

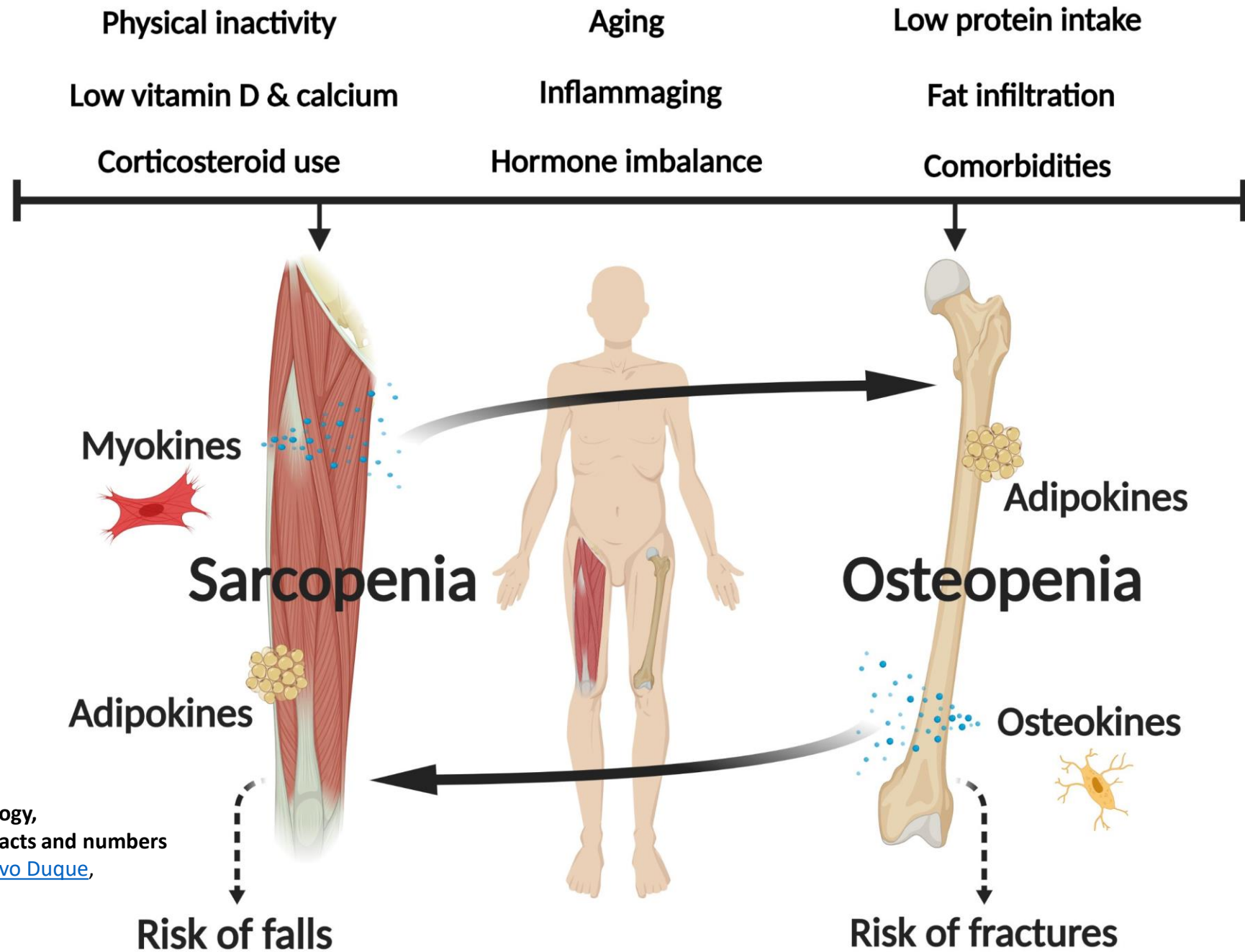
Bone Health in CF: Non-diet modifiable factors Medications update

