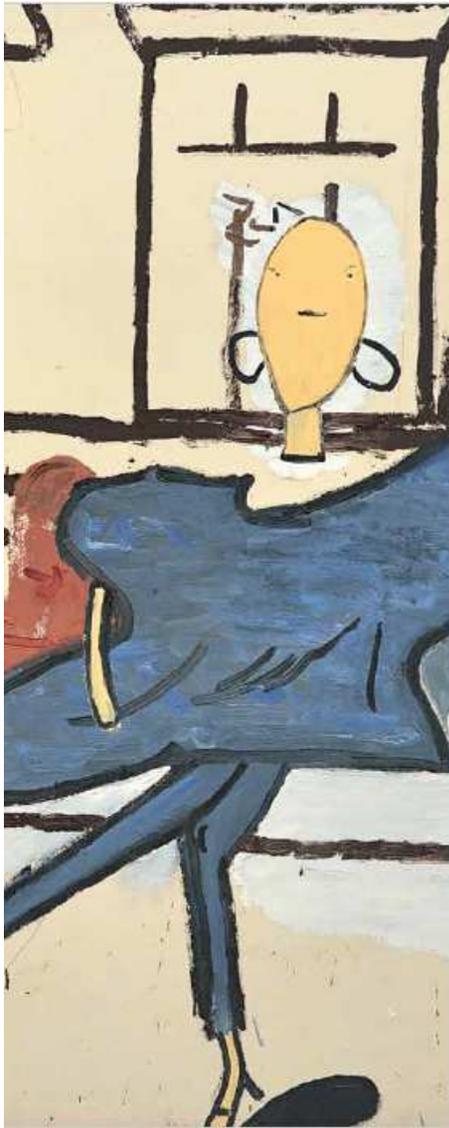

Why care about ageing?

Rachel E B Watson PhD
The University of Manchester

Overview

- Population ageing
- Skin conditions of the elderly
- Mechanisms of skin ageing
- Does skin structure dictate the microbiome or does the microbiome dictate skin structure?



