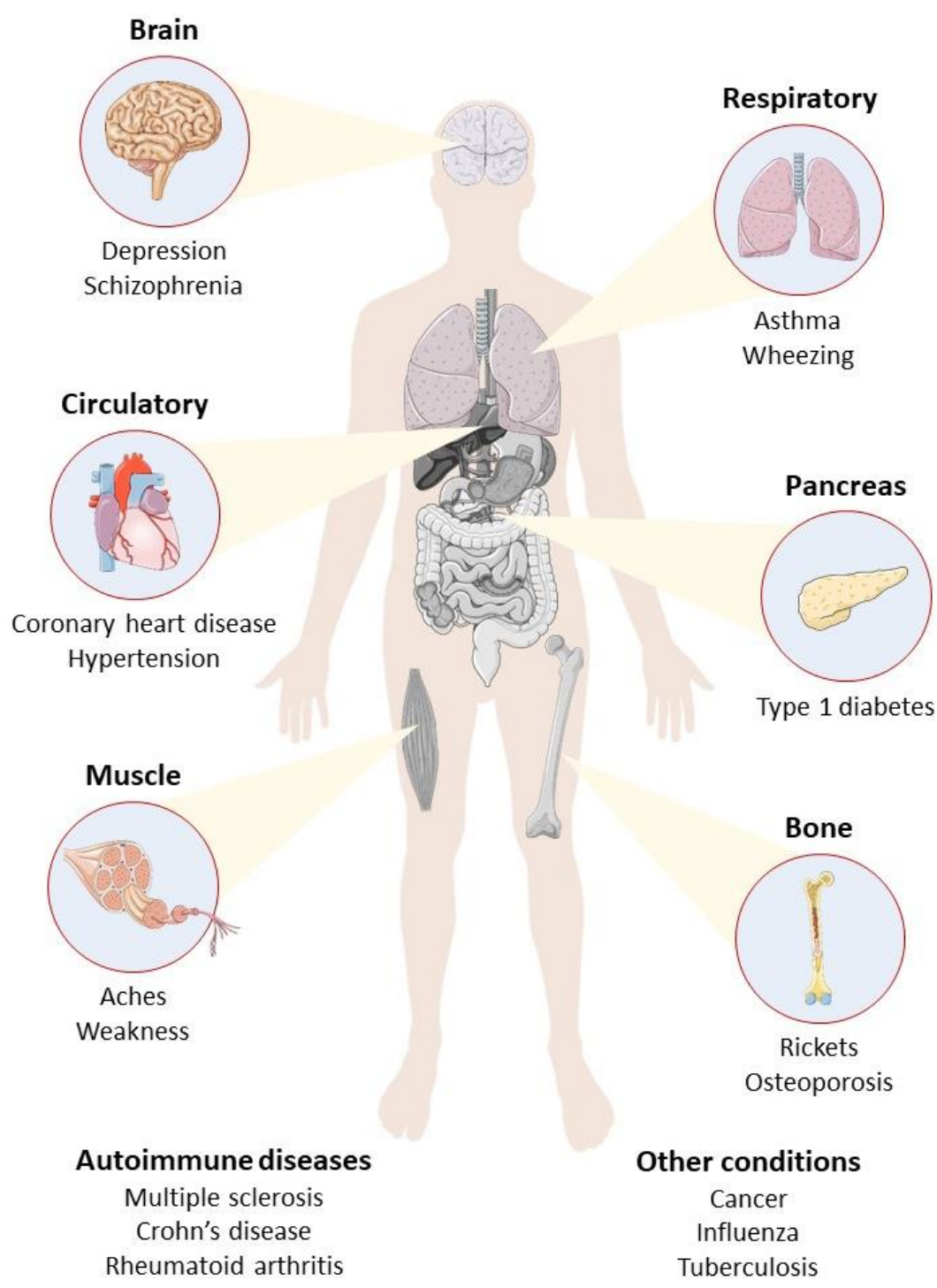


VITAMIN D: THE SUNSHINE-SUPPLEMENT IS EXERCISE THE RAY OF SUNSHINE THIS VITAMIN NEEDS?

