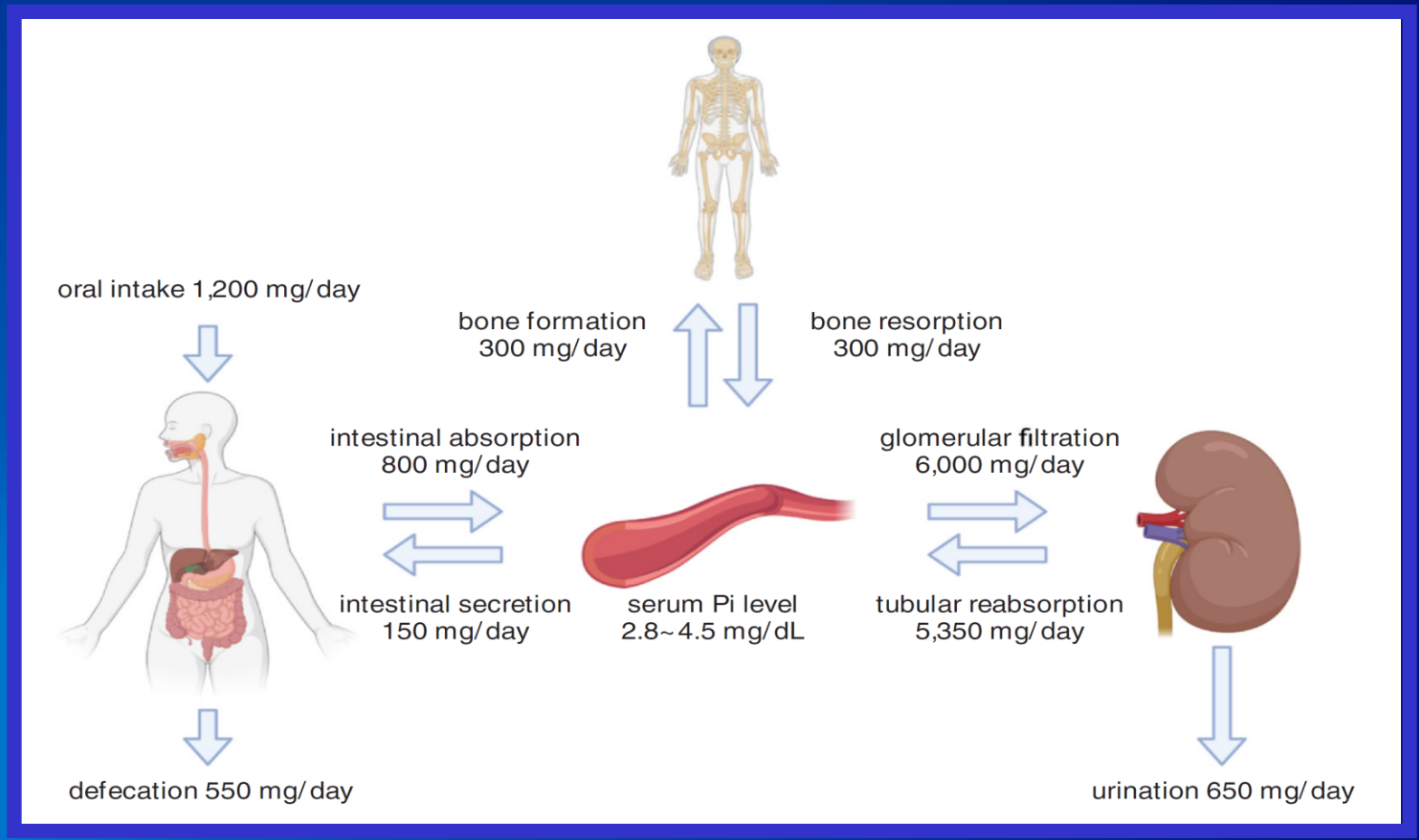