WORLD
REPORT
ON
**AGEING
AND
HEALTH**



Economic &
Social Affairs

2015

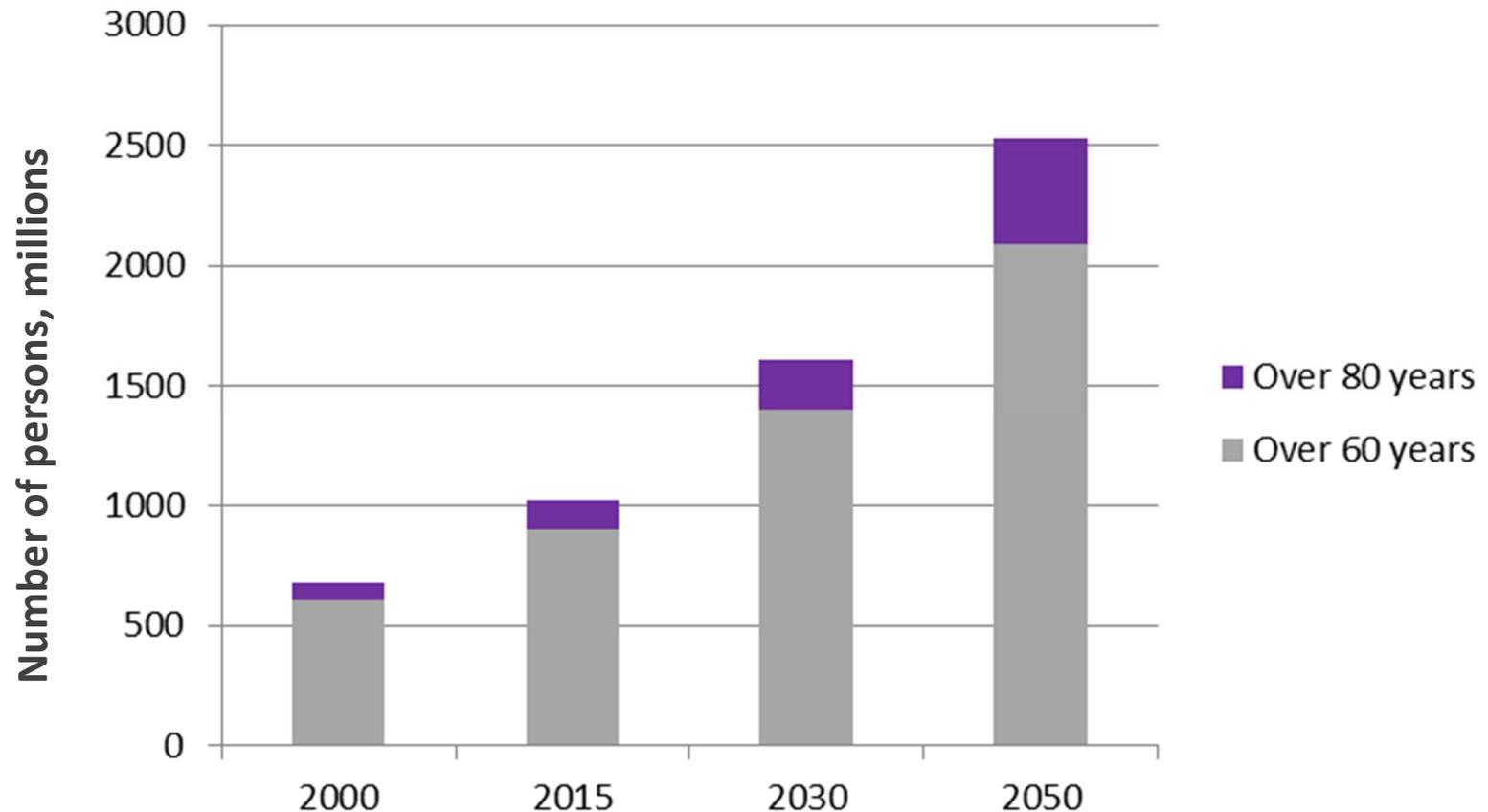
World
Population
Ageing



United Nations

[report]

Worldwide increase in the old and very old



Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

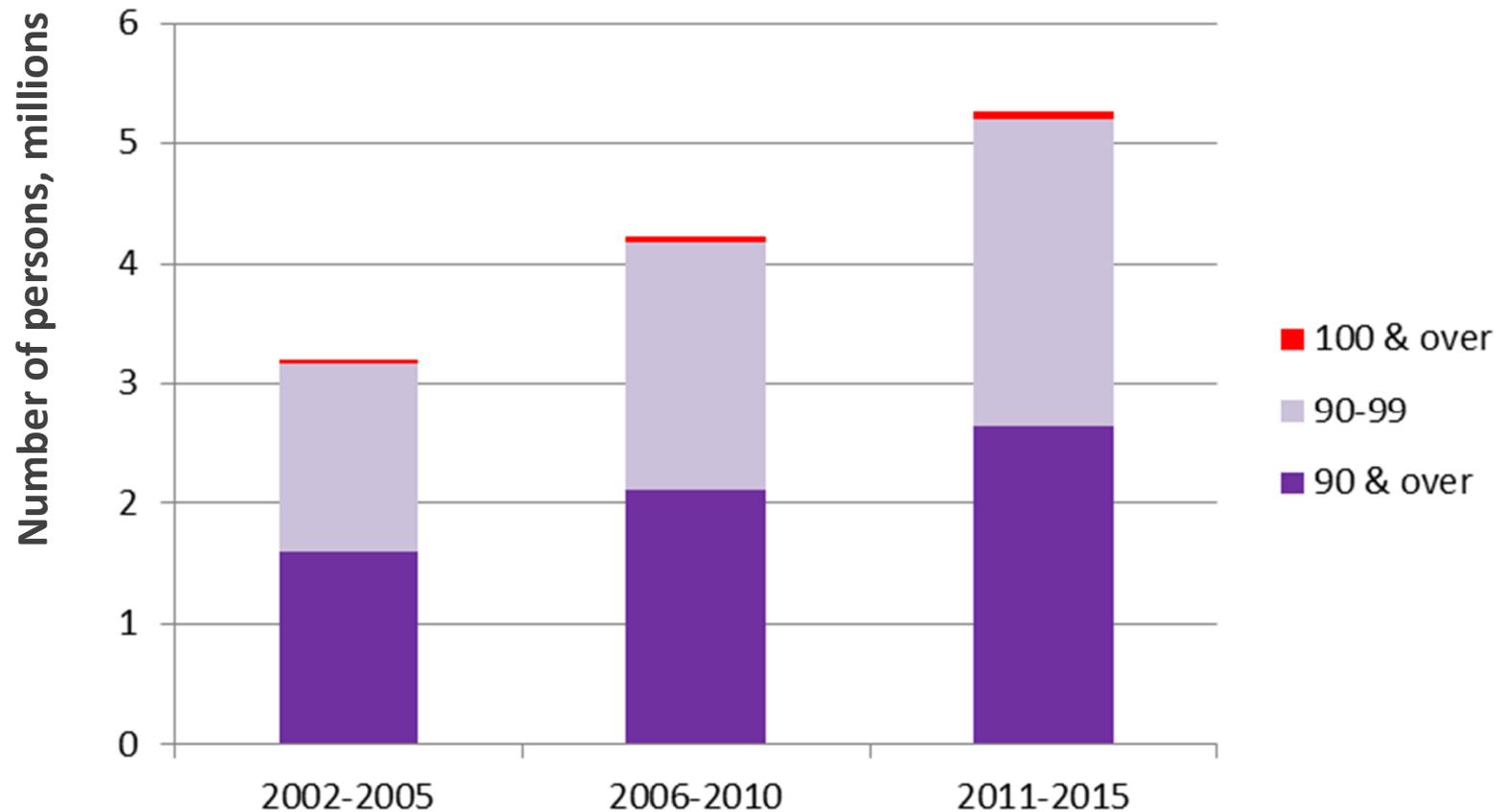
Drivers of population change

Declining fertility - reduction in fertility rate (from **5 children/woman** in 1950 to **2.5 children/woman** in 2015; predicted to fall to **2 children/woman** by 2050).
As families have fewer children, the older-age share of the population naturally increases.