Beth Clarke

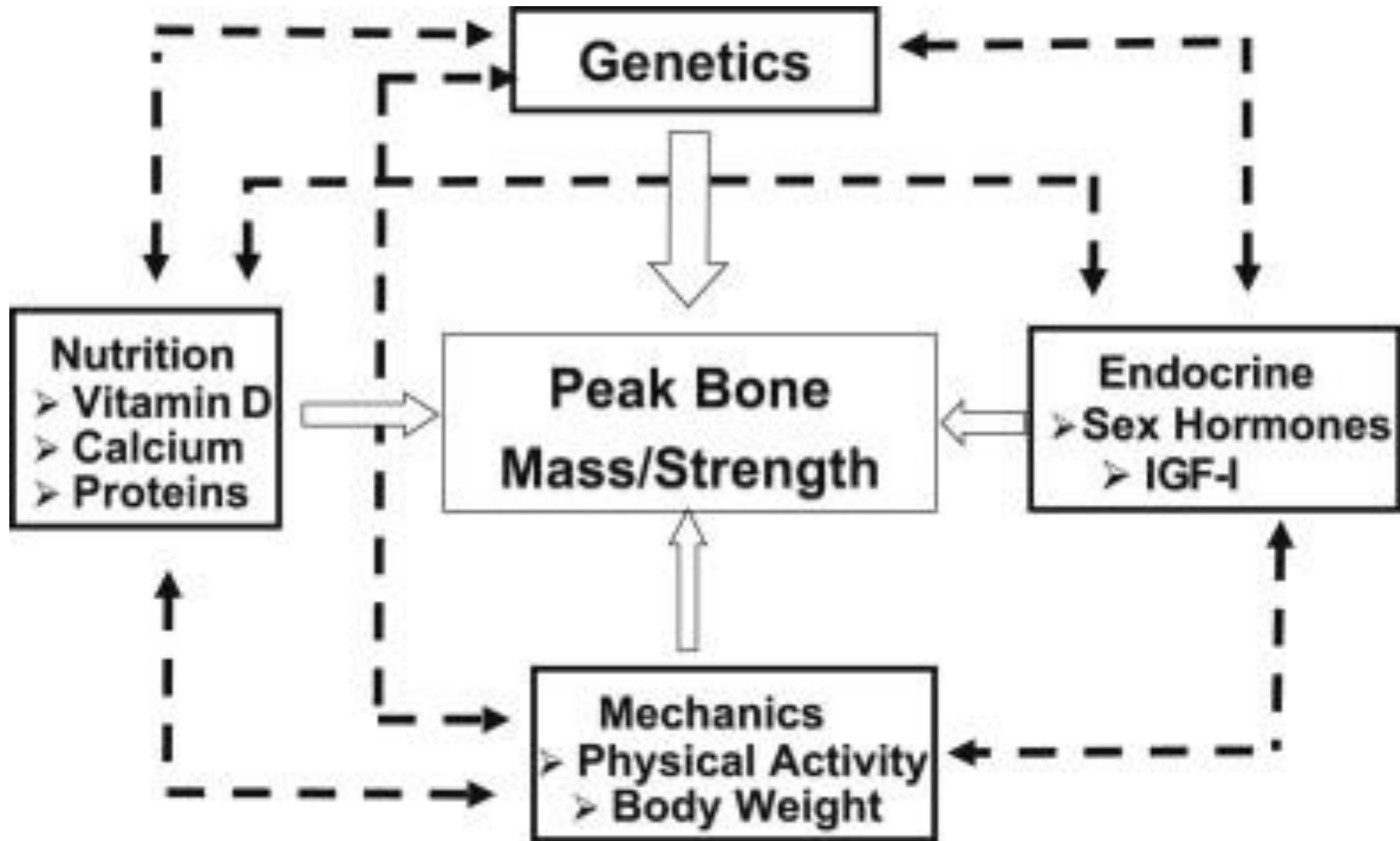
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Outline

- Nondiet modifiable risk factors: muscles and hormones
- Medications for osteoporosis: what's new



@DrBenKirk
Osteosarcopenia: epidemiology,
diagnosis, and treatment—facts and numbers
[Ben Kirk](#), [Jesse Zanker](#), [Gustavo Duque](#),



Falls Risk (rather than osteoporosis risk)

- Neuropathy
 - Low muscle mass
 - Hypoglycaemia
 - We don't often talk about frailty in CF – but some of our patients are
-
- Assessment, treatment, support (sometimes OT input, sometimes physio) all important for these

What exercise should be recommended for bones?

- Exercise you enjoy and can fit into your schedule is exercise you are more likely to do!
- Strengthening muscles strengthens bones
- Weightbearing where this fits other needs
- Input from physios
- Royal Osteoporosis society website has information

Hormones

- Disclaimer: I'm not an endocrinologist!
- Measure testosterone levels and refer/replace appropriately
- Ask about menstrual history – amenorrhea (unless induced by hormonal treatment or pregnancy) is a sign that bones are going to be affected by low hormone levels
- High PTH is most commonly due to low vitamin D, but needs investigation if it remains high when vitamin D is normal or if calcium is high. Hyperparathyroidism causes osteoporosis,