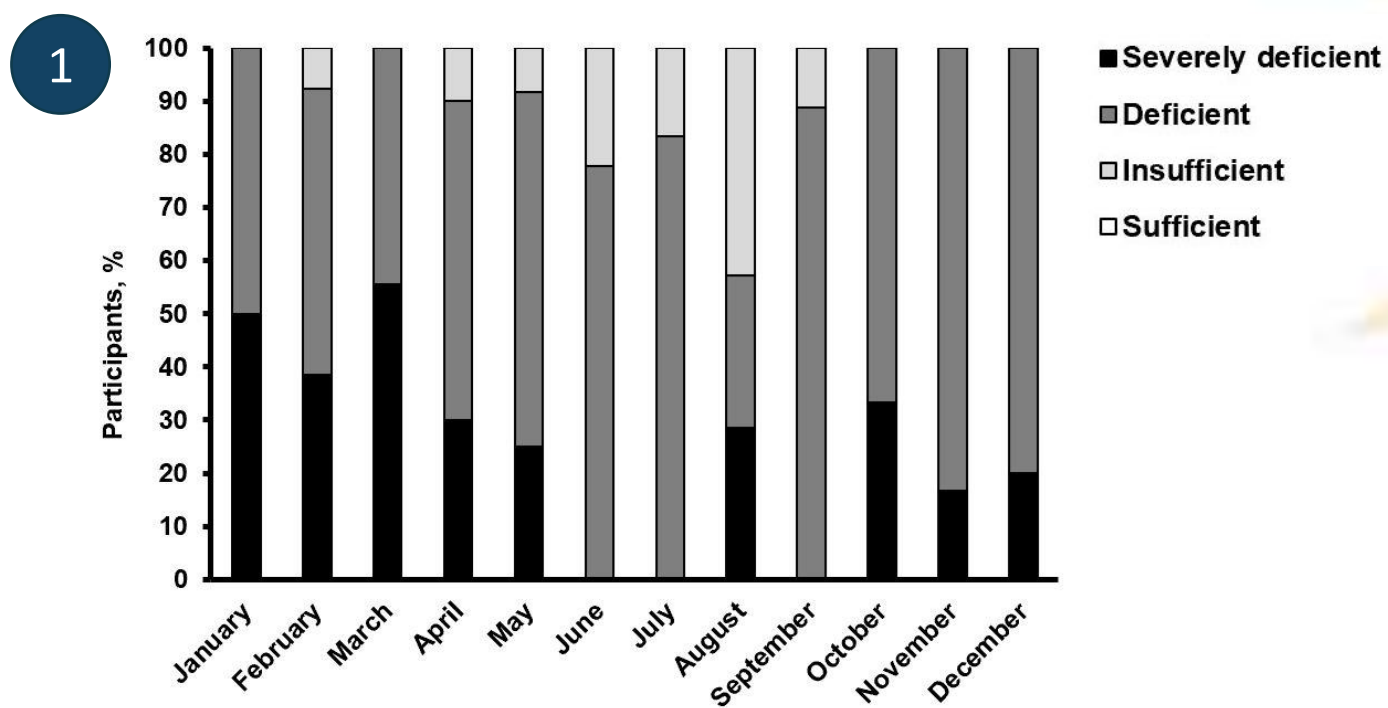
HOW DEFICIENT ARE WE AS A NATION?



Living in Scotland you are 3x more likely to be vitamin D deficient compared to the south of the UK.

Vitamin D deficiency is associated with numerous health conditions – with older adults more at risk.

There is a strong seasonal influence on vitamin D status, with deficiency high across the year.