Increased longevity - life expectancy increased by two decades since 1950 (from 48 years in 1950-1955 to 68 years in 2005-2010; expected to rise to 75 years by 2050).

Falls in mortality prior to falls in fertility - large cohorts were born, mainly due infant and child mortality rates prior to the changed rates in fertility; these have now reached old age (e.g. post-WWII baby boomers).

UK ageing demographics 2002-2015



Data source: Office of National Statistics (2015) released 29/09/2016



The Gerontologist
cite as: *Gerontologist*, 2016, Vol. 56, No. S2, S230–S242
doi:10.1093/geront/gnw003

OXFORD

Literature Review

Age-Associated Skin Conditions and Diseases: Current Perspectives and Future Options

Ulrike Blume-Peytavi, MD,^{*,1} Jan Kottner, PhD,¹ Wolfram Sterry, MD,^{1,2} Michael W. Hodin, PhD,³ Tamara W. Griffiths, MD,⁴ Rachel E. B. Watson, PhD,⁴ Roderick J. Hay, MD,⁵ and Christopher E. M. Griffiths, MD^{4,2}

¹Department of Dermatology and Allergy, Charité-Universitätsmedizin Berlin, Germany. ²The International League of Dermatological Societies, London, UK. ³Global Coalition on Aging, New York, New York. ⁴The Dermatology Centre, University of Manchester, Academic Health Science Centre, UK. ⁵Kings College NHS Hospital Trust, London, UK.