Medications in Osteoporosis

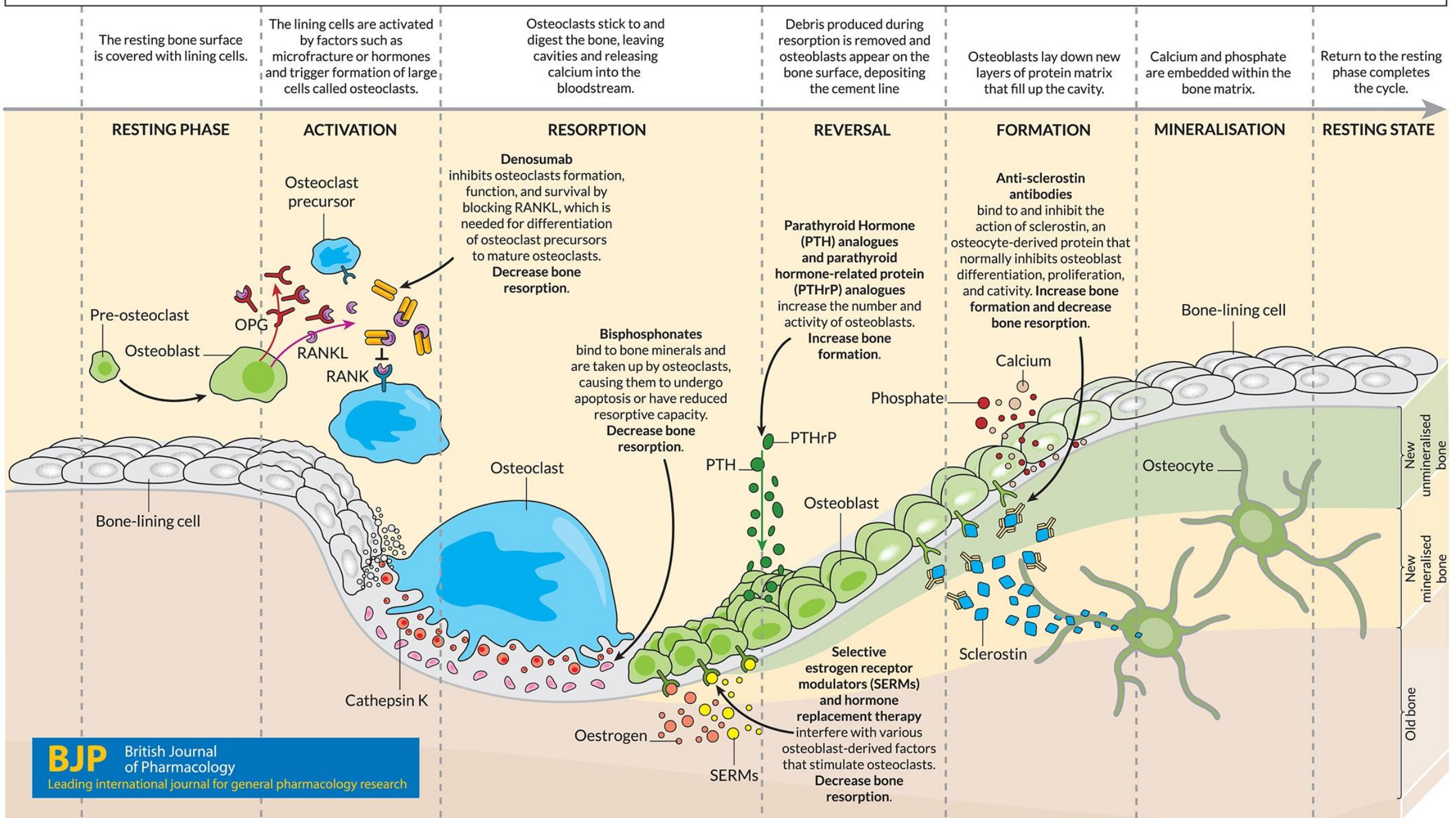
- Bisphosphonates
- Denosumab
- Teriparatide
- Romozosumab

