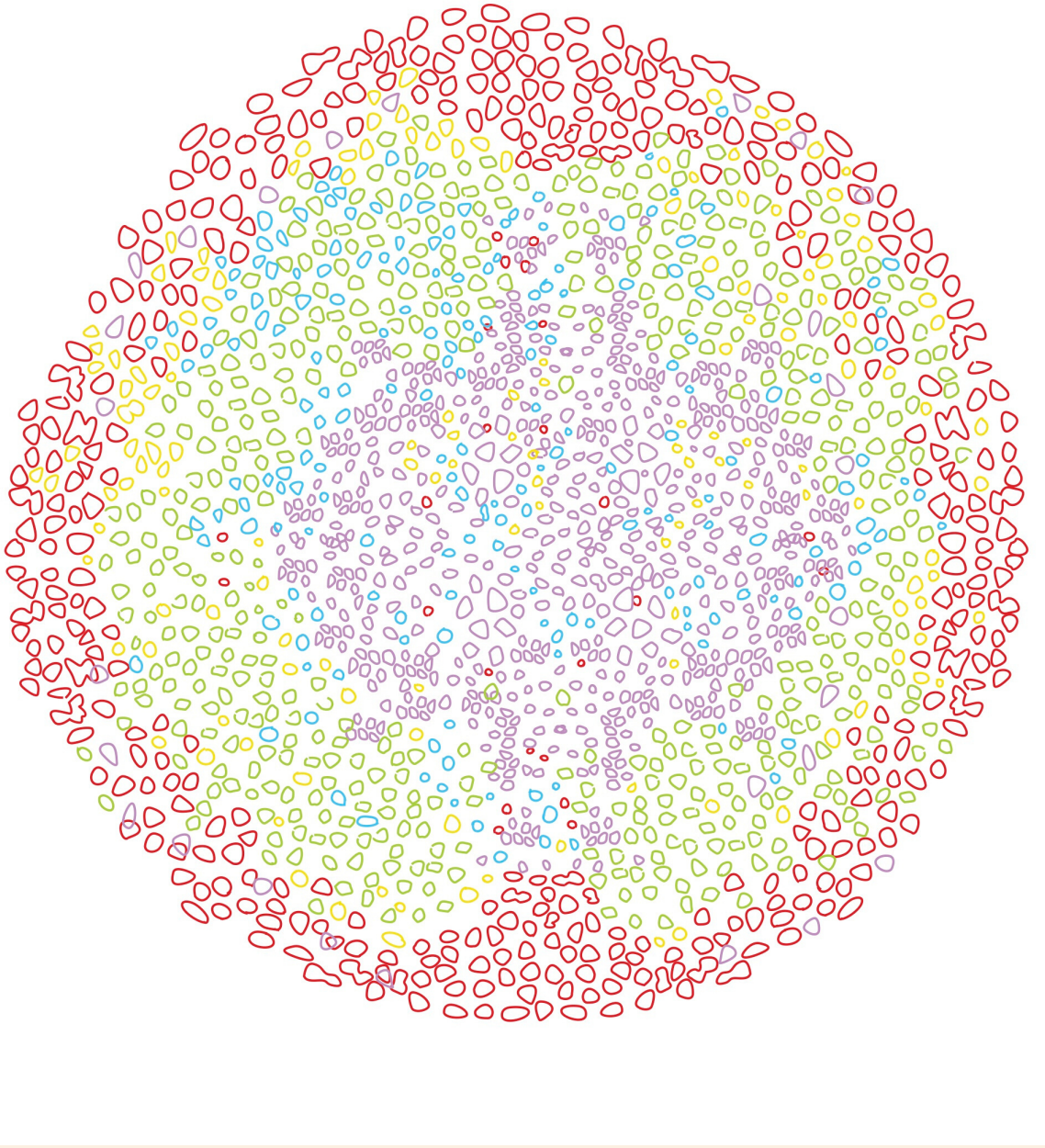


DIY EMBROIDERY KIT

Stitch 'n Stem

CENTRE FOR STEM CELLS & REGENRATIVE MEDICINE,
KING'S COLLEGE LONDON

Stitch 'n Stem

Stich 'n Stem is a stem cell embroidery wokshop designed to engage audiences with research taking place at the Centre for Stem Cells & Regenerative Medicine through the medium of embroidery. Download this pack to learn a new skill & learn about stem cell research in a fun & interesting way...

Research images that have been generated by scientists based at the CSCRM have been transformed into beautiful embroidery templates for you to make your own piece of science art. Make sure you share your creations on social media & tag us or use the hashtag #StitchnStem so we can see what you have made!

https://www.kcl.ac.uk/bmb/our-departments/centre-for-stem-cells-regenerative-medicine

Facebook: @CSCRM
Twitter: @KCLStemCells
Instagram: @KCLStemCells

Centre for Stem Cells & Regenerative Medicine

Our Centre brings together scientists & doctors from King's College London & our partner hospitals to harness the power of stem cells in order to improve human health.