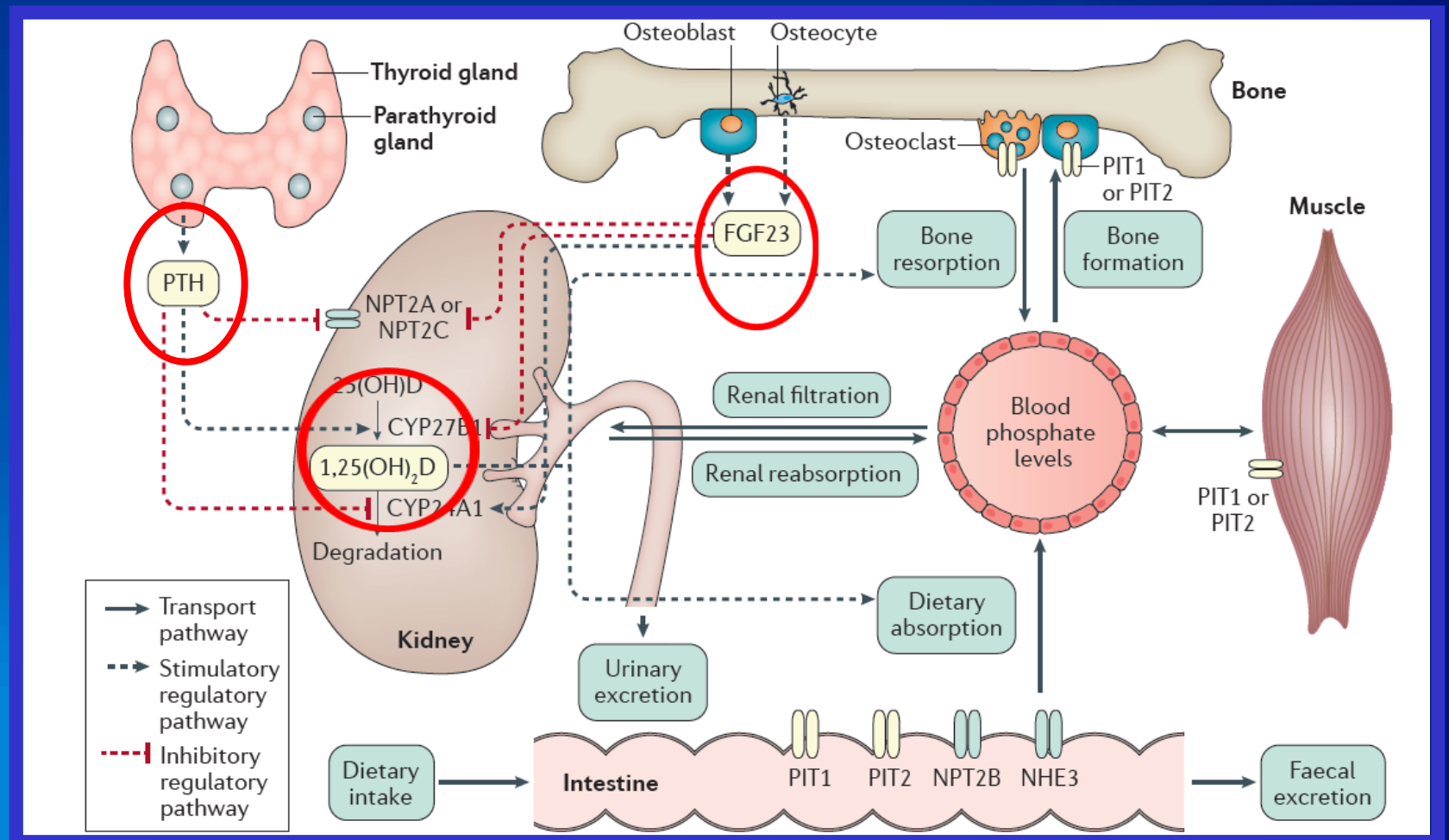
PHYSIOLOGY OF PHOSPHATE METABOLISM