Osteoporosis is like
missing bricks

Osteomalacia is like
poor quality bricks



BONE REMODELLING STAGES

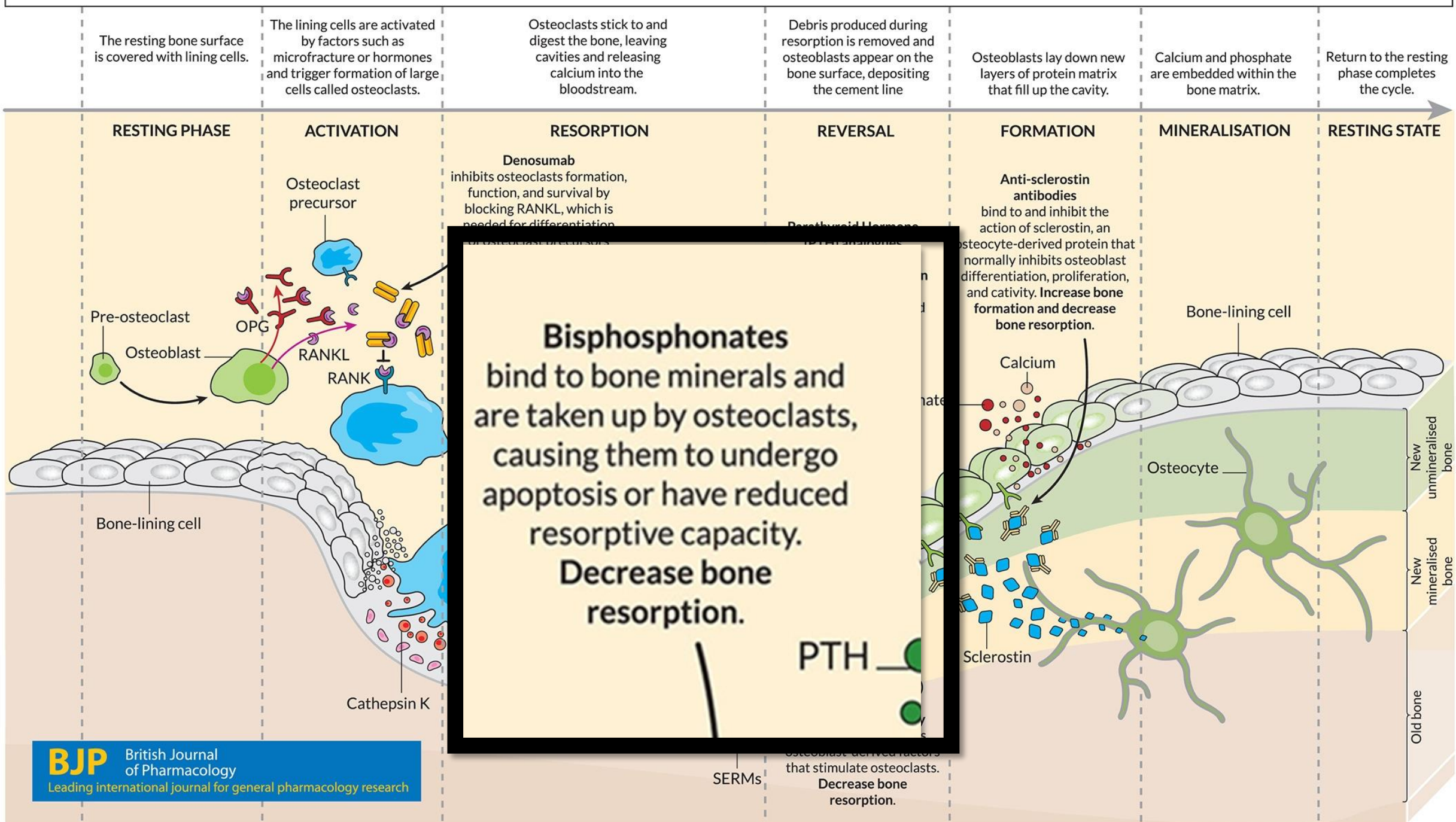


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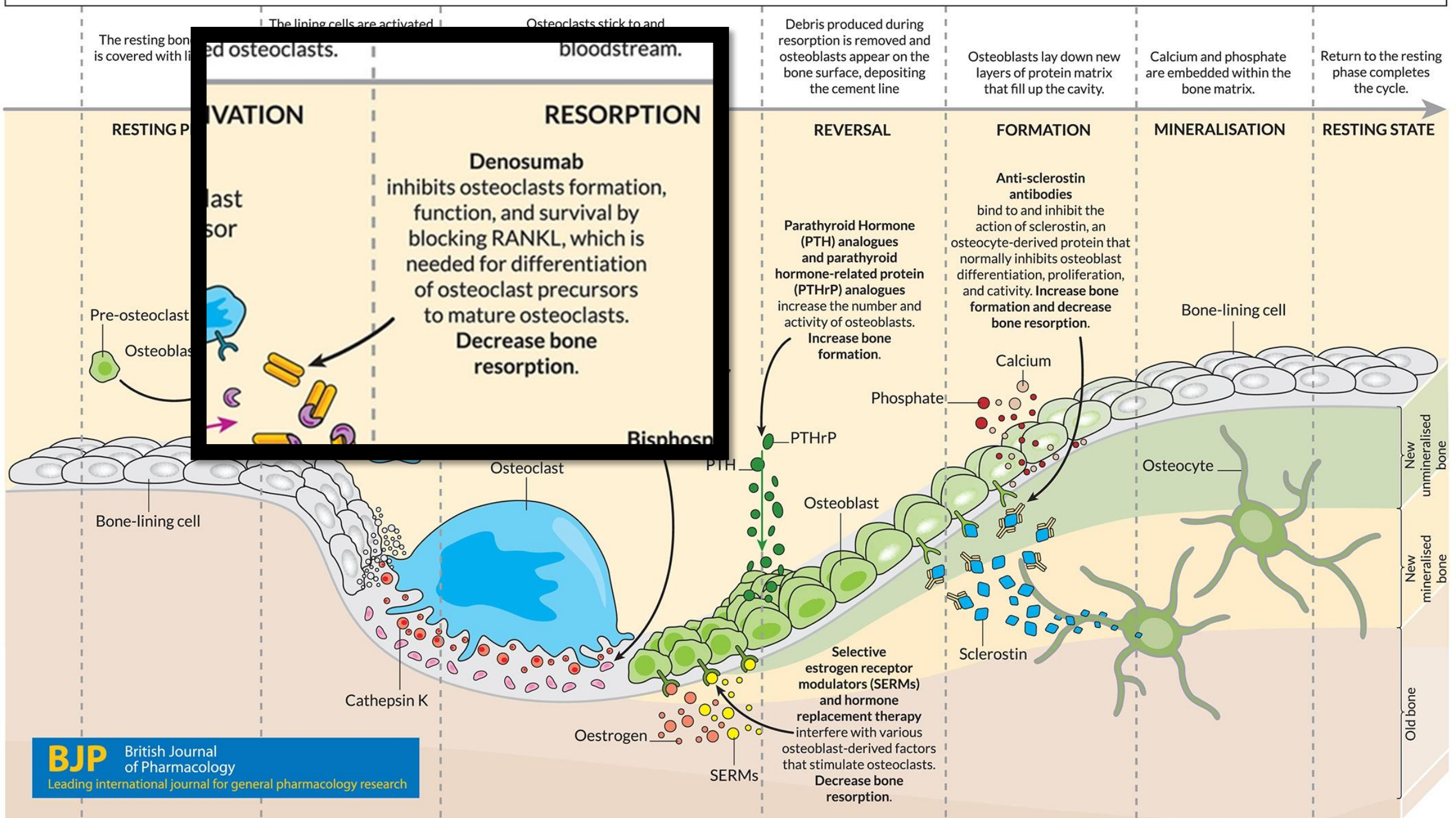
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BONE REMODELLING STAGES



BONE REMODELLING STAGES



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Denosumab

- Binds to RANKL to inhibit it's activation leading to **less bone reabsorption by osteoclasts**
- 6-monthly subcut injection
- Must not miss doses! Risk of rapid loss of bone especially in spine
- Need to give “lock-in” dose of zoledronic acid at end of course
- Contraindicated in pregnancy/breastfeeding
- Licenced in postmenopausal women



Anti-resorptive vs anabolic

- Bisphosphonates and denosumab are anti-resorptive – they try and **reduce reabsorption of bone**
- Teriparatide and Romozosumab are anabolic, meaning they also **BUILD bone**/osteoblasts lay down new bone

Who gets anabolics?

