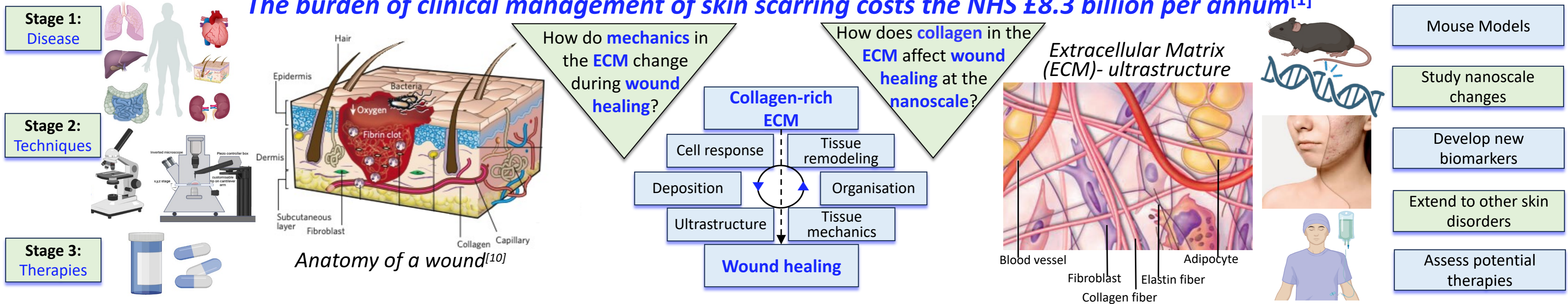
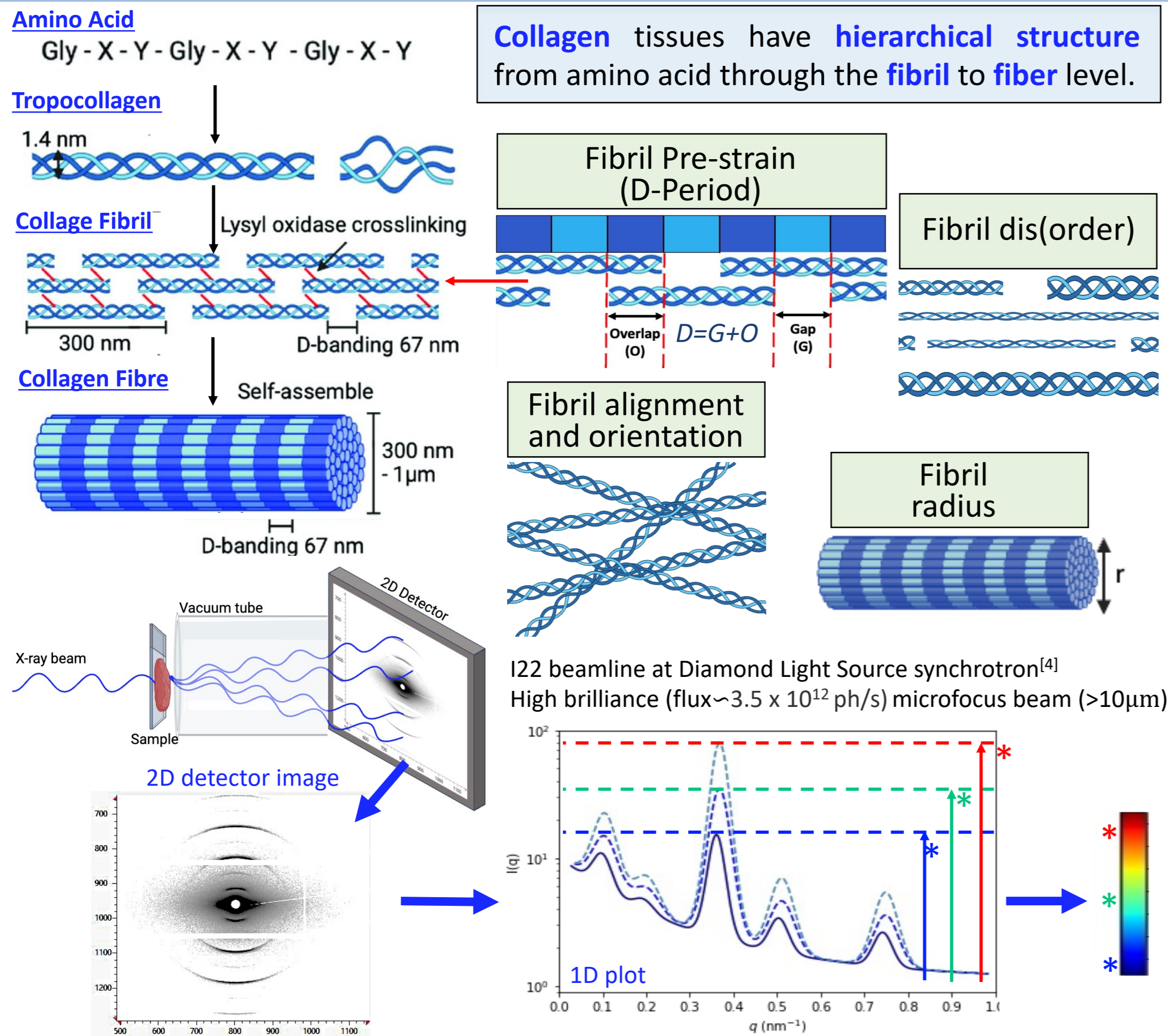