Common conditions of the elderly



Seborrheic dermatitis

prevalence \approx 30%



Pruritus

prevalence \approx 70%

Cutis laxa senilis

prevalence \approx 90%



Nail disorders incl. Tinea

prevalence \approx 50%



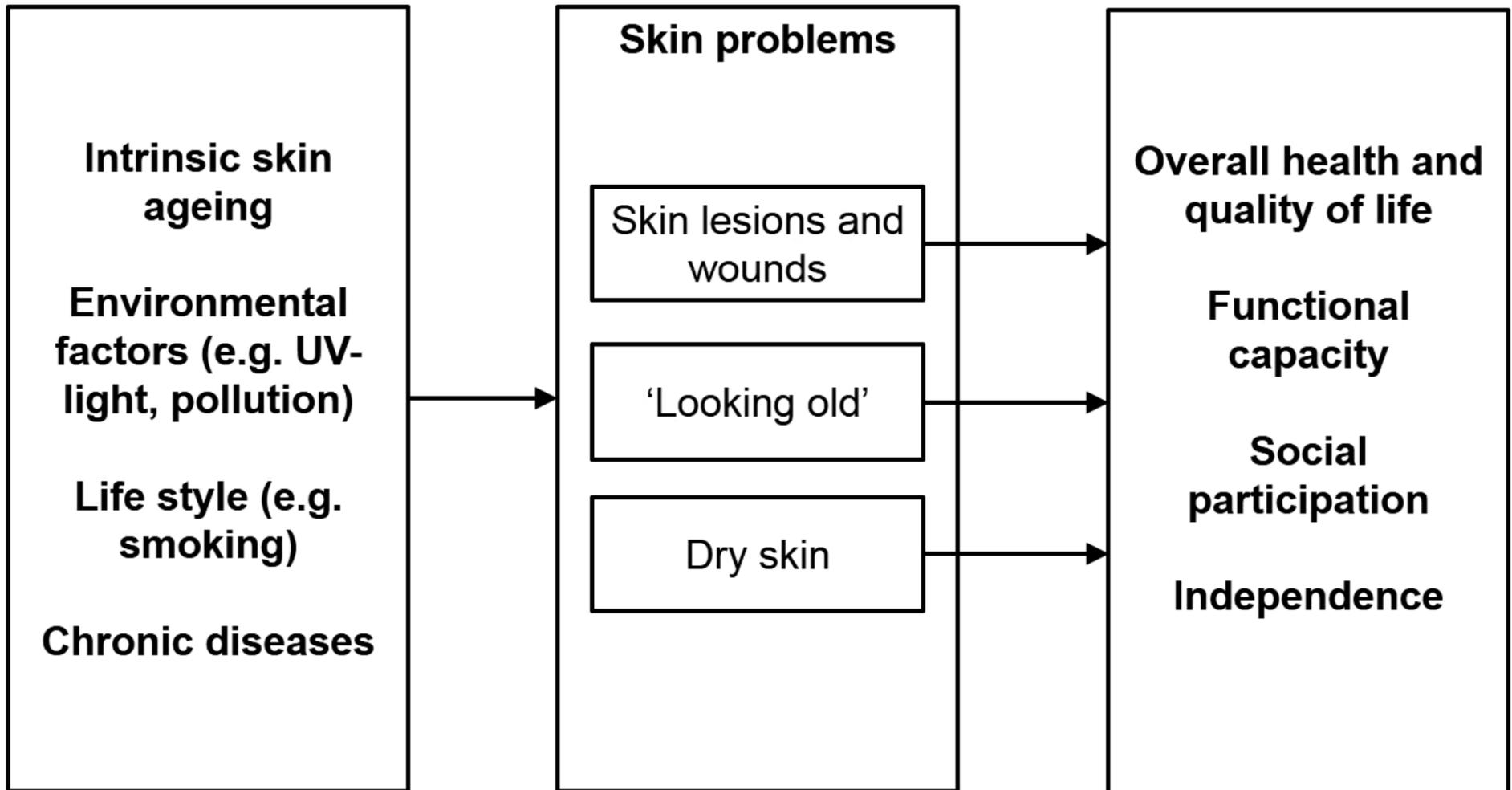
Seborrheic keratosis

prevalence \approx 70%



Xerosis cutis

prevalence \approx 70%



Ageing and human skin



Mechanisms of ageing

Intrinsic skin ageing

Environmental factors (e.g. UV-light, pollution)

Life style (e.g. smoking)

