AGE WELL PROJECT

What happens in our bodies as we age, and finding our sense of purpose

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Resources

The Age-Well Project

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Books

The Age-Well Project Easy Ways to Live a Longer, Healthier, Happier Life

The Age-Well Plan The 6-week Programme to Kickstart a Longer, Healthier, Happier Life

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Disclaimer

I'm not a doctor or a nurse. I can't prescribe, I can't give you advise on individual health issues. You need to talk to your GP about those. I'm here to guide you to make your own healthy choices, and to coach you to discover what's right for you.

This session is all about:

My 1st Rule for Ageing Well – Taking Responsibility for Our Own Health

I will:

1. Give you a very simple understanding of what's happening in our bodies as we age.
2. Help you work out your sense of purpose – your 'why'.

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What's Happening In Our Bodies As We Age?

Nine Hallmarks of Ageing

DNA Instability - DNA is found in the nucleus of every cell, it's what makes us, us. Throughout our lives, DNA continuously replicates and divides to create new cells when our bodies need them. As we get older, interior and exterior factors challenge our DNA, resulting in errors in the original genetic code. Imagine copying the same book by hand, over and over again. In time, you'd be bound to make mistakes: that's what happens as our DNA replicates.

Telomere Shortening - Each of our DNA molecules is packaged into thread-like structures called chromosomes. Think of chromosomes like shoelaces. The tip on the end stops the shoelace fraying: telomeres do the same job for our chromosomes. As DNA replicates telomeres wear down, making it difficult for those shoe-lace-like chromosomes to function properly. Eventually they 'fray' like old shoelaces, and die off. Forget the number of candles on our birthday cake, the clearest indication of our true age is the length of our telomeres. The shorter they are, the older we are.

Epigenetic Alterations - Our DNA (the genome) comes with an instruction manual, the epigenome, which controls how genes are expressed. This 'expression' of genes switches them on and off, allowing DNA to create a huge variety of cells in our bodies. The epigenome attaches chemical compounds and proteins to DNA, 'marking it' so it knows how to make heart cells, or fingernail cells, for example, from the same raw material. The epigenome also has a huge range of repair mechanisms primed and ready to deal with DNA damage. But, over time, these can fail, exhausted by errors in the replication of our genetic code, as well as exterior factors like lifestyle and pollution. This can lead to the epigenome making mistakes, switching the wrong genes on and off.

Protein Misfolding - Every one of our cells contains thousands of protein molecules which perform a wide variety of functions within the cell. These proteins are neatly folded into shape so they can do their work, but stresses inside and outside the body cause them to unfold. The body either refolds the proteins back into shape or, if they're too damaged, gobbles them up in a process called **autophagy** (literally, self-eating) (Barbosa et al, 2019). Ageing impairs the system which identifies and tags proteins for this 'recycling' process, and without this quality control damaged proteins build up. This has been linked to heart disease (Li at al, 2018) and the accumulation of damaged proteins in the brain which causes Alzheimer's disease.

Nutritional Insensitivity - Our cells can 'read' how much fat or glucose we have in our bodies, and respond accordingly, burning or storing fat. As we age, that system becomes less sensitive, impacting the storage of fat, and the response of insulin to glucose. The end result is weight gain and, potentially, diabetes.

Mitochondrial Function - Every cell in our bodies runs on 'batteries' called mitochondria: structures which convert energy from food into a form that cells can use. This conversion process produces waste in the form of 'free radicals'. These unpaired electrons are unstable atoms which cause havoc in our bodies. When we're younger they're cleared away by antioxidants and the damage is minimal. As we age, they build up, causing **oxidative stress**. On a car, we'd call it rust. We're rusting! The build-up of this 'rust' in our batteries makes them less efficient.

Zombie Cells - When our cells can no longer cope with all this DNA damage, stress and rusting they give up the ghost and become **'senescent'** – zombie cells which refuse to die and cause further harm by pumping out inflammation. Inflammation is both our body's best friend and worst enemy. If we cut ourselves the body sends an acute inflammatory response and our skin is red and swollen as the cut heals. But as we age, the body is almost permanently in a threat state, dealing with ageing cells and broken DNA. This chronic, low-grade inflammation alters communication within each cell and is a hallmark of ageing – so much so doctors have coined the term '**inflamm-ageing'**. It's linked to type-2 diabetes, cognitive decline, reduced immunity, cancer, cardiovascular disease. High levels of inflammation are found in people who become frail as they age.

Stem Cell Exhaustion - Stem cells are brand new cells with 'factory settings' that our epigenome can programme to replace any cell in the body if it becomes damaged. As we get older, they run out of energy and fail to renew or replace other damaged cells properly. This is part of the reason that injuries take longer to heal as we get older.

Altered Cell Communication - Our cells are in constant communication with each other, passing messages back and forth so they can function normally. As we age, messages become harder to decipher and cells fail to respond to messages they receive. With all this background noise, the immune system can no longer clear out damaged cells or respond appropriately to viruses, leaving us at greater risk of cancer or infections. Hormonal messaging, from insulin, for example, gets lost too.

Click the link to read the full article at:

https://www.sciencedirect.com/science/article/pii/S0092867413006454

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A Critical Way Of Taking Responsibility For Our Health As We Age Is To Find Our Sense of Purpose

A functional genomic perspective on human well-being – Barbara Frederickson

Click the link to read the full article at:

https://www.pnas.org/content/110/33/13684

Psychological Well-Being and the Human Conserved Transcriptional Response to Adversity

Barbara L. Fredrickson

Click the link to read the full article at:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4374902/

My Sense of Purpose

"To help the world age well; to remain healthy myself so that I can travel, enjoying arts and culture around the world, for as long as I can."

Best Goldster Classes for Working on Our Purpose:

- Kath Temple, Happiness Hub – Monday Mornings and Weds 11am
- Matt Faull Mindfulness Monday and Friday at Midday
- Anna Campkin Tuesdays 1oam, and Thursdays 11am
- Nikkola Thornton Friday's Journalling Class 10am

References

Barbosa, M.C., Grosso, R.A., Fader, C.M. (2019) Hallmarks of Aging: An Autophagic Perspective, *Frontiers in Endocrinology,* 9, 790, ISSN 1664-2392, https://www.frontiersin.org/article/10.3389/fendo.2018.00790

López-Otín, C., Blasco, M.A., Partridge, L., Serrano, M., Kroemer, G. (2013) The Hallmarks of Aging, *Cell*, (153)6, 1194-1217, ISSN 0092-8674, https://doi.org/10.1016/j.cell.2013.05.039.

Li, J., Zhang, D., Wiersma, M., & Brundel, B. (2018). Role of Autophagy in Proteostasis: Friend and Foe in Cardiac Diseases. *Cells*, *7*(12), 279. https://doi.org/10.3390/cells7120279