



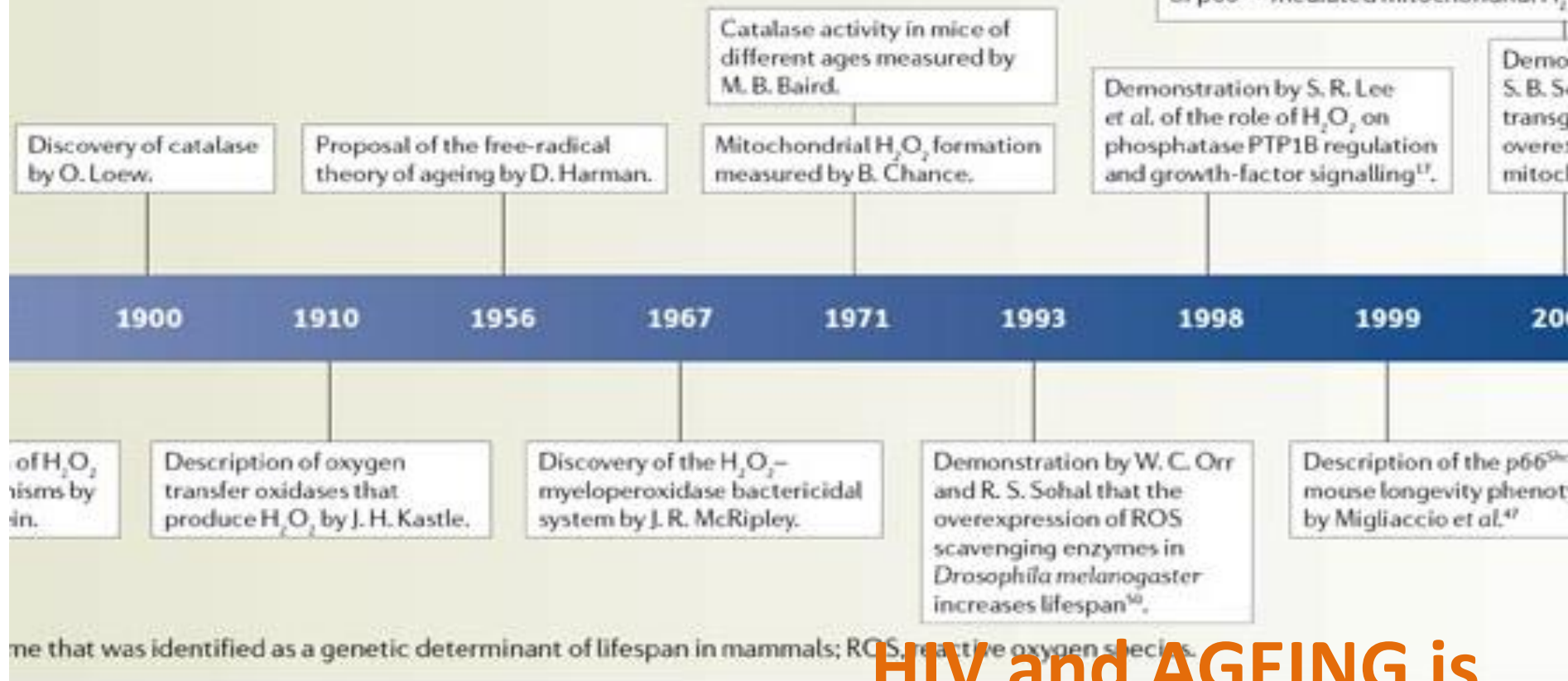
AGEING and HIV

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Ageing is not a new concept

events in the H₂O₂ theory of ageing



HIV and AGEING is

Four Decades of HIV

- ***First decade*** – Activism, energy and understanding. Awareness raising of HIV/AIDS and warnings / education and death
- ***Second decade*** Intervention and medication. Biological advances started to control the disease.
- ***Third decade*** Simpler drug regimes and stabilisation of HIV. Understanding of HIV progression and advances in research and drug developments.



Fourth Decade

- Ageing with HIV
- How do we care for patients?
- HIV is now under control – or is it?



