GARVAN
INSTITUTE
OF MEDICAL RESEARCH

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Thank you

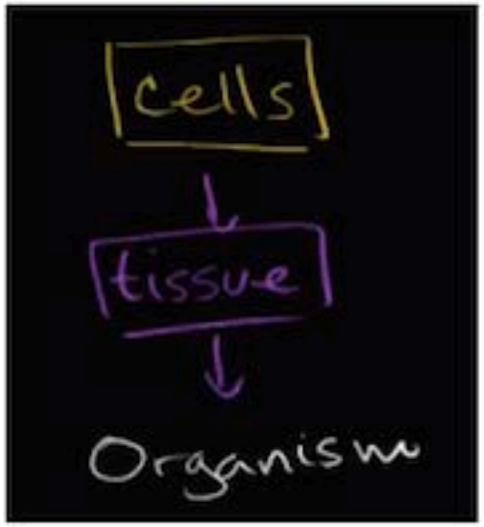
What is the extracellular matrix (ECM)?

Cells are the basic unit of life

How do cells organise to form tissues and organs

'**Extracellular**' = 'outside of the cell'

'**Matrix**' = the mesh or web that holds cells together in tissues



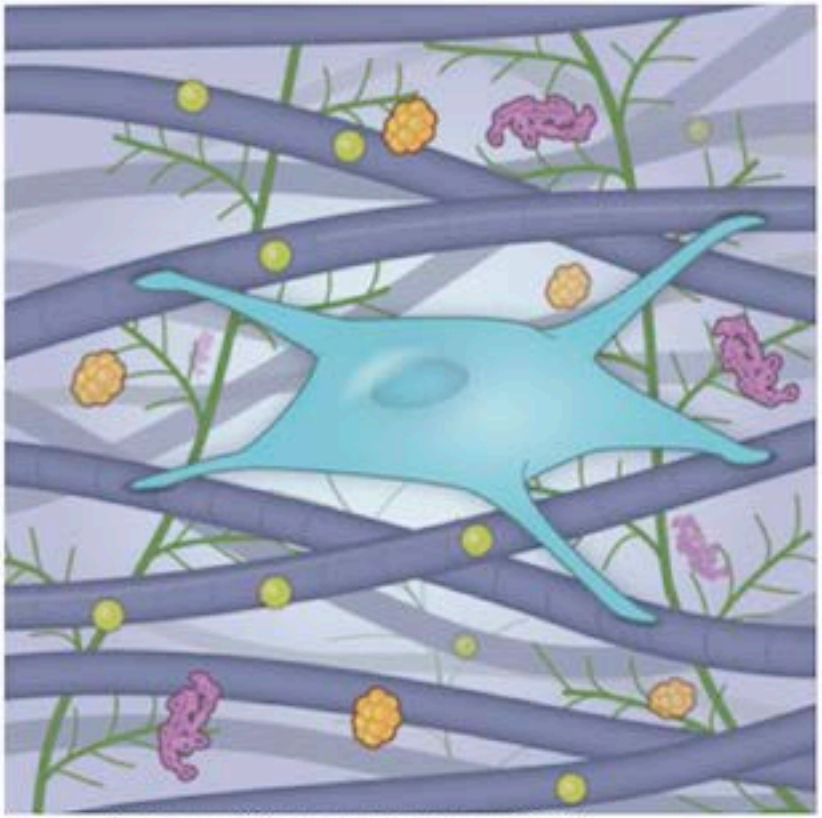


Image: Gaharwar AK *et al.* Adv Mater. (2016)