The human body contains more than 200 different types of cells that are organised into tissues & organs, such as the skin, heart & brain. Many, if not all, tissues & organs contain stem cells – cells that have the ability to divide & turn into the specialised cell types that are required for our bodies to function. In some tissues the rate of new cell production is very high – for example our bodies produce 2 - 3 million red blood cells every second. In others – such as the brain – very few new cells are produced.

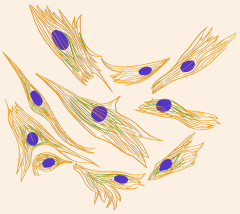
In addition to the stem cells that reside in our tissues, stem cells have been created in the lab which have the remarkable property of being able to form all of the different cell types of the body. They are called pluripotent stem cells & can be made by culturing cells from embryos – embryonic stem cells - donated by couples undergoing fertility treatment (IVF). They can also be formed by introducing DNA into cells cultured from tissues – these are called induced pluripotent stem cells, or iPS cells. Stem cells are important because if we can control their behaviour we can stimulate tissues to repair - 'regenerate' - & we can also tackle diseases, such as cancer, in which cells behave abnormally.

Embroidery Instructions

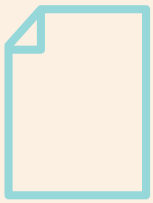
EQUIPMENT

Embroidery Hoop

T-Shirt/Fabrict to embellish



Template



Tracing/Transfer paper

Needle

Coloured threads

SECURING FABRIC IN YOUR HOOP

1. Unscrew embroidery hoop until it's just loose enough for the inner loop to slide out
2. Place inner hoop on a flat surface and lay fabric on top
3. Feel where thee edge of the inner hoop is & lay the outer hoop over the inner ring
4. Use both hands to press the outer hoop over the fabric & inner hoop, trying to maintain fabric tension
5. If the outer hoop is too tight to go over the inner hoop & fabric, loosen it slightly & try again
6. If the fabric feels loose then remove the outer hoop, tighten it slightly & try again
7. Once the hoop is on snuggly, tighten the screw to hold the fabric in place

Embroidery Instructions

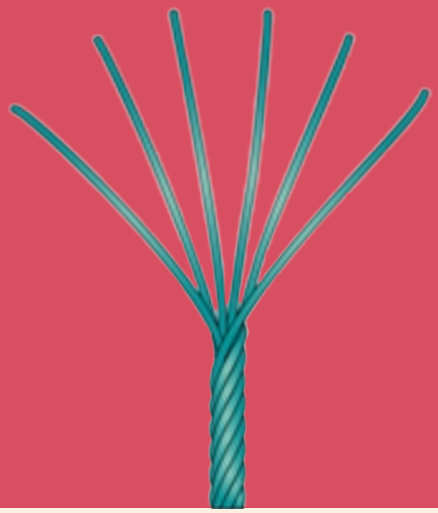
TRANSFERRING TEMPLATE TO FABRIC

1. Select your preferred stem cell template (see below)
2. To use Tracing Paper - Place your fabric on a hard smooth surface & tape it down to secure. Position the tracing paper over the fabric with the coloured side down. Print your design & place the over the transfer paper & tape it into place. Carefully trace the design with a stylus or an empty fine point ball tip pen. To achieve the best results, take your time & use a long continuous line with even pressure rather than a sketching motion. Use dark coloured paper for light coloured fabrics & light coloured paper for darker fabrics.
3. To use adhesive embroidery paper - Print your design onto the non-adhesive side of the paper. Cut out image and remove backing. Stick image to fabric, embroider your design & either tear or dissolve away transfer paper (depending on which you are using).

Embroidery Instructions

THREADING THE NEEDLE

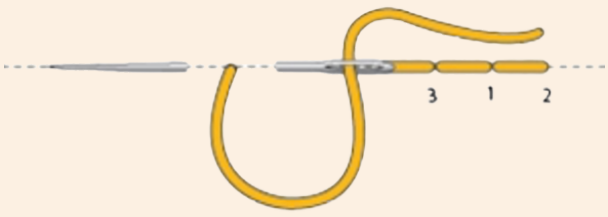
Embroidery threads come in bundles of 6 twisted together. Depending on the pattern you are stitching, you may need mulitple strands in your needle - i.e. creating thicker or thinner lines in your design



STITCHING

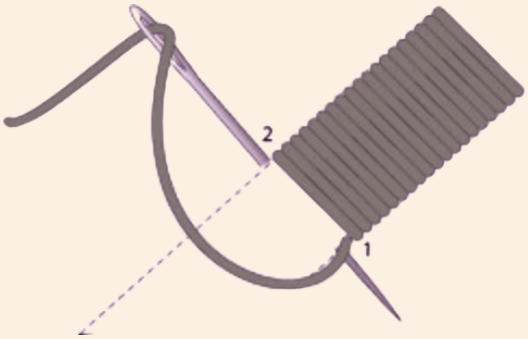
There are many types of embroidery stitches. The stem cell templates can be completed with 2 simple stitches. You can add more if you are feeling adventurous!