- SIGN define severe osteoporosis of the spine as: **One severe or two or more moderate vertebral fractures on x-ray, and T-score <-1.5 at any site or spine T score <-4.0**
- NICE define imminent risk as **severe osteoporosis and has had a major osteoporotic fracture within 24 months**

The resting bone surface is covered with lining cells.

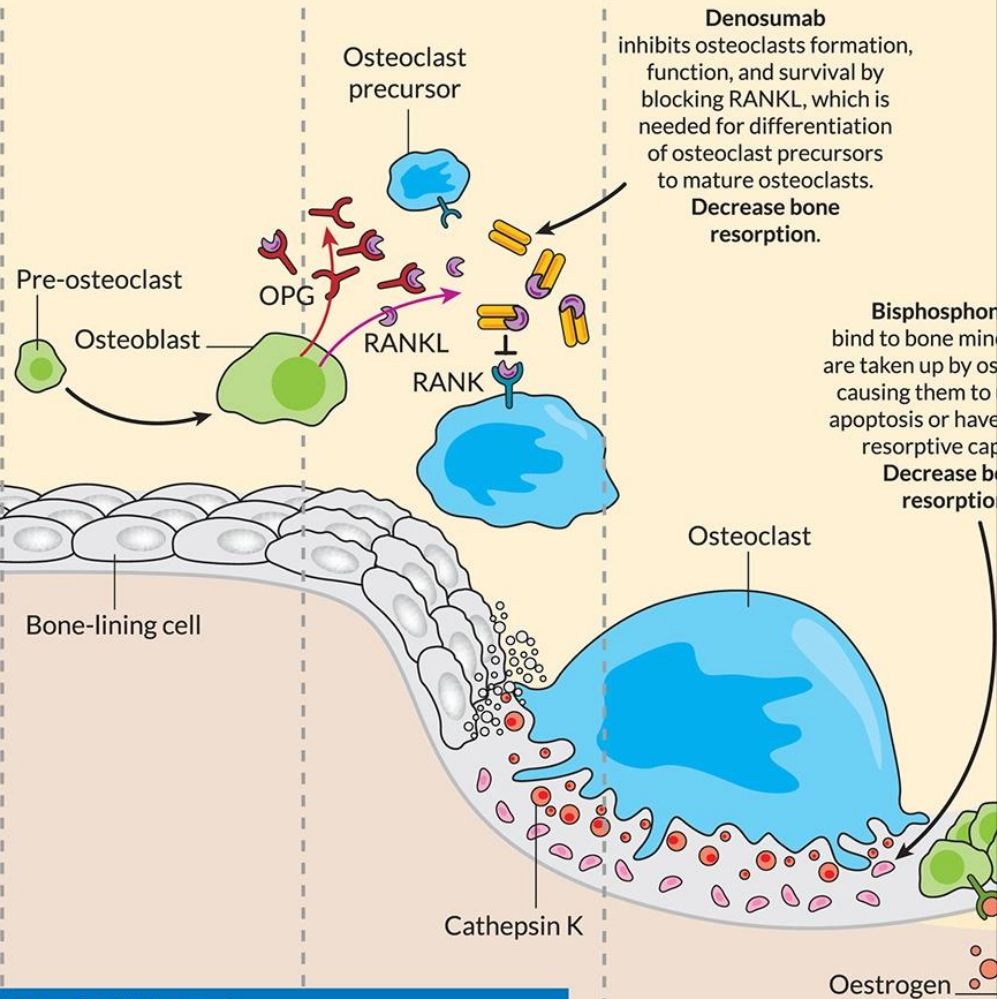
The lining cells are activated by factors such as microfracture or hormones and trigger formation of large cells called osteoclasts.

Osteoclasts stick to and digest the bone, leaving cavities and releasing calcium into the bloodstream.

