD 5D we suggest

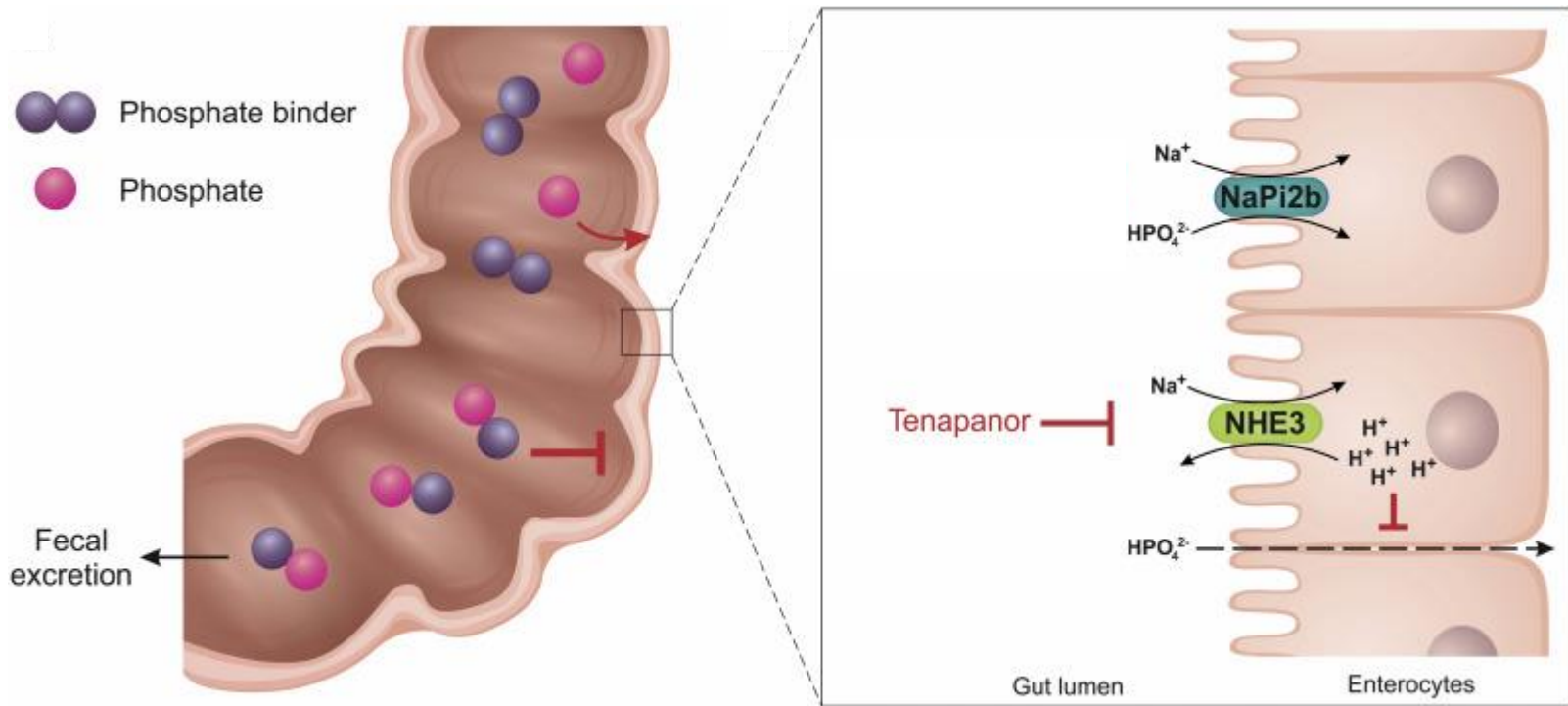
calcitriol, or vitamin D analogs or **calcimimetics**

or a combination









The image features a classic hypnotic spiral background, consisting of concentric circles that create a sense of depth and motion. The colors are primarily red and black, with the spiral transitioning from a bright red in the center to a deep black at the edges. Overlaid on this background is the text "That's all Folks!" in a white, elegant cursive font. The text is positioned diagonally across the center of the spiral, starting from the left side and ending on the right. The overall effect is reminiscent of the iconic ending sequence of a Looney Tunes cartoon.