Ageing with HIV

- But what really counts as “Ageing” with HIV?



Ageing

- Decline of physical ability
- Appearance
- Mental functions
- Medically quantified by measuring things such as the heart, brain liver and bone functions



When does it start?

- The 1st “ageing” process starts at birth
- By teenage years the thymus gland has aged
- Bones have formed, but not developed fully
- By 25 years of age the body systems will decline by 1% every year
- HIV does contribute to the ageing process but by how much?
 - Genetic / environmental

Immune System and Ageing

- Low CD4
- High rates of immune activation
- Reduced thymus activity
- Shorter telomeres (protection caps at the end of DNA strands protect chromosomes)
- Oxidative stress (excess of chemical production) compromises the immune system and allows HIV to multiply easier
- HIV infection intensifies the ageing process
 - Or the ageing process intensifies HIV?

Comorbidities and ageing

- Cardiovascular disease (stroke, high blood pressure, heart attacks)
- Liver disease
- Kidney disease
- Osteoporosis
- Cancers
- Memory loss
- Brain functions



Frailty

- Weakness
 - Vulnerability
 - Disability
 - OLD AGE
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- More common in women than men
 - Caused by underlying inflammation within the body
-
- Frailty syndrome – slowing of physical and mental ability, height reduction
 - Low CD4 count associated but no ART combination association known

Psychological ageing

- Illness
- Disability
- Social circle
- Loss of loved one
- Lifestyle
- Occupation
- Depression
- Isolation
- Stigma
 - Known associated link with ARV's and psychiatric illness

Smoking ageing and HIV

- Its bad for you
 - Oral thrush more common in smokers
- Its bad for you
 - Emphysema and lung cancer
- And guess what...
 - PCP is three times more likely to occur in smokers
 - Not to mention heart disease stroke high blood pressure

– Its bad for you!



Drugs and ageing

- Cannabis use does have medical uses
 - Peripheral neuropathy, reduces insomnia, anxiety
- Long term use concerns
 - Heart disease
 - Bronchitis
 - Asthma
 - Depression
 - Mental illness

Other drugs such as class A's impact on adherence and may have interactions

There is very little research on drug use HIV

Exercise ageing and HIV

- From pilates to stretching
 - walking to running
 - Swimming to cycling
 - And even having a sex life
- They all improve health age HIV and body function
 - Heart lung brain bone muscle mood
 - ART use may lead to become more susceptible to injury and repair much slower



Exercise

- Reduces insulin resistance
 - Slows type 2 diabetes
 - Lowers cholesterol levels (progression of atherosclerosis)
 - Increases the good component – high density lipoprotein
 - Lipodystrophy or other body changes due to medication can be improved
 - There is known association of ARV use high lipids deposited fats increased depression

Neuromuscular / Musculoskeletal AGE and HIV

- Brain and nervous system don't work properly together
 - Muscle
 - Joints
 - Ligaments
 - Tendons
 - Heart
 - Lungs
 - neck back joint and pain most common with HIV infection
- Known association of ARV use especially with bones

Oral health HIV and AGE

- Age affects teeth and gums
- HIV affects teeth and gums
 - Oral cancer gum disease - known HIV effect
 - Possible bone loss due to some ARV's
 - Oral hygiene can pick up early signs of other infections or illness's



Cardiology

- Increased risk of heart disease – and at an earlier age
inflammation in early infection may be to cause
ARV's
Male gender risk at any age
Women increased risk post menopause
Diabetes
Ethnicity (South Asian greater risk factors)
High lipid levels increases risk

Framingham scorer and Q risk assessment tools useful



Lipids:

- Lipids (or fats) absorbed by the digestive system stored and used as energy
 - Essential for healthy function and maintenance (muscle and bone)
 - Brain function
- Good forms and bad forms
 - Low density lipoprotein (LDL) (bad ones)
 - High density lipoprotein (HDL) (good ones)
- Triglycerides (TG) found in the blood stream
 - ^results in heart inflammation of the pancreas and T2 diabetes