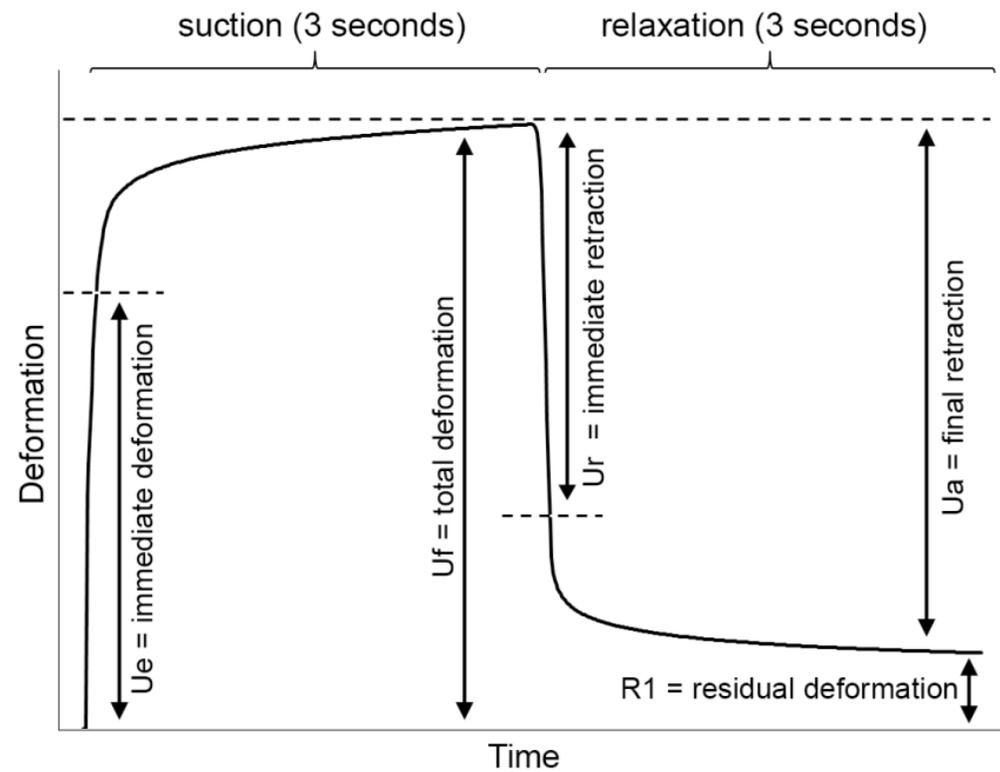
Chronic diseases

Skin is smooth, finely wrinkled, pale

Skin is coarse, deeply wrinkled, sallow, dyspigmented



Testing skins' biomechanical properties using cutometry

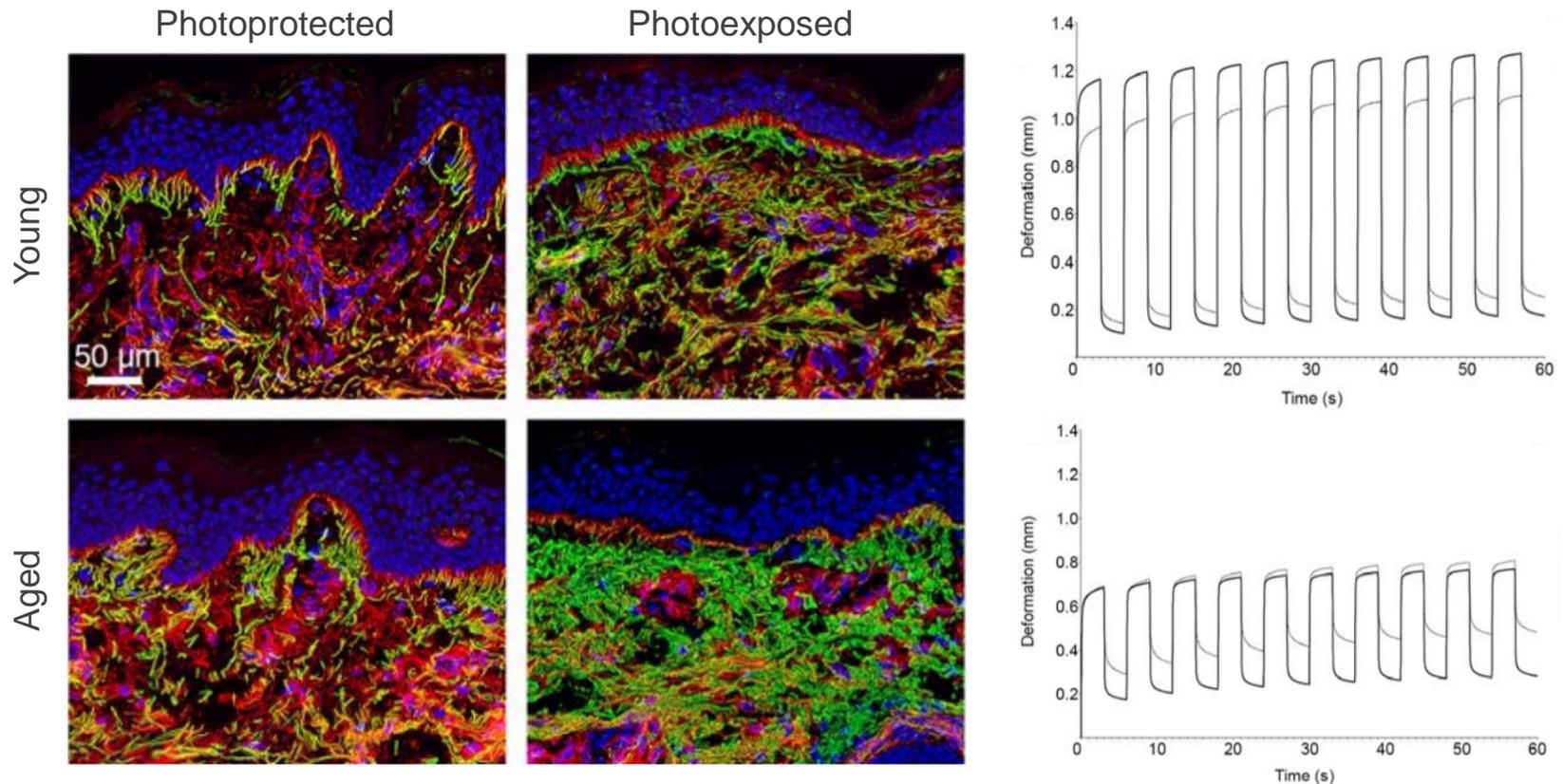


Testing skins' biomechanical properties using cutometry

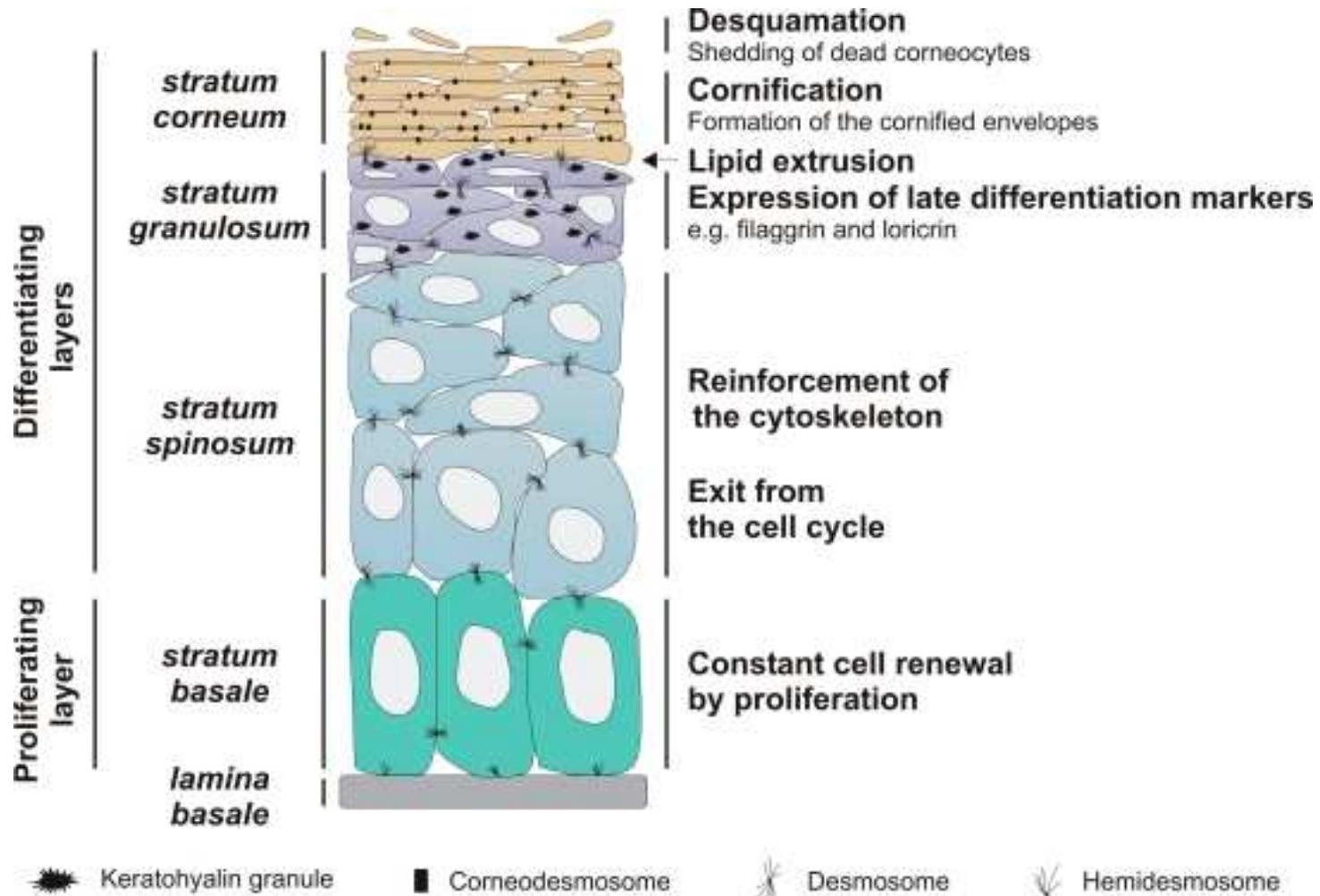


Cutometer® parameters	
R0 (U_f)	Height of the first maximal skin deformation
R1 ($U_f - U_a$)	Residual deformation (a return to the original position?)
R2 (U_a/U_f)	Gross elasticity
R4	Skin fatigue (difference between min values)
R5 (U_r/U_e)	Net elasticity
R6 (U_v/U_e)	Viscoelastic to elastic ratio
R7 U_r/U_f	Elastic recovery
R9	Hysteresis (difference between max deformation)

Testing skins' biomechanical properties using cutometry



The epidermis



Novel approaches to characterize age-related remodelling of the dermal-epidermal junction in 2D, 3D and *in vivo*