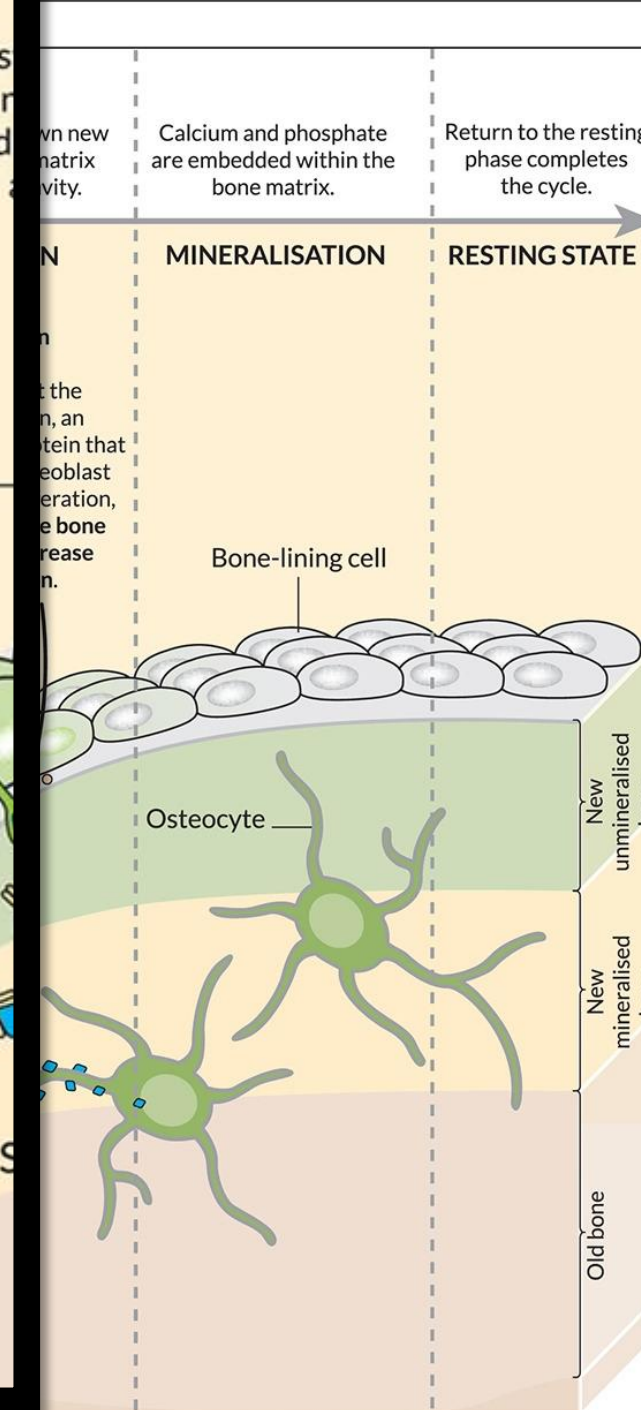
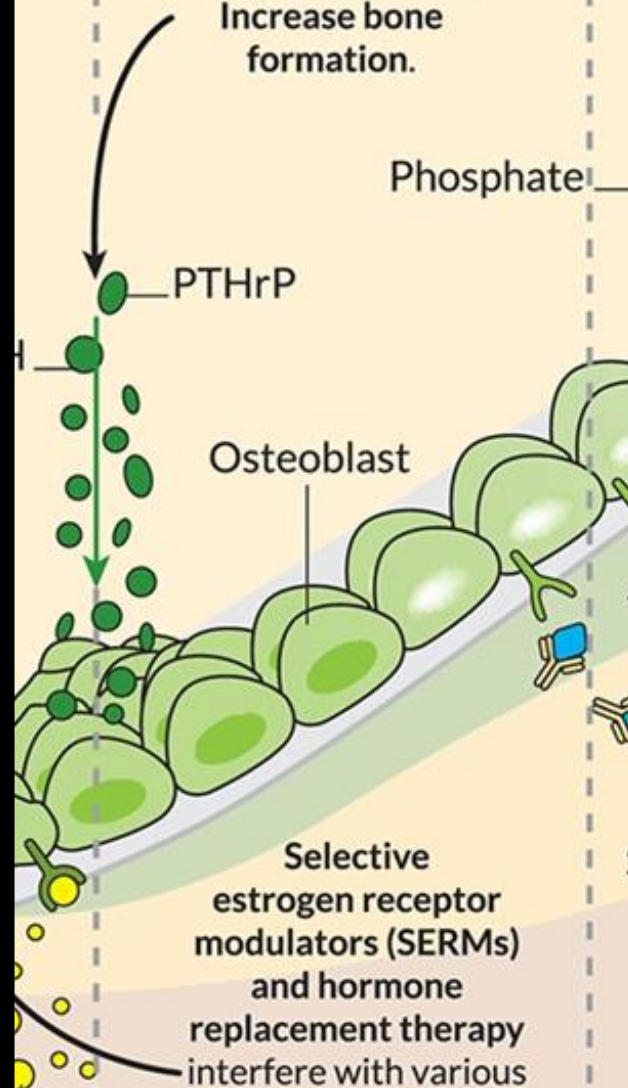
RESTING PHASE

ACTIVATION

RESORPTION



Parathyroid Hormone (PTH) analogues and parathyroid hormone-related protein (PTHrP) analogues increase the number and activity of osteoblasts. **Increase bone formation.**