*That's all Folks!*



Ο καλύτερος τρόπος για να μειωθεί ο φώσφορος είναι:

1. Χορήγηση δεσμευτικών
2. Δίαιτα χαμηλών λευκωμάτων
3. Αποφυγή συντηρητικών
4. Αύξηση του Kt/V

Ο καλύτερος τρόπος για να μειωθεί ο φώσφορος είναι:

1. Χορήγηση δεσμευτικών
2. Δίαιτα χαμηλών λευκωμάτων
3. **Αποφυγή συντηρητικών**
4. Αύξηση του Kt/V



ναι στις πρωτεΐνες, όχι στα συντηρητικά!

Ο FGF-23 αναστέλλει:

1. την παραγωγή της iPTH
2. την 1-υδροξυλάση
3. την έκφραση του συμμεταφορέα νατρίου-φωσφόρου
4. όλα τα παραπάνω

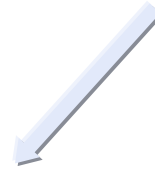
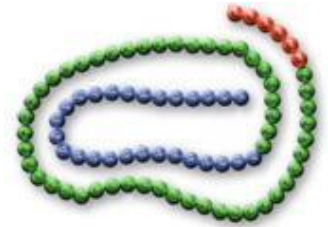
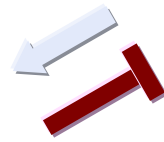
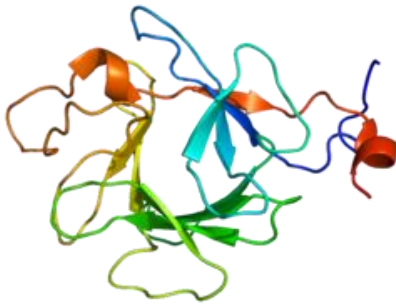
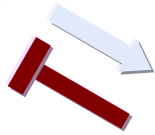
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4. **όλα τα παραπάνω**



Ο φώσφορος αυξάνει τα επίπεδα της iPTH δρώντας πάνω:

1. στην κλωθώ

2. στον διαμεμβρανικό του υποδοχέα

3. στον κυτταροπλασματικό του υποδοχέα

4. στον υποδοχέα του ασβεστίου

Ο φώσφορος αυξάνει τα επίπεδα της iPTH δρώντας πάνω:

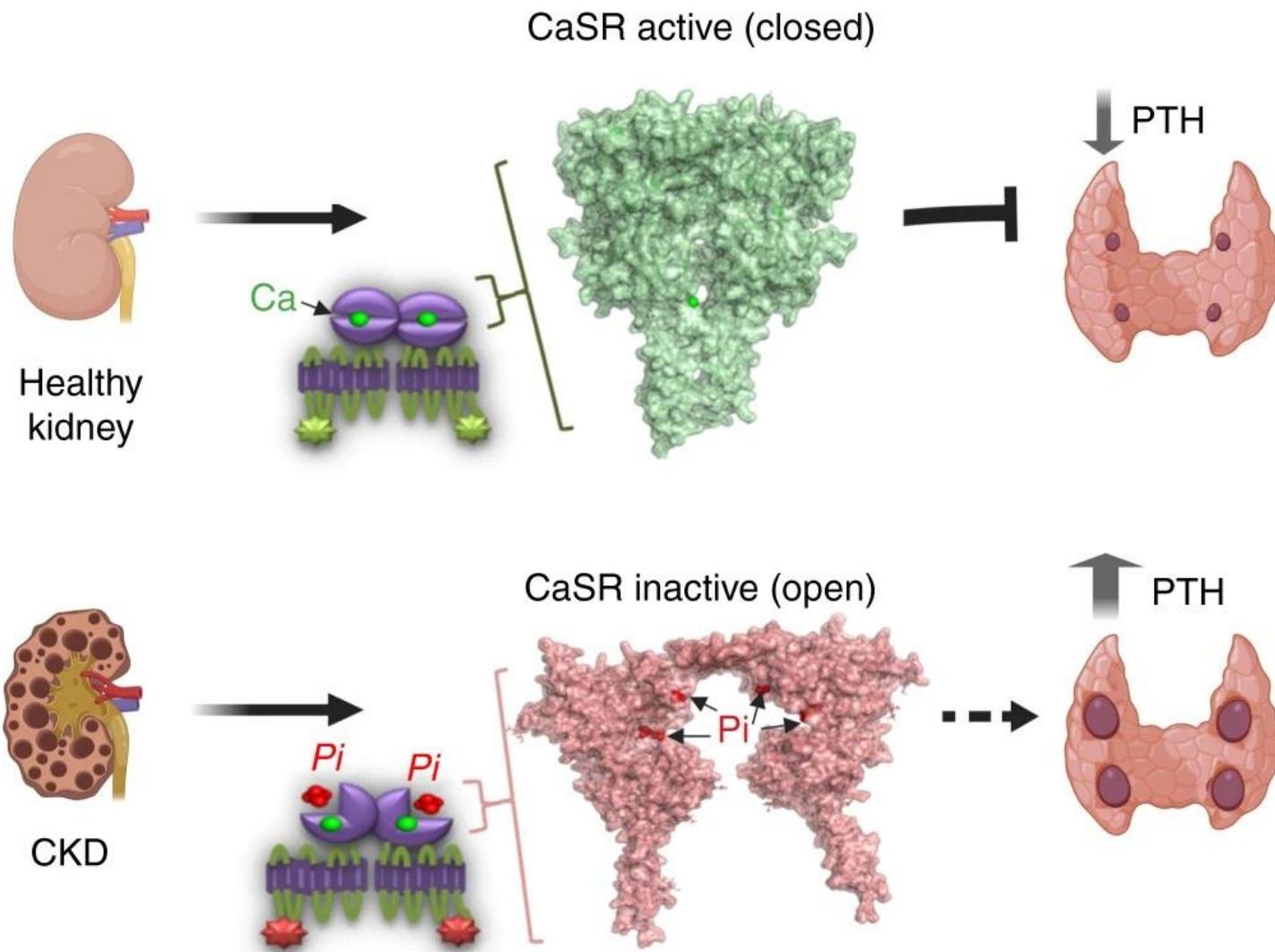
1. στην κλωθώ

2. στον διαμεμβρανικό του υποδοχέα

3. στον κυτταροπλασματικό του υποδοχέα

4. **στον υποδοχέα του ασβεστίου**





Αυξημένη θνησιμότητα παρατηρείται σε:

1. ↑ iPTH

2. ↓ iPTH

3. ↑ FGF-23

4. όλα τα παραπάνω

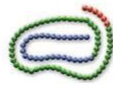
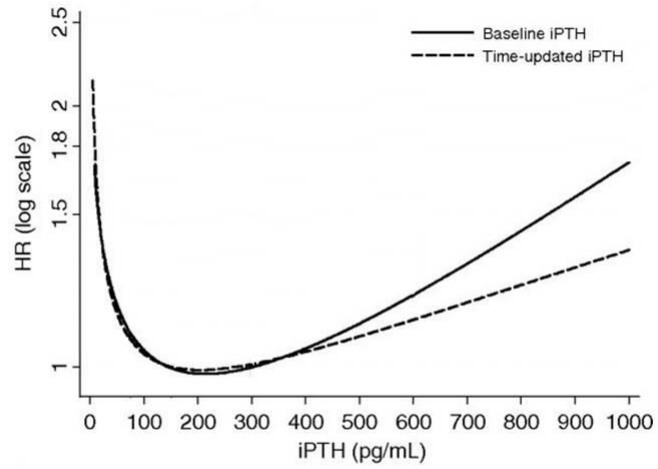
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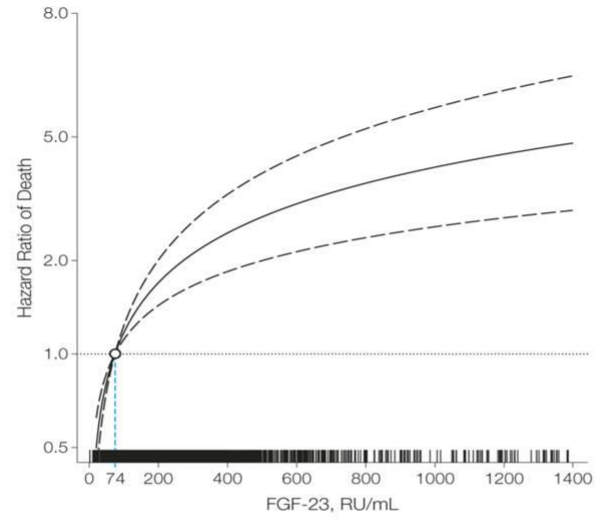
2. ↓ iPTH

3. ↑ FGF-23

4. **όλα τα παραπάνω**



Floege J et al, NDT 2011



Isakova T et al, JAMA 2011