1. Back Stitch: For outlines



Work from right to left. Bring needle up at 1 & back down at 2. Move left & bring needle up at 3, then back down at 1. Continue stitching.

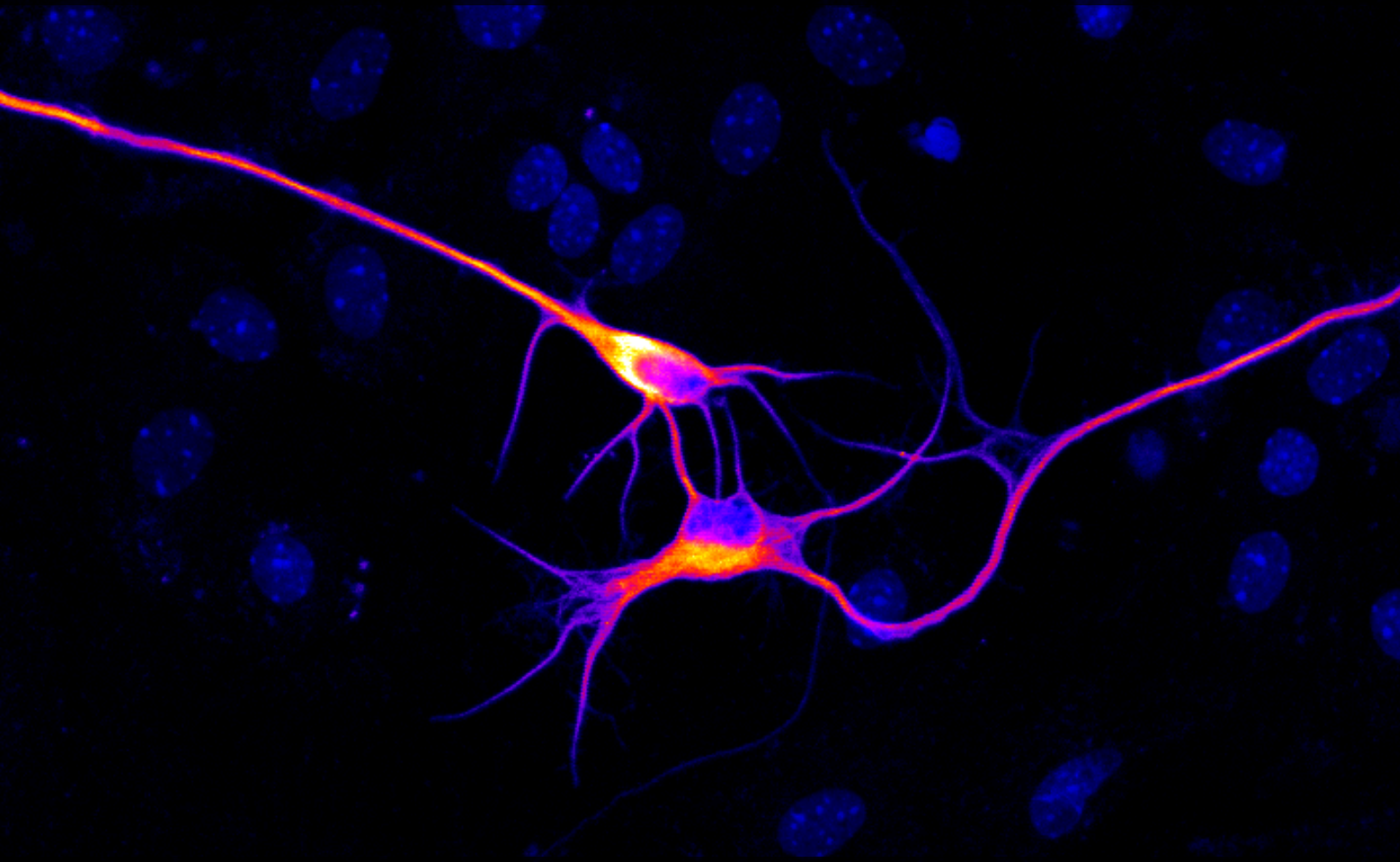
2. Satin stitch: Fill areas with colour