Made up of over 100 building blocks

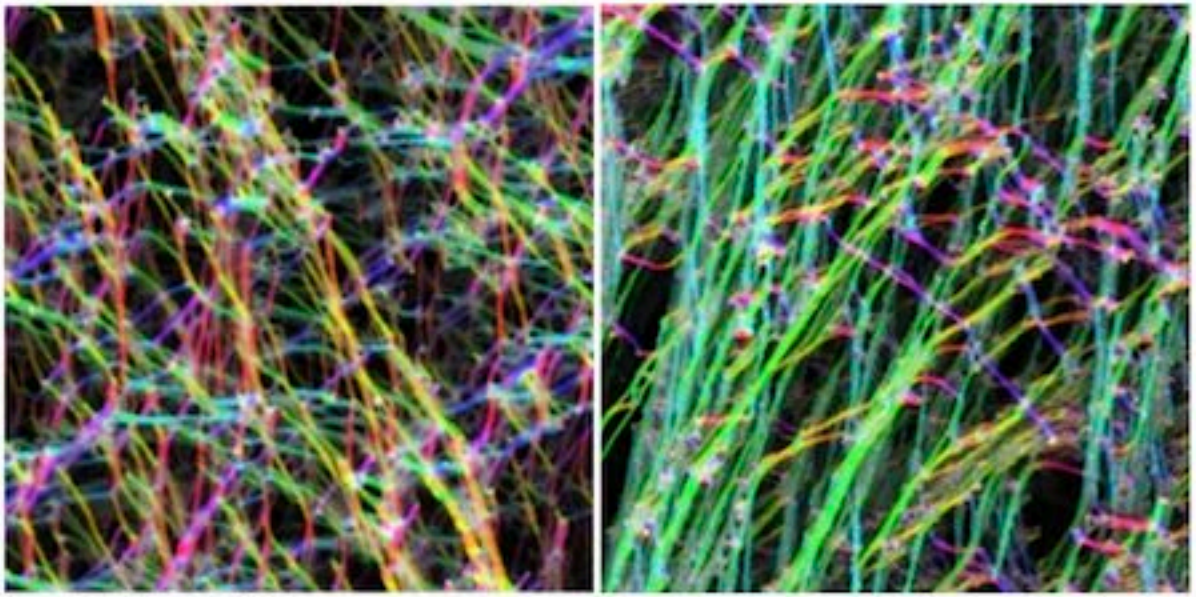
Most abundant molecule is collagen - which makes up around a quarter of the proteins in your body

Why is the matrix important?

Just as you and I respond to our surroundings, so cells respond to the extracellular matrix

The matrix informs the cell when to reproduce, when to die, when to move and when to produce different molecules

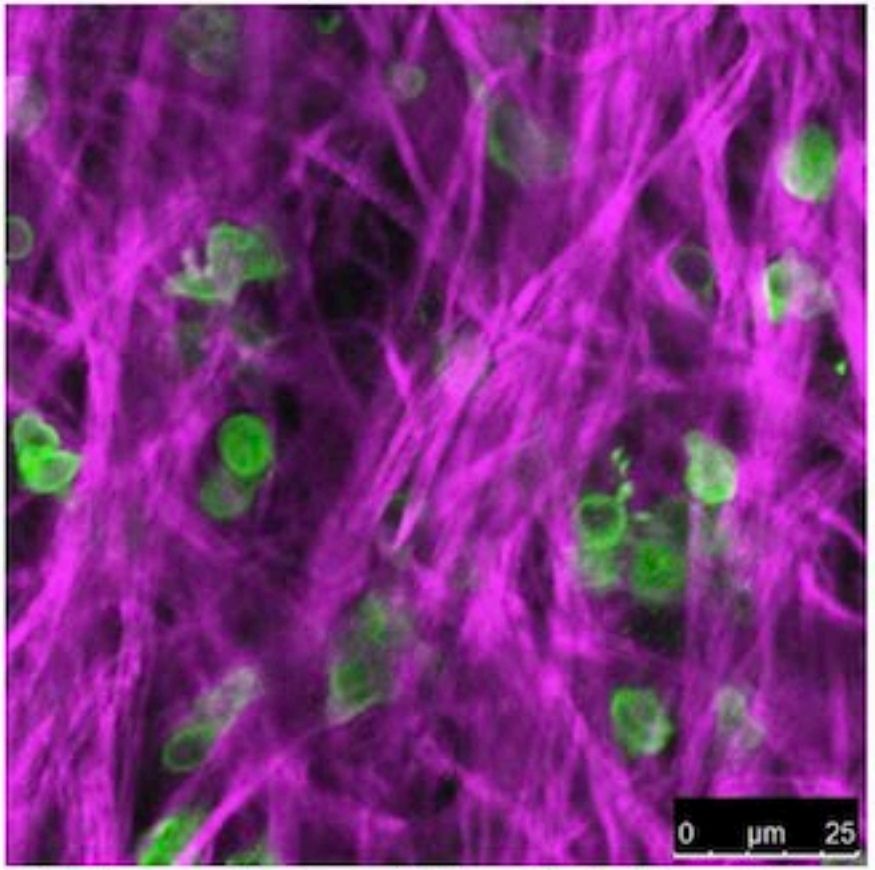
Very important in repairing our tissues and keeping them functioning correctly