How Does Ultrastructural Stiffness and Structure Affect Wound Healing?

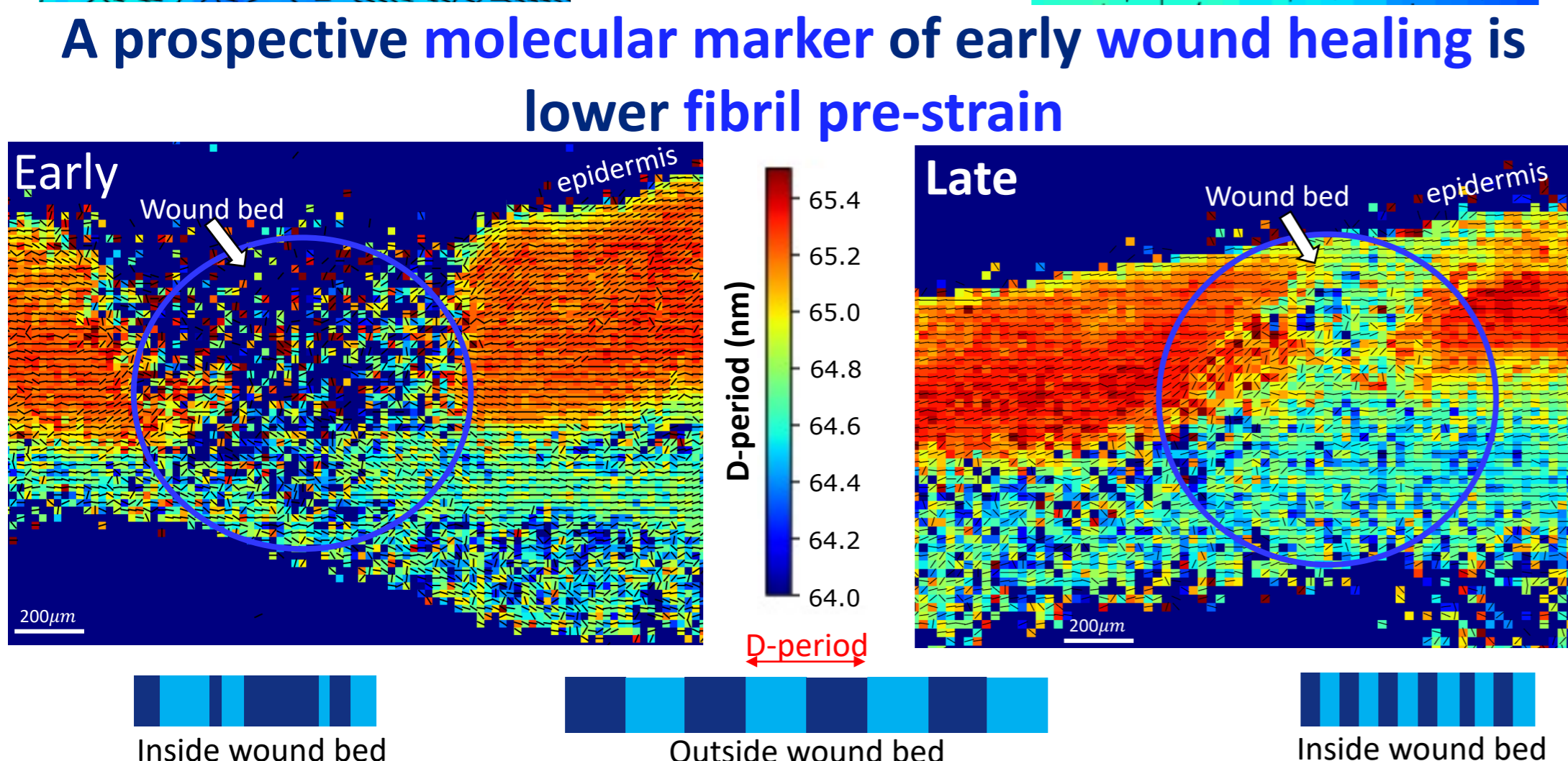