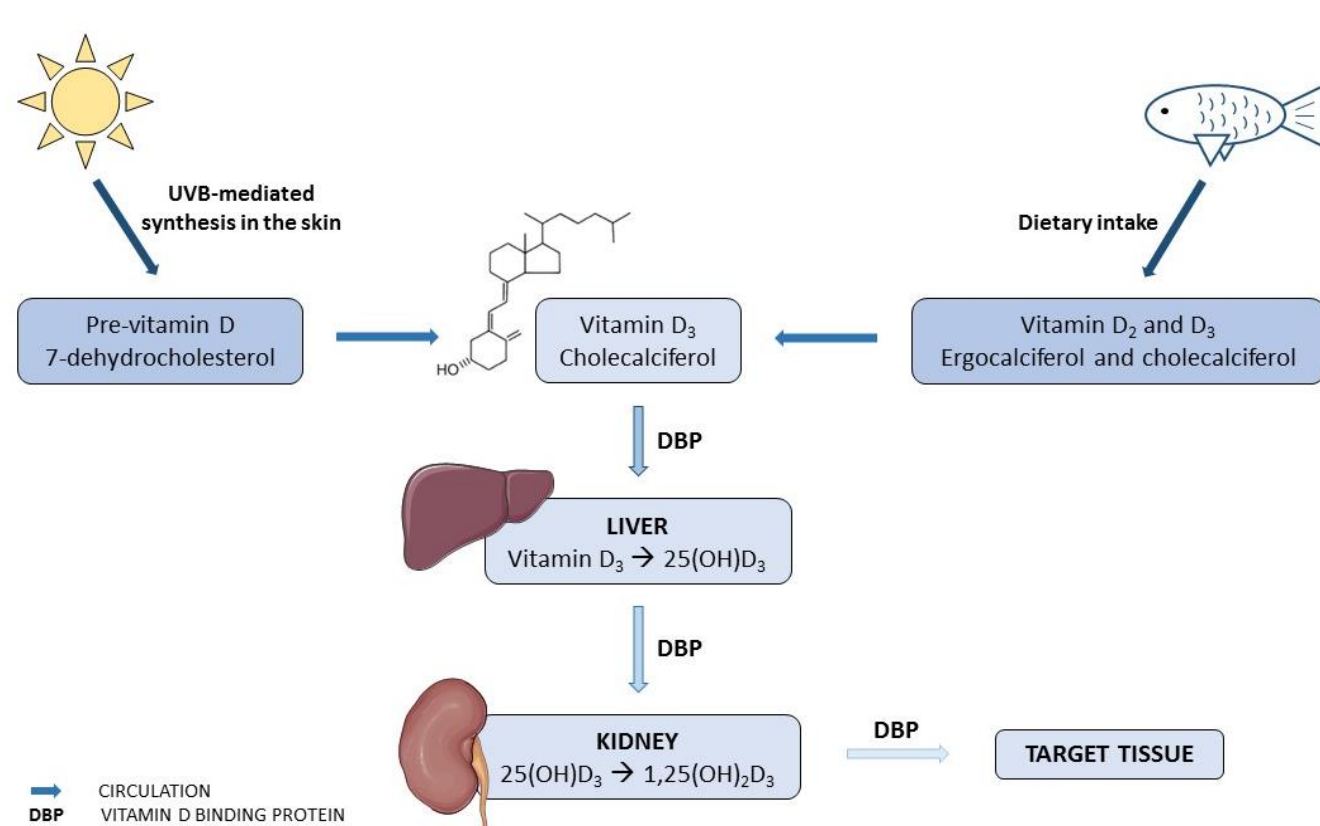


Research aims:

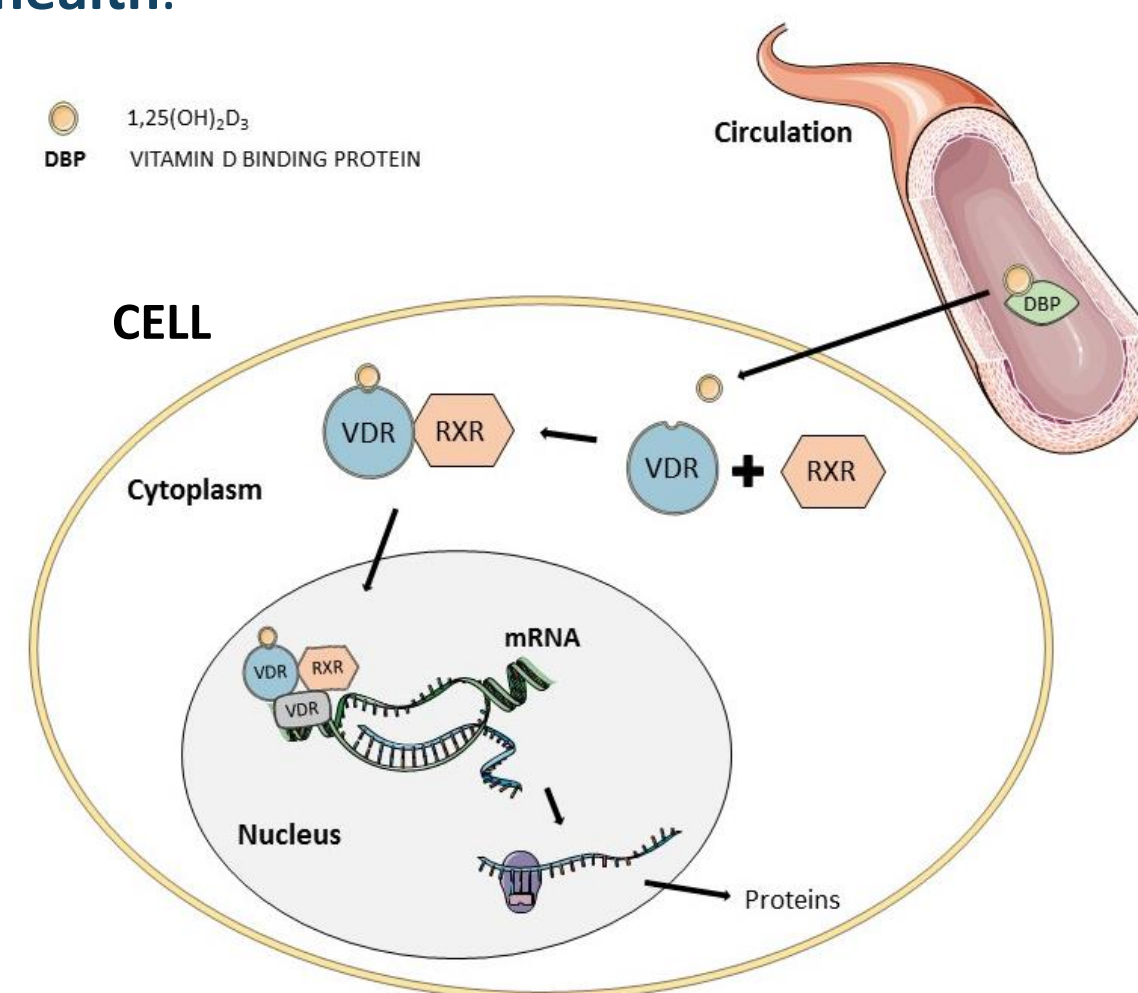
- 1 Determine baseline vitamin D levels in a Scottish population
- 2 Explore the effect of age on Vitamin D Receptor (VDR) expression
- 3 Investigate whether a single bout of exercise can modulate VDR expression

THE VITAMIN D METABOLIC PATHWAY – WHERE CAN WE INTERVENE?

Vitamin D has to go through numerous metabolic conversions to be “active”. Then it can be transported to the **target cells** within target organs.