Ito N. et al., Best Pract. Res. Clin. Endocrinol. Metab., 2024

PHOSPHATE HOMEOSTASIS



$1,25(OH)_2D$, 1,25-dihydroxyvitamin D (calcitriol); 25(OH)D, 25-hydroxyvitamin D; CYP24A1, cytochrome P450 family 24 subfamily A member 1; CYP27B1, cytochrome P450 family 27 subfamily B member 1; FGF23, fibroblast growth factor 23; NHE3, sodium–hydrogen exchanger 3; NPT2A, sodium-phosphate transport protein 2A; NPT2B, sodium-phosphate transport protein 2B; NPT2C, sodium-phosphate transport protein 2C; PIT1, phosphate transporter 1; PIT2, phosphate transporter 2; PTH, parathyroid hormone.

Minisola S. et al., Nature R.D.P., 2017

PHOSPHORUS

1) Mandatory component of the lipid bilayer of cell *membranes* nucleoproteins and nucleic acids

2) Essential for bone *mineralization*

3) Essential for storage and liberation of metabolic *energy*, cellular signaling, enzyme activity, lipid metabolism, muscle and neurological functions

4) Essential for the *delivery of oxygen* to the peripheral tissues through formation of 2-3 diphosphoglicerate

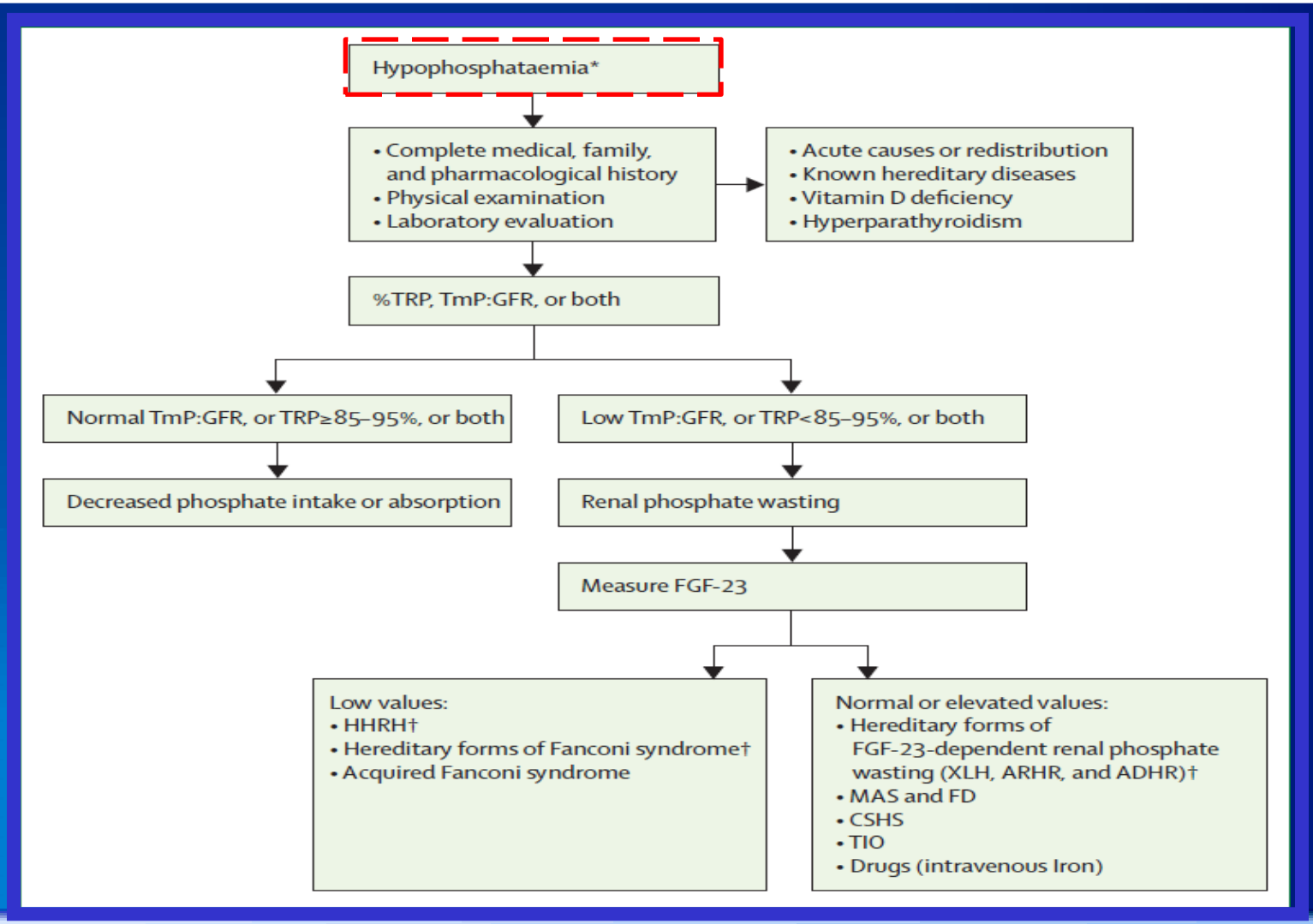
Beck L. & Beck-Cormier S. J., Mol. Endocrinol., 2020

NORMAL AGE-DEPENDENT VALUES OF SERUM PHOSPHATE

	Serum phosphate (mg/dL)	Serum phosphate (mmol/L)
0–5 days	4·8–8·2	1·5–2·6
1–3 years	3·8–6·5	1·2–2·1
4–11 years	3·7–5·6	1·2–1·8
12–15 years	2·9–5·4	0·9–1·7
16–19 years	2·7–4·7	0·9–1·5
≥20 years	2·5–4·5	0·8–1·4

Florenzano P. et al., L.D.E., 2020

A DIAGNOSTIC ALGORITHM



ADHR, autosomal dominant hypophosphataemic rickets; ARHR, autosomal recessive hypophosphataemic rickets; CSHS, cutaneous-skeletal hypophosphataemia syndrome; FD, fibrous dysplasia; FGF-23, fibroblast growth factor 23; HRHH, hereditary hypophosphataemic rickets with hypercalciuria; MAS, McCune-Albright syndrome; TIO, tumour-induced osteomalacia; TmP/GFR, ratio of tubular maximum reabsorption of phosphate to glomerular filtration rate; TRP, tubular reabsorption of phosphate.

Florenzano P. et al., L.D.E., 2020