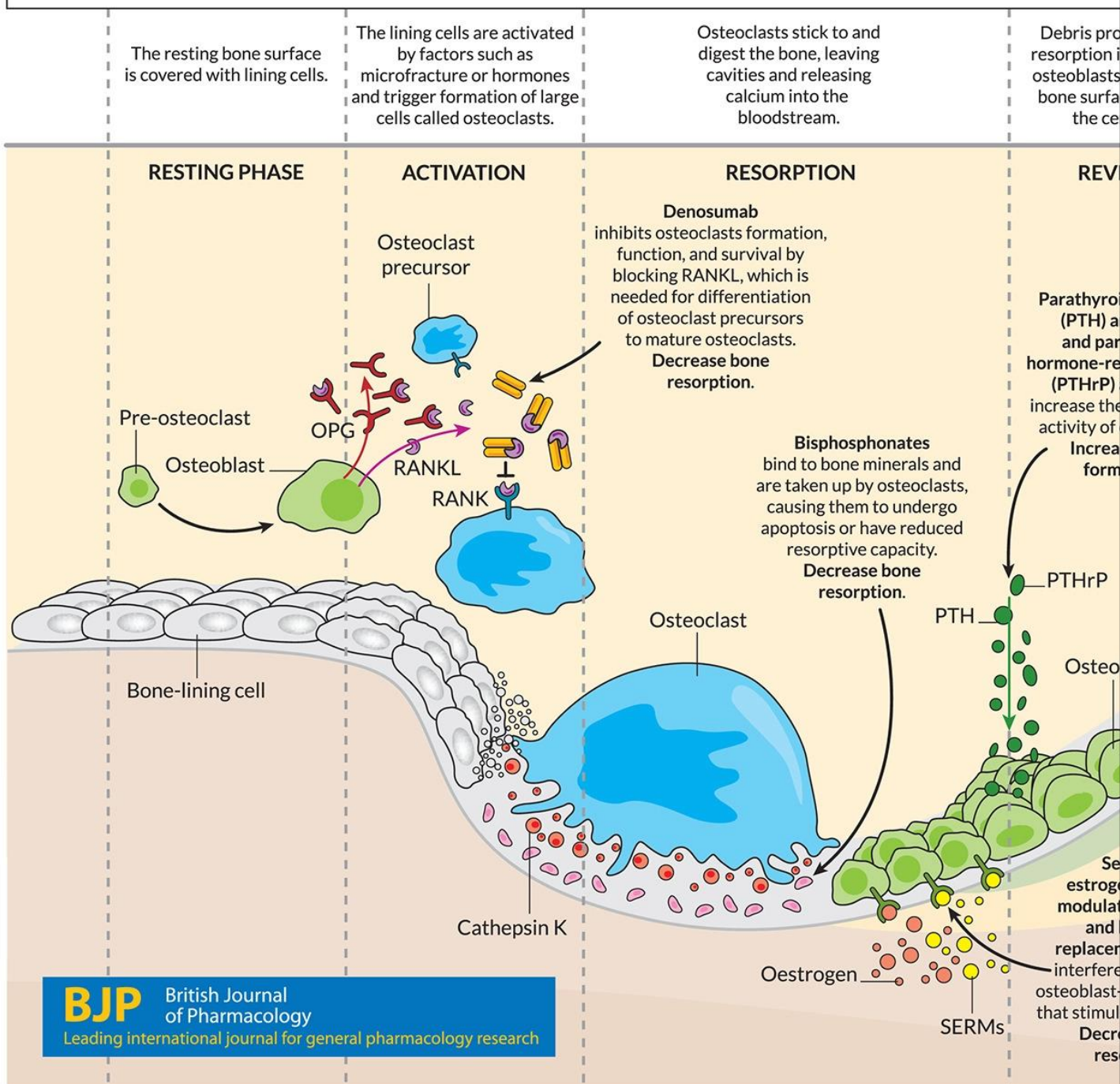


Teriparatide

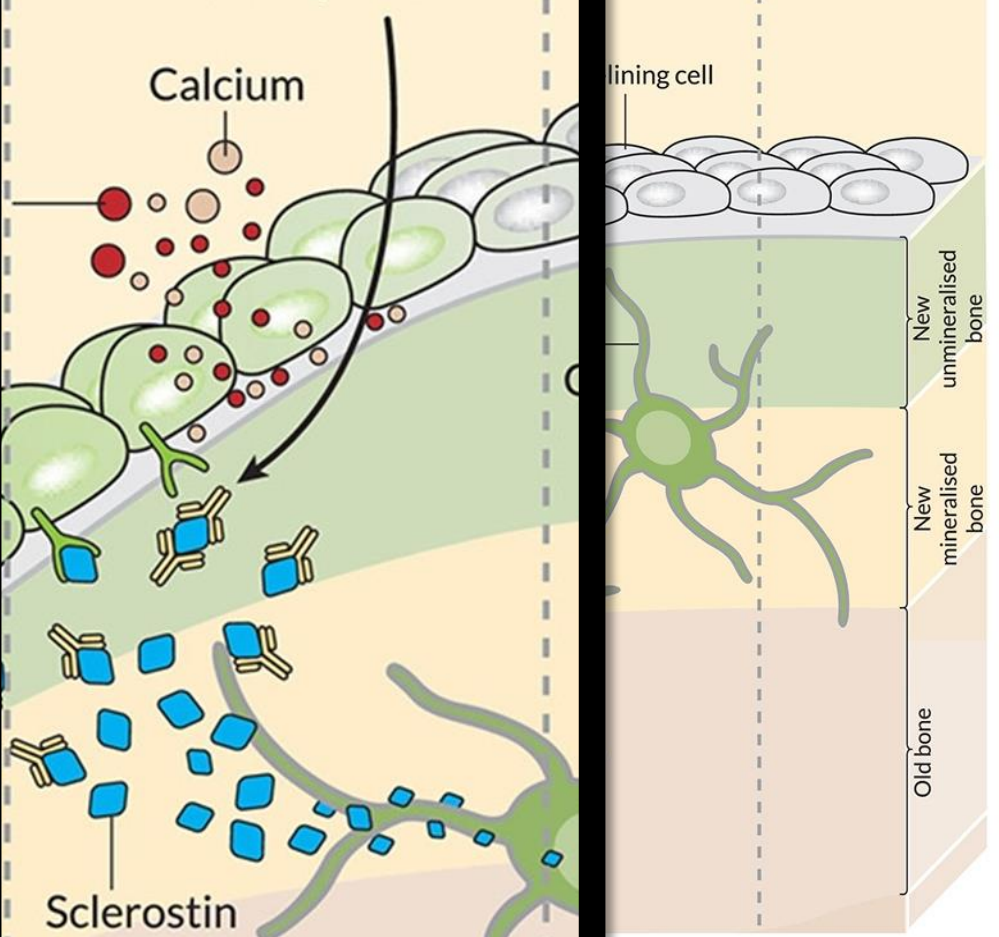
- Daily injection for 2 years
 - Similar to insulin pen (same needles)
 - Indicated for severe osteoporosis of spine
 - Increases bone formation
-
- Must have adequate calcium/vit D, and not have high PTH
 - Contraindicated if pregnant or breastfeeding