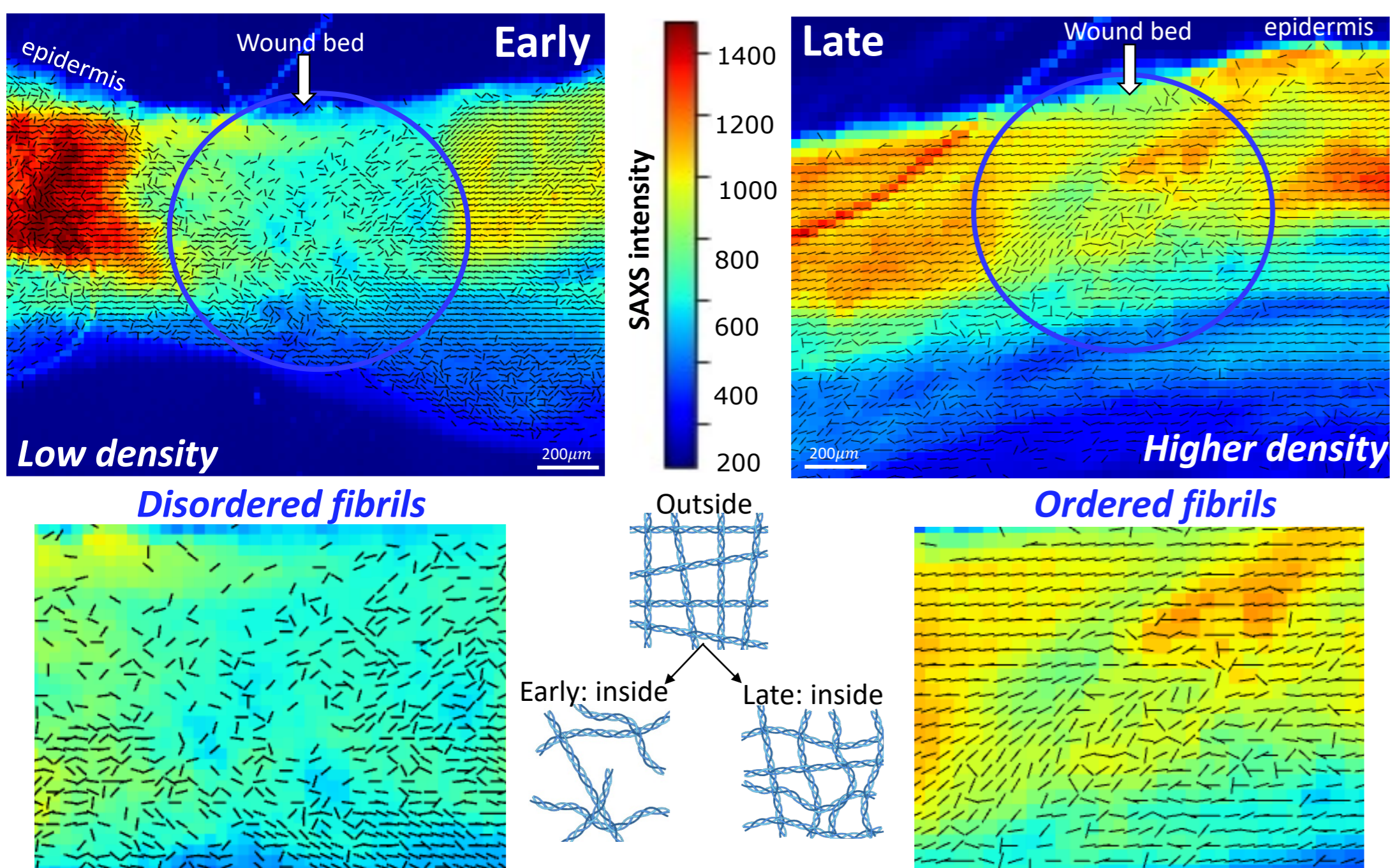
The burden of clinical management of skin scarring costs the NHS £8.3 billion per annum^[1]