Images: Thomas Cox

In cancer we typically see big changes

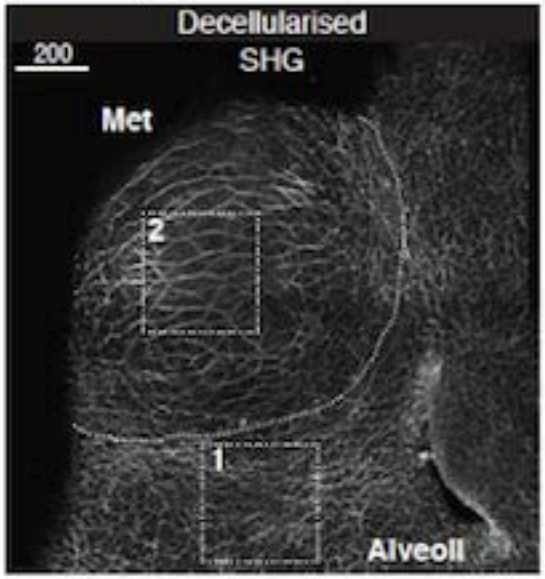
Matrix (Collagen) / Cells

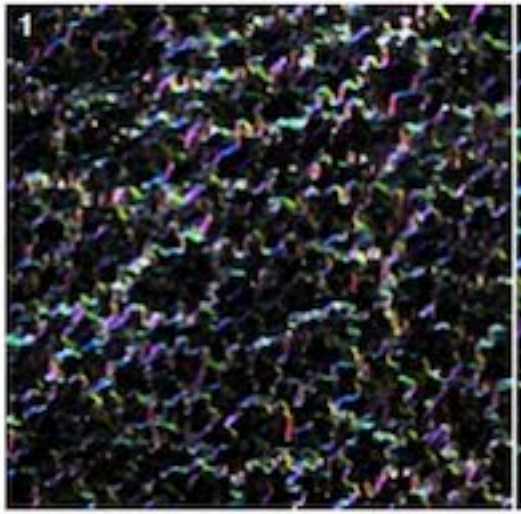


Movie: Timpson Lab, Garvan Institute of Medical Research

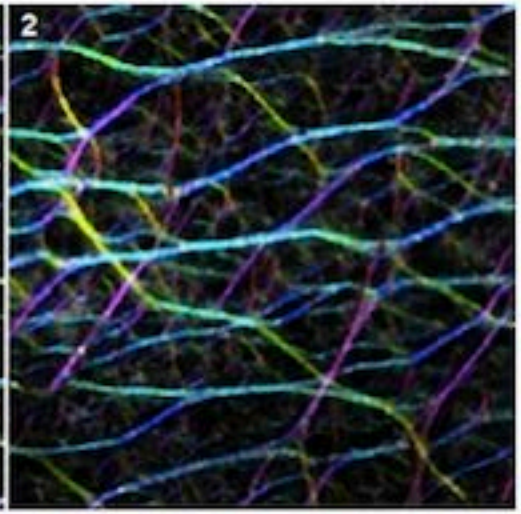
Studying the matrix in cancer

We have developed new approaches to dissolve cells away from tissues to study the matrix





Healthy Lung Tissue

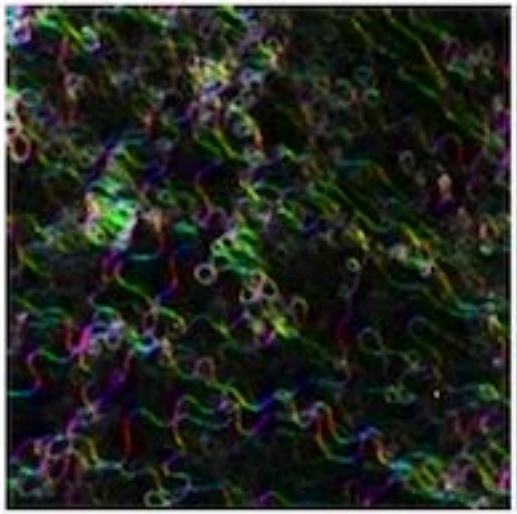


Lung Metastasis

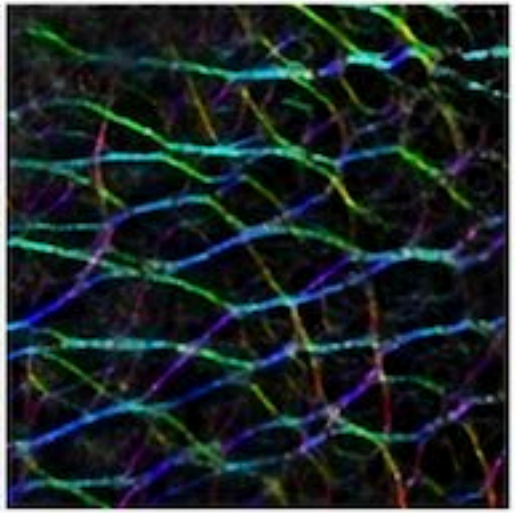
The matrix is significantly changed as cancers grow

These changes help the cancer to grow

Understanding how the matrix changes, and how it then changes the behaviour of cancer cells, we can design drugs to target it