BONE REMODELLING STAGE



Anti-sclerostin antibodies bind to and inhibit the action of sclerostin, an osteocyte-derived protein that normally inhibits osteoblast differentiation, proliferation, and activity. **Increase bone formation and decrease bone resorption.**

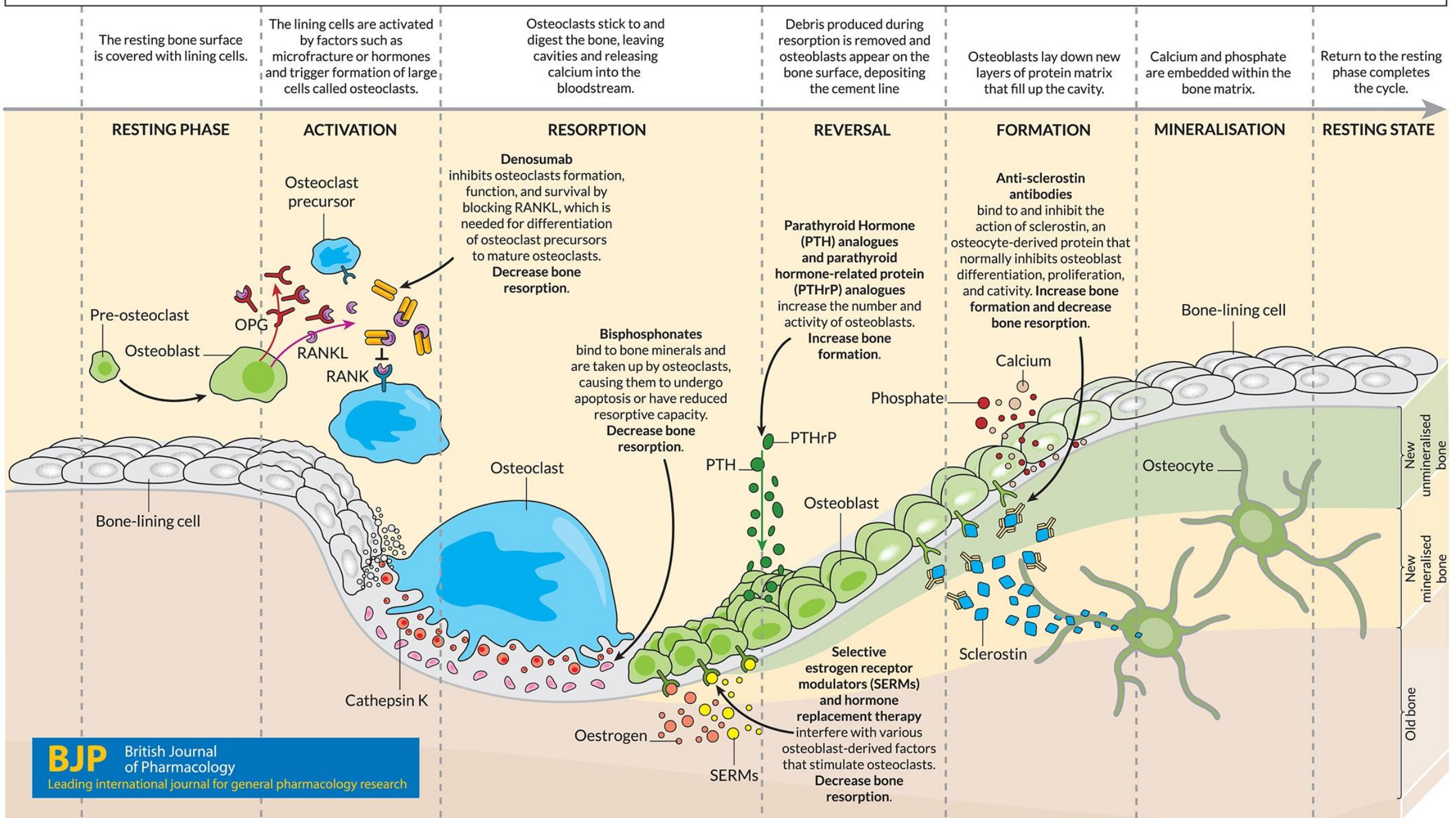


Romozosumab

- For “imminent fracture risk”
- Increase bone formation AND decrease bone reabsorption
- Risks: cardiovascular concerns
- Only licenced for women at present



BONE REMODELLING STAGES



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Resources

- <https://theros.org.uk/>
- Sign guideline 142 (Scotland)



Questions!

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