- Total cholesterol
- HDL levels (-)
- TG levels = LDL level
 - This should be done fasted for 12 hrs
- Normal ageing process is to see an ^ in cholesterol
- Statins and Fibrates used to to reduce cholesterol
 - Caution when using with ARVS due to interaction

It is know that ARV's do increase LDL and TG levels

Diabetes

- Type 1 and 2 are increasing
 - Ageing - fat increase, muscle mass reduces = indicator
 - Obesity
 - ARV's predispose the development of T2 diabetes
 - Family history
 - Smoking
- Age HIV ARV's are the big concern with diabetes especially T2

Chest and Lungs with Age and HIV

- +ve ^COPD rates – HIV harboring in the lung walls
- Influenza can be fatal in +VE people AND in older people – low CD4
 - Vaccine is recommended for all people taking ARV's regardless of the CD4 count and recommended for all “old” people
 - Not always recommended for people not on ARV'S
- Pneumonia (*Streptococcus pneumoniae*)
 - Higher risk of infection for HIV +low CD4 counts
 - Septicemia and meningitis especially in older age
 - Vaccinations should be given to everyone with HIV

Lung Cancer

- Biggest killer in men and women
 - 2-3 times higher rates than the general population
 - Advances much quicker and in younger people who are HIV+
 - No known associated link to ARV's
 - But many unanswered questions



Kidney disease in ageing

- Decrease function with age – blood pressure, urine, vitamin D production (made in the skin but converted through the kidney).
- Common factors that damage the kidneys are drugs ageing diabetes and HIV (especially for black African descent)
 - ARV's do have an association with Kidney disease
 - Regular urea and creatinine tests should be done. High levels indicate kidney damage
 - Abnormal levels of protein, blood, bilirubin, white blood cells, glucose and ketones indicate potential damage



Bones Age & HIV

- HIV and Age both cause bones to weaken
- Osteoporosis (bones with holes)
 - HIV infection causes this
 - Age causes this
 - ARV's cause this
 - Hormone levels cause this

Pain in the back hip pelvis. Fractures in the vertebrae and loss of height

Falls are very common in older people and in those with HIV infection due to nerve damage

Bone density at its best at age 20 after which it declines

Cancers

- 3 main cancers affecting HIV+
 - Kaposi's sarcoma (KS), Non Hodgkin's Lymphoma (NHL) and Invasive Cervical Cancer
- Over 200 cancers and many HIV+ people are now experiencing these
 - Lung, Anal, Liver, Kidney and Skin cancers
- Affect all ages but increased risk with age



Neurology

- Ageing and HIV result in nerve damage (and or deterioration), muscles spinal chord and brain tissues damage
- Cognitive function decreases
- Peripheral neuropathy – common in old age also in HIV and some ARV association known
- Dementia – HIV related AGE related



Sex and Hormones

- Andropause and menopause – both due to hormone changes
- Andropause – males over 30 lose 10% testosterone/ decade. HIV infection causes this to happen much earlier decrease in testosterone matched by increase in globulin
 - Reduces bodies uptake of testosterone
 - Osteoporosis, heart disease and cognitive impairment
- Menopause – Oestrogen production stops normally 45 – 55
 - HIV may lead to early menopause
 - Osteoporosis, fatigue, skin changes, insomnia and urinary tract infections – all linked to both age and HIV

The drugs work

- Yes they do
 - No viral load
 - No onward transmission
 - Good immune systems
 - “normal” life spans – or better.....
- They also carry with them toxicities
 - On young bodies
 - On “middle” age bodies
 - On “older” bodies