Healthy Breast Tissue



Breast Cancer

Images: Mayorca-Guiliani, Madsen, Cox *et al.* Nature Medicine (2017)

Studying the matrix in cancer

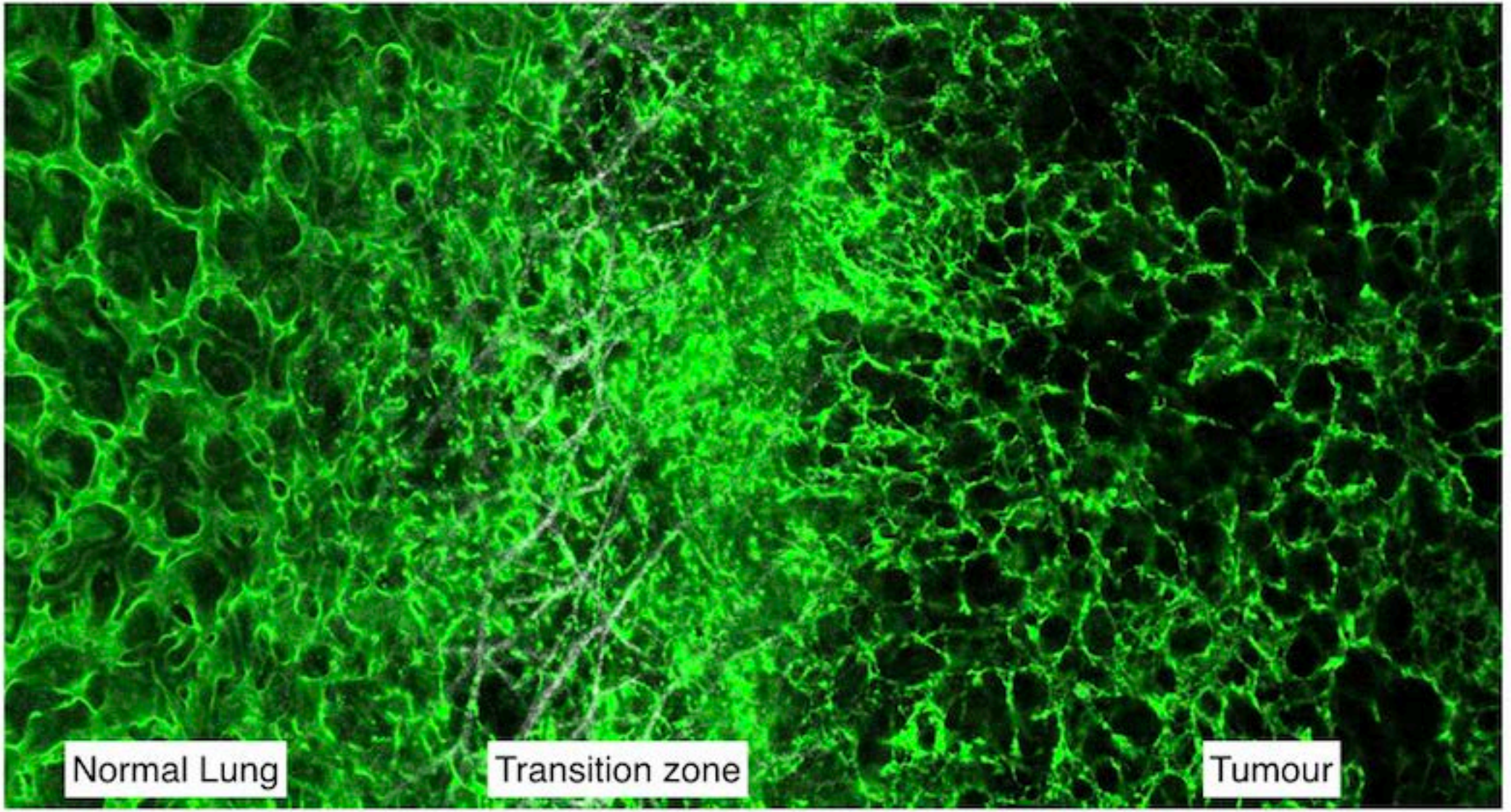


Image: Mayorca-Guiliani, Madsen, Cox *et al.* Nature Medicine (2017)

The future

The matrix is everywhere. It is all around us. Even now, in this very room…

The matrix is critical for the normal functioning of ALL our tissues and organs

In cancer the matrix is significantly changed and this typically accelerates progression

Through the development of new imaging technologies and approaches we can now study and better understand the contribution of the matrix to diseases such as cancer

The extracellular matrix presents a vast, unexplored repository of anti-cancer targets, which we are only just beginning to tap into