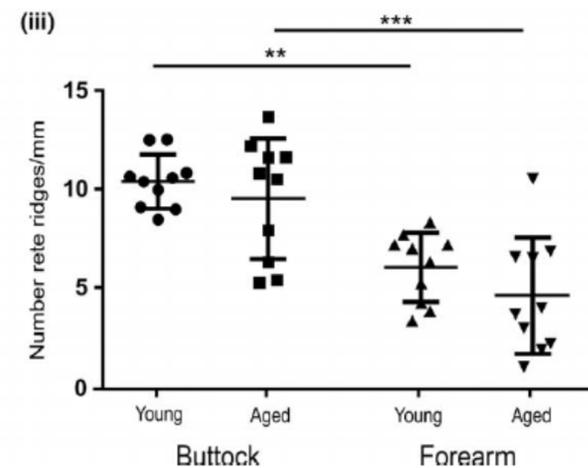
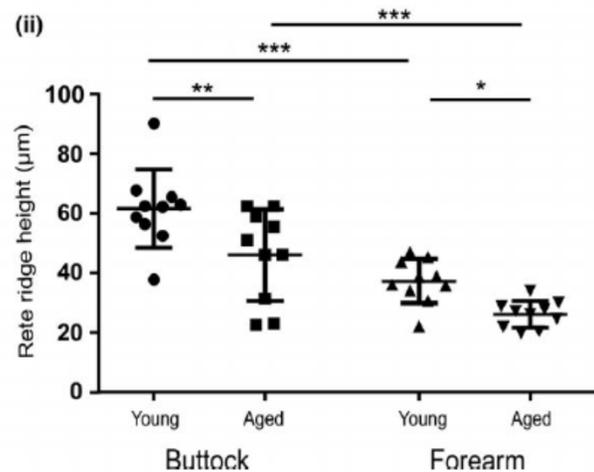
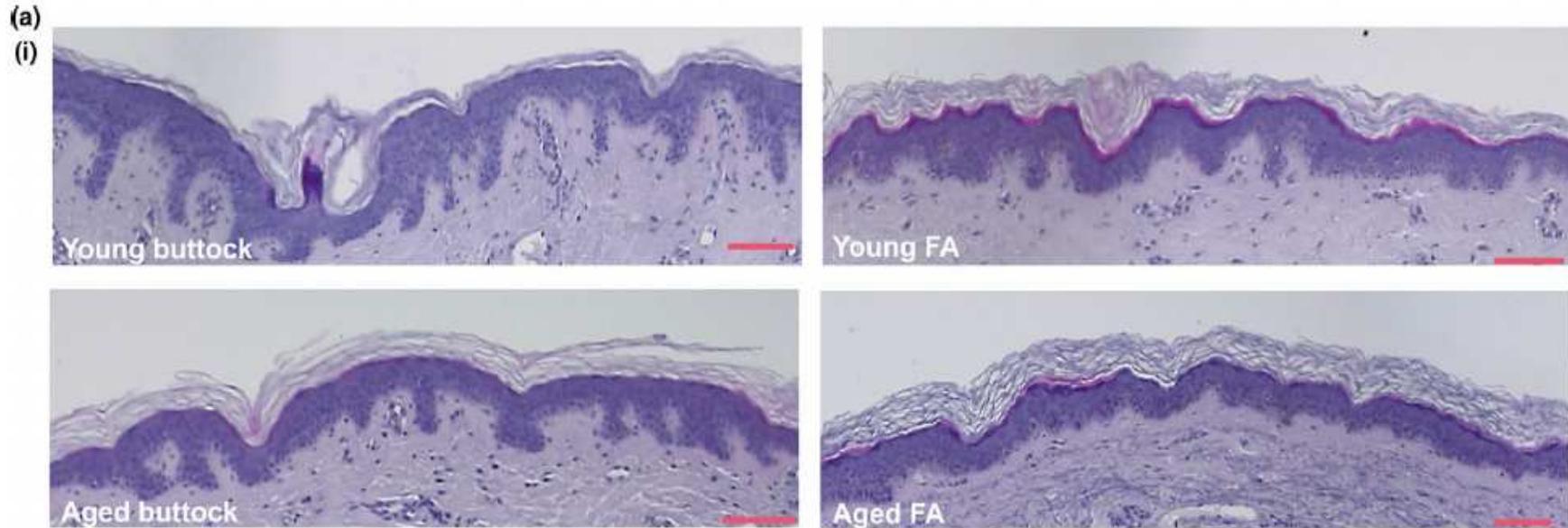
V. L. Newton^{1,2}, R. S. Bradley³, P. Seroul⁴, M. Cherel⁴, C. E. M. Griffiths^{1,2}, A. V. Rawlings⁵,
R. Voegeli⁶, R. E. B. Watson^{1,2,#} and M. J. Sherratt^{7,#}

¹Centre for Dermatology Research, Institute of Inflammation & Repair, Manchester Academic Health Science Centre, University of Manchester, Manchester, UK, ²The Dermatology Centre, Salford Royal NHS Foundation Trust, Salford, UK, ³School of Materials, The University of Manchester, Manchester, UK, ⁴Newtone Technologies, Lyon, France, ⁵AVR Consulting Ltd, Northwich, UK, ⁶DSM Nutritional Products Ltd, Kaiseraugst, Switzerland and ⁷Centre for Tissue Injury and Repair, Institute of Inflammation & Repair, Manchester Academic Health Science Centre, The University of Manchester, Manchester, UK

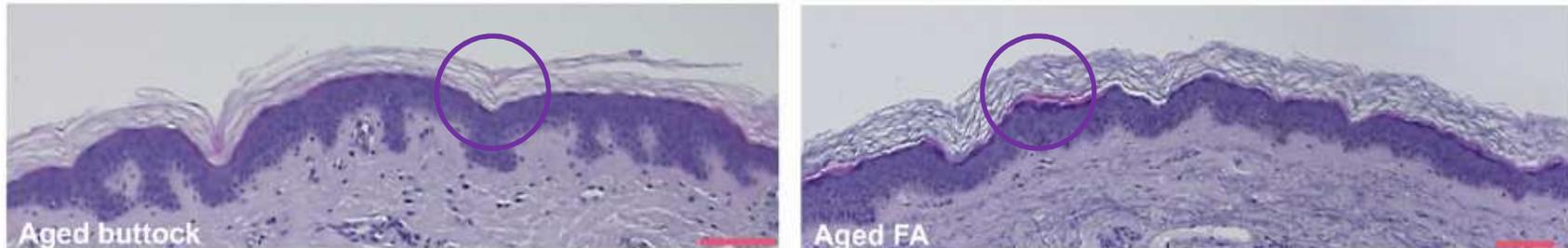


Dr Vicki Newton

With increasing age, the structure of the epidermis changes...