Polypharmacy

- Side effects
- Drug interactions
- Number of drugs taken

- Points to consider
 - Absorption
 - Distribution
 - Metabolism
 - Elimination



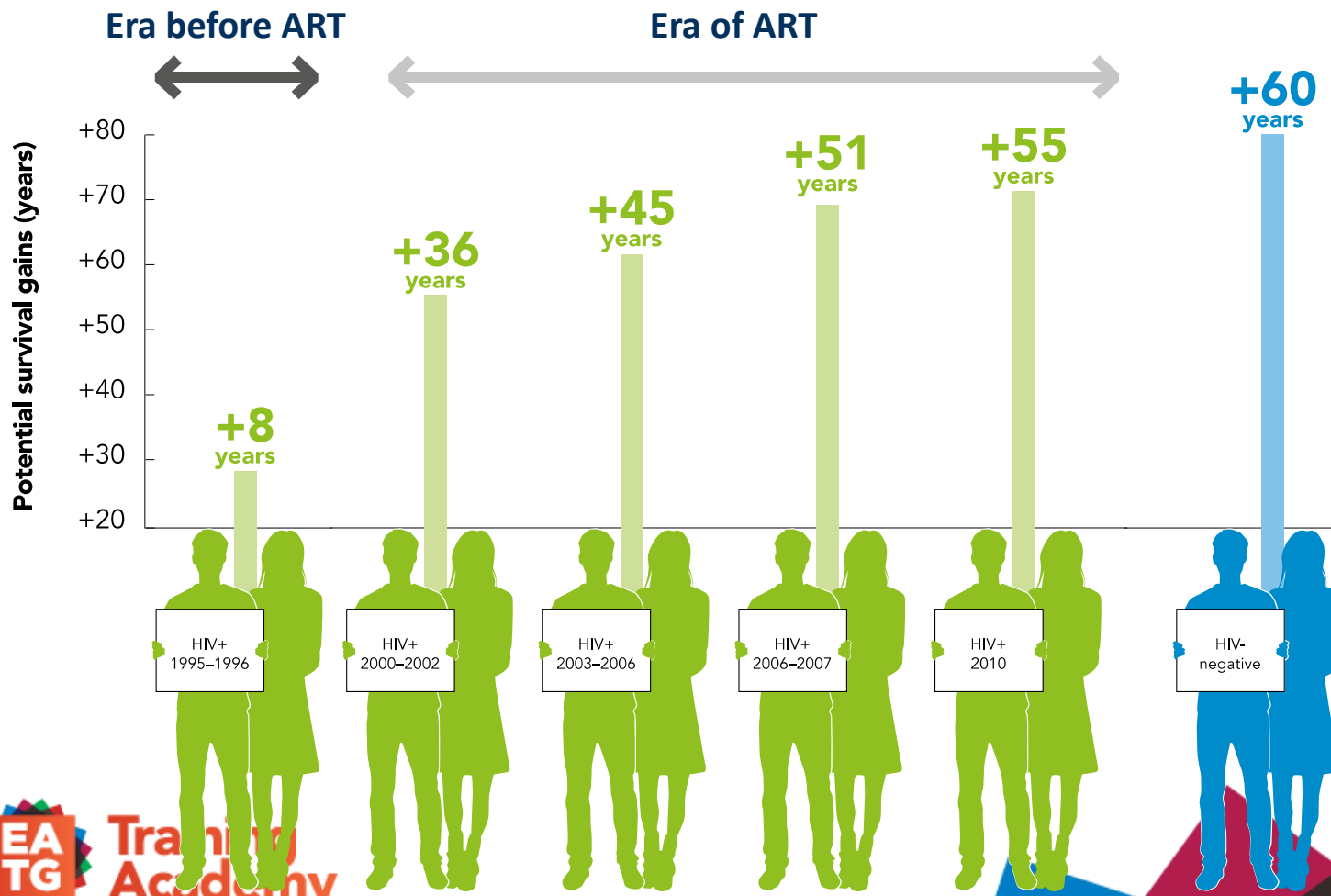
The body's systems affected by HIV and Ageing

- Integumentary system ✓
- Skeletal system ✓
- Muscular system ✓
- Lymphatic system ✓
- Respiratory system ✓
- Digestive system ✓
- Nervous system ✓
- Endocrine system ✓
- Cardiovascular system ✓
- Urinary system ✓
- Reproductive system ✓



The success of ART

Expected survival of a 20-year-old person living with HIV in a high income country



Do the Policies exist and do they work work?

- Age related
- Education
- Pension
- CARE (multi disciplinary teams)
- Employment
- Social status
- Housing
- Trauma
- Health systems for co-morbidities
- Patient centered care



What is needed now?



With thanks to the following