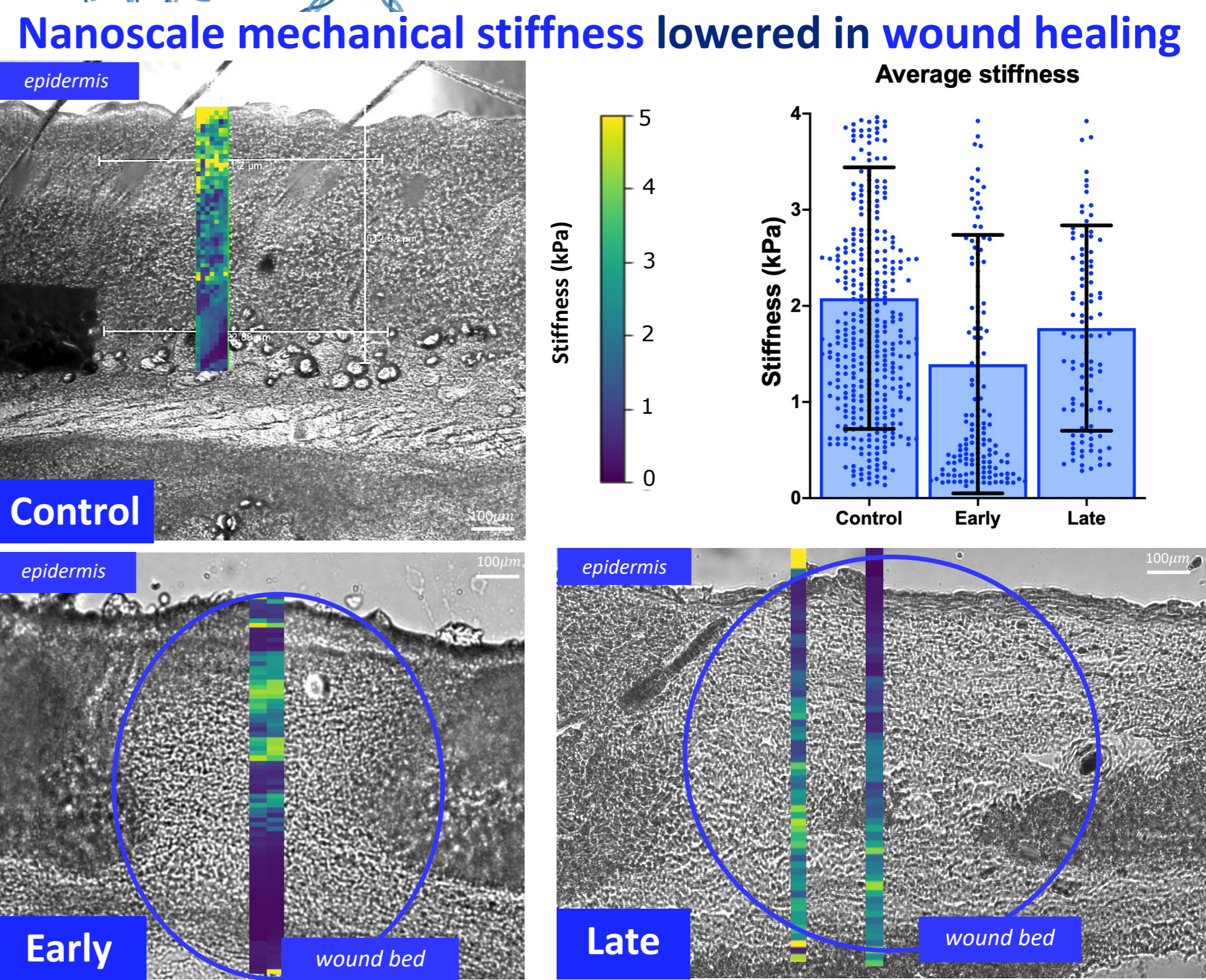
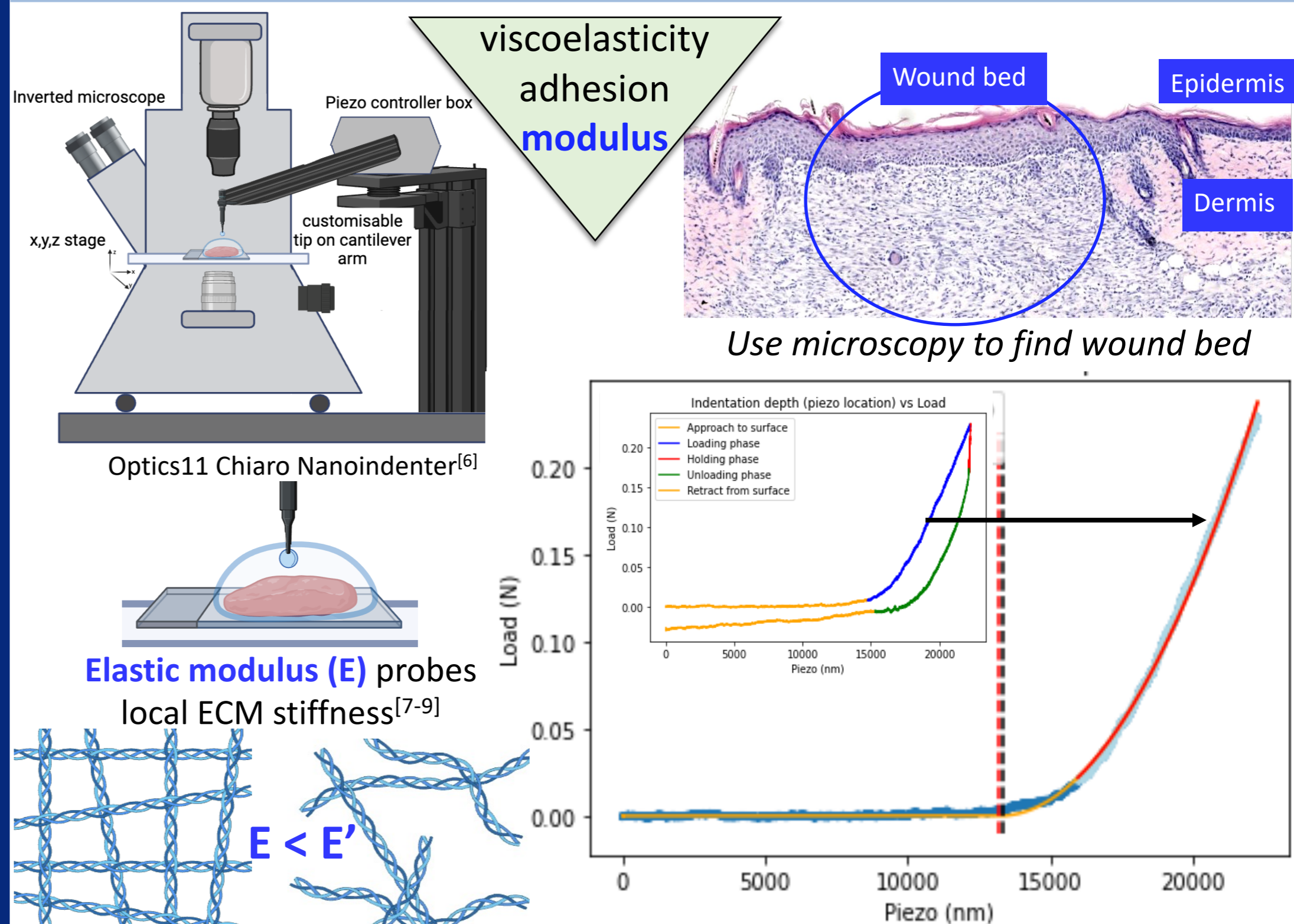
X-ray Scattering for ECM Ultrastructure