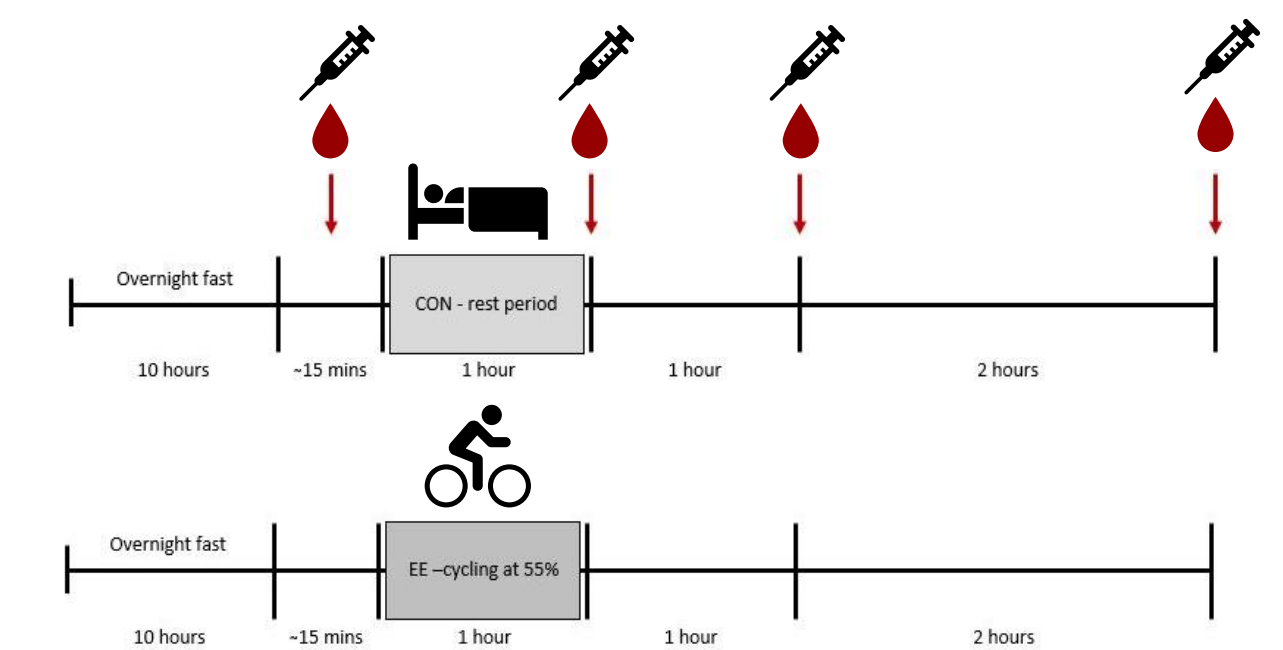


Inside the cell - the activated form of vitamin D binds to the **Vitamin D Receptor (VDR)**. This complex can then regulate the expression of genes and thus... key proteins for **optimal health**.



Mechanical stress, i.e. **exercise**, could increase the expression of VDR.

So here is what we did:



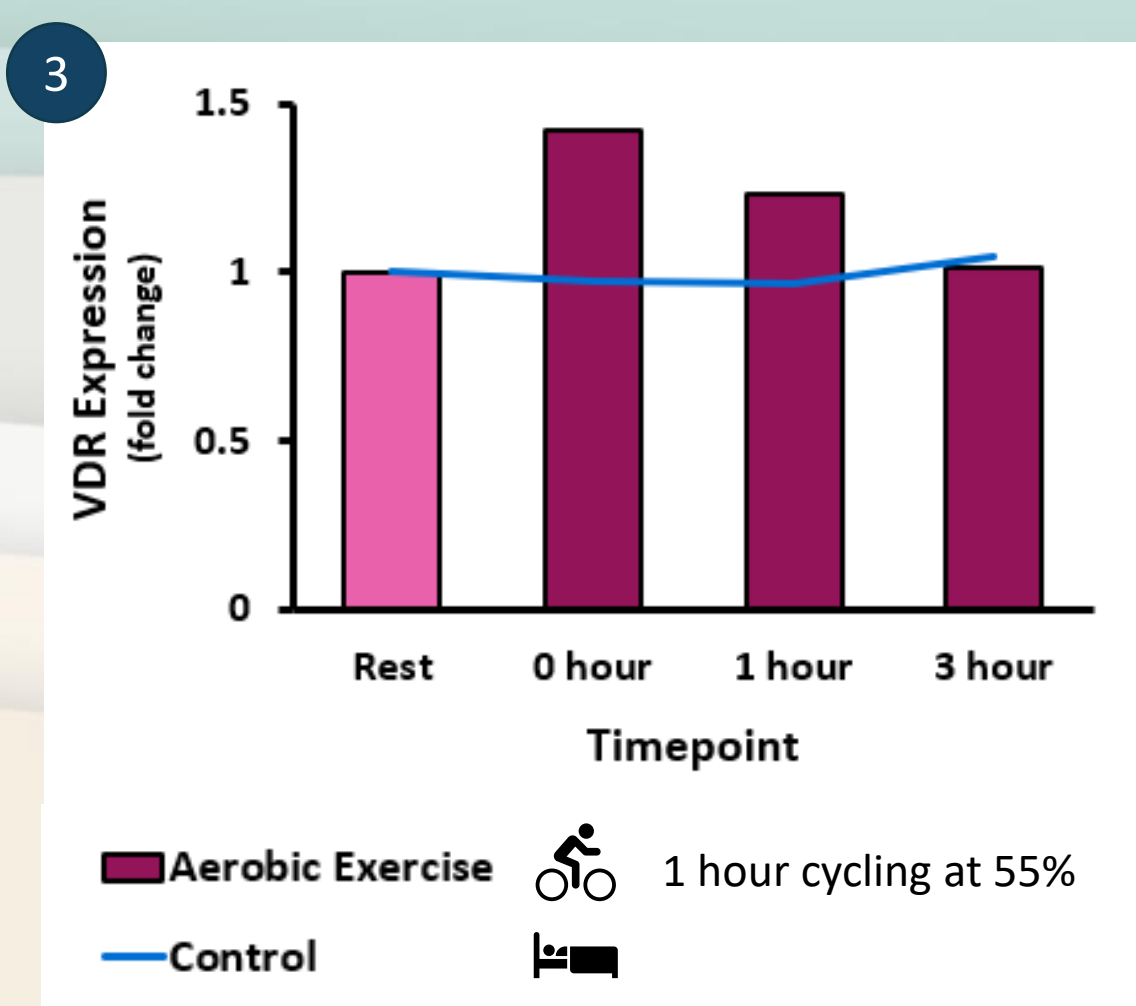
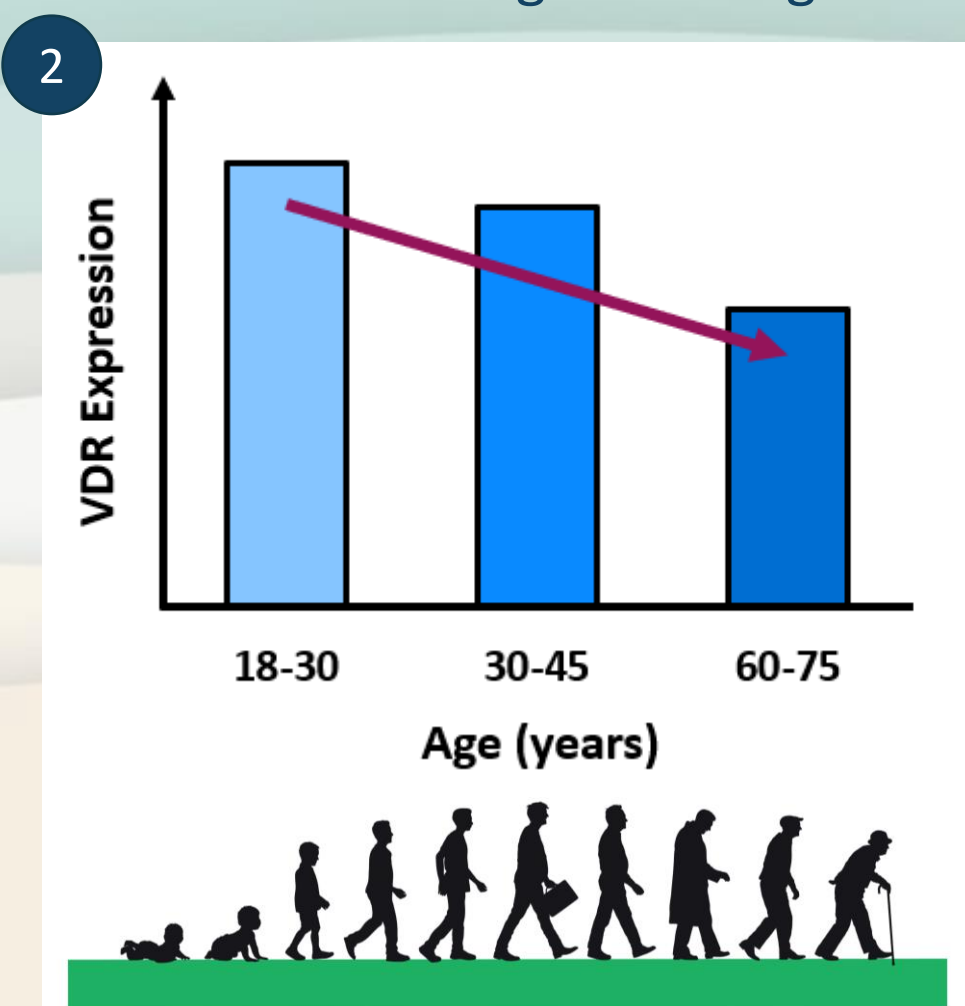
...to answer these questions:

Are we more VDR deficient as we age?
And could exercise increase VDR expression?

WHAT DID WE FIND?

VDR expression is lower in older adults, whereas vitamin D status remained unchanged with age.

Exercise induced an increase in VDR expression, which remained elevated for 1 hour after the exercise bout.



THE IMPACT OF THIS RESEARCH

- Scotland is a vitamin D deficient nation
- We have shown for the first time that exercise can affect the pathway further downstream with an elevation in VDR expression in vitamin D-deficient adults
- This presents a strategic intervention to combat the consequences of vitamin D deficiency and increase our ‘health span’
- Exercise could be the ray of sunshine that vitamin D needs!

References:

1. Lithgow et al. (2021). Exercise acutely increases vitamin D receptor expression in T lymphocytes in vitamin D-deficient men, independent of age. *Experimental physiology*, 106(7), 1460–1469.
2. Makanae et al. (2015). Acute bout of resistance exercise increases vitamin D receptor protein expression in rat skeletal muscle. *Experimental physiology*, 100(10), 1168–1176.