...and the *stratum corneum* thickens...



- Why does this layer become thicker?
- Is there a change in its composition (**lipids**)?

How do the lipids in our skin change as we age?
Does this contribute to skin dryness and itch?

...but we are more than just our skin



How do the bacteria living on our skin's surface affect how our skin functions?

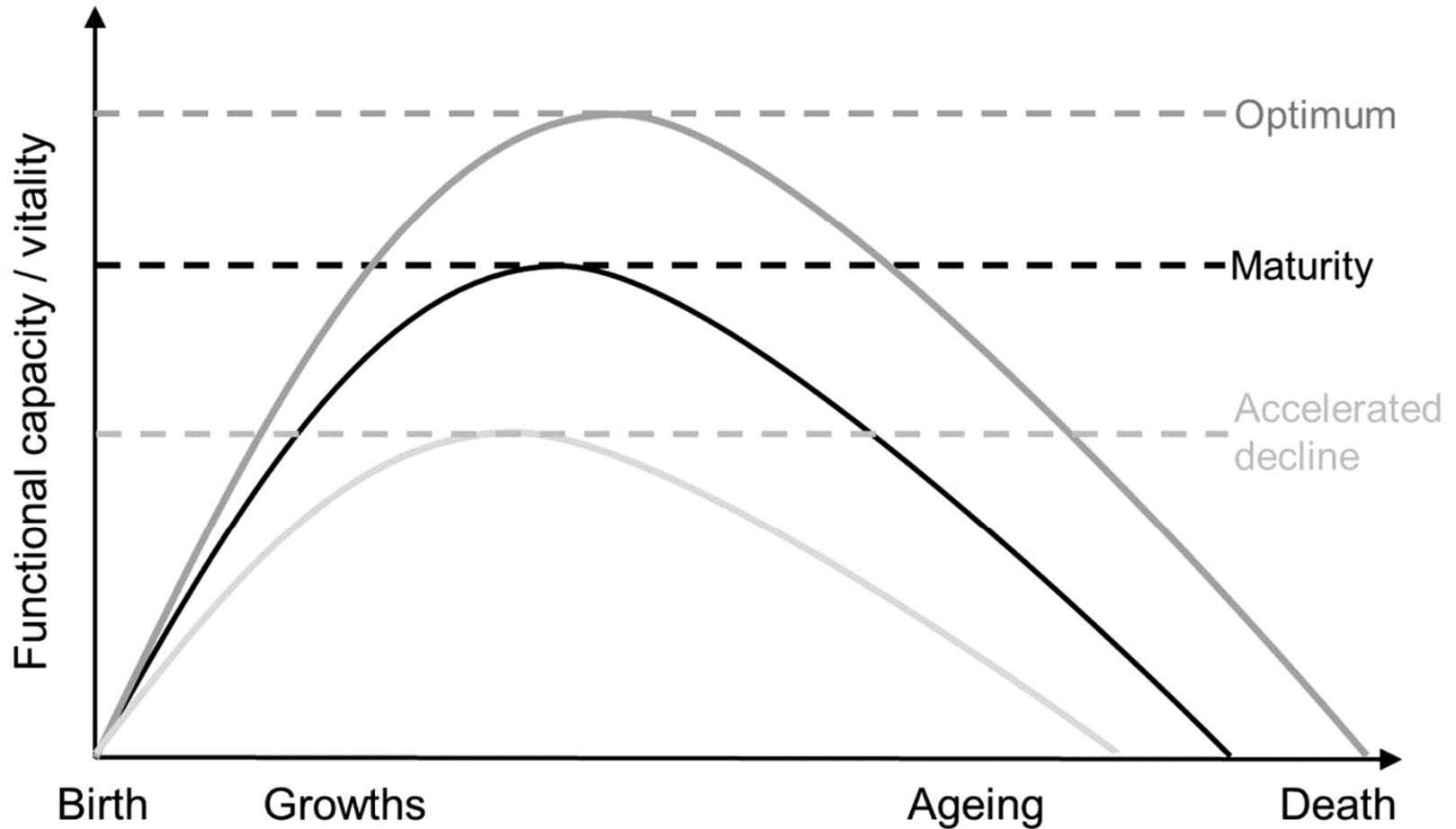
Can they change the lipids made by skin cells?

Or do the altered lipids change the environment leading to an altered microbiome?

Summary

- The global population is ageing – expect to see an increase in the numbers of patients who are old (>75 years) or very old (> 90 years);
- Intrinsic ageing is a subtle process and as such, is more difficult to study;
- If we understand the relationship between age, lipids and the microbiome, can we keep skin healthier for longer?

AGE-ASSOCIATED SKIN CONDITIONS AND DISEASES



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