Disordered collagen fibrils in early stage wound healing
Progressive nano/microscopic alignment with healing



Nanoindentation for ECM Biomechanics



Conclusion & Outlook

Conclusion: New nanoscale features identified

Disordered fibrils	Low collagen density	Lower stiffness	Inconsistent D-period
Early wound bed exhibits measurable mechanical and ultrastructural changes.			

Outlook: Link with micro and macro scale changes

Link cell behaviour at **microscale** and tissue-level response at **macroscale** with **nanoscale** features.

Outlook: Biomarker Identification

Characterise **biomarkers** to quantify impaired **wound healing** and **fibrotic** conditions.

Outlook: Therapy Innovation

Use pipeline to evaluate existing **therapies** and find potential future **treatments**.

References and Acknowledgements

LF thanks EPSRC for PhD studentship funding. HSG thanks EPSRC, BBSRC and UKRI for grant funding.

Engineering and Physical Sciences Research Council

EP/V011235/1
BB/R003610/1
MR/R025673/1

diamond
We thank Diamond Light Source for synchrotron beamtime, I22 beamline team for support and Thomas Iskratsch, Erica Di Federico and Nuria Gavara for their time and expertise

- [1] Guest, J.F. et al. 2020 *BMJ Open*
- [2] Ahmed, A. 2023 *J. Inv. Derma* 5(143)
- [3] Rognoni, E. 2018 *Mol. Syst. Biol.* 14(8)
- [4] Inamdar, S. et al. 2017 *ACS Nano* 11(10)
- [5] Radlinski, A. et al. 2015 *ICCP*
- [6] Antonovaite, N. et al. 2020
- [7] Gavara, N. 2016 *Nature* 6(21267)
- [8] Pharr, O. et al. 1991. *J Mater. Res.* 7(4)
- [9] Hertz, H. et al. 1896 *Princ. Mech*
- [10] Gurtner, G. et al. 2008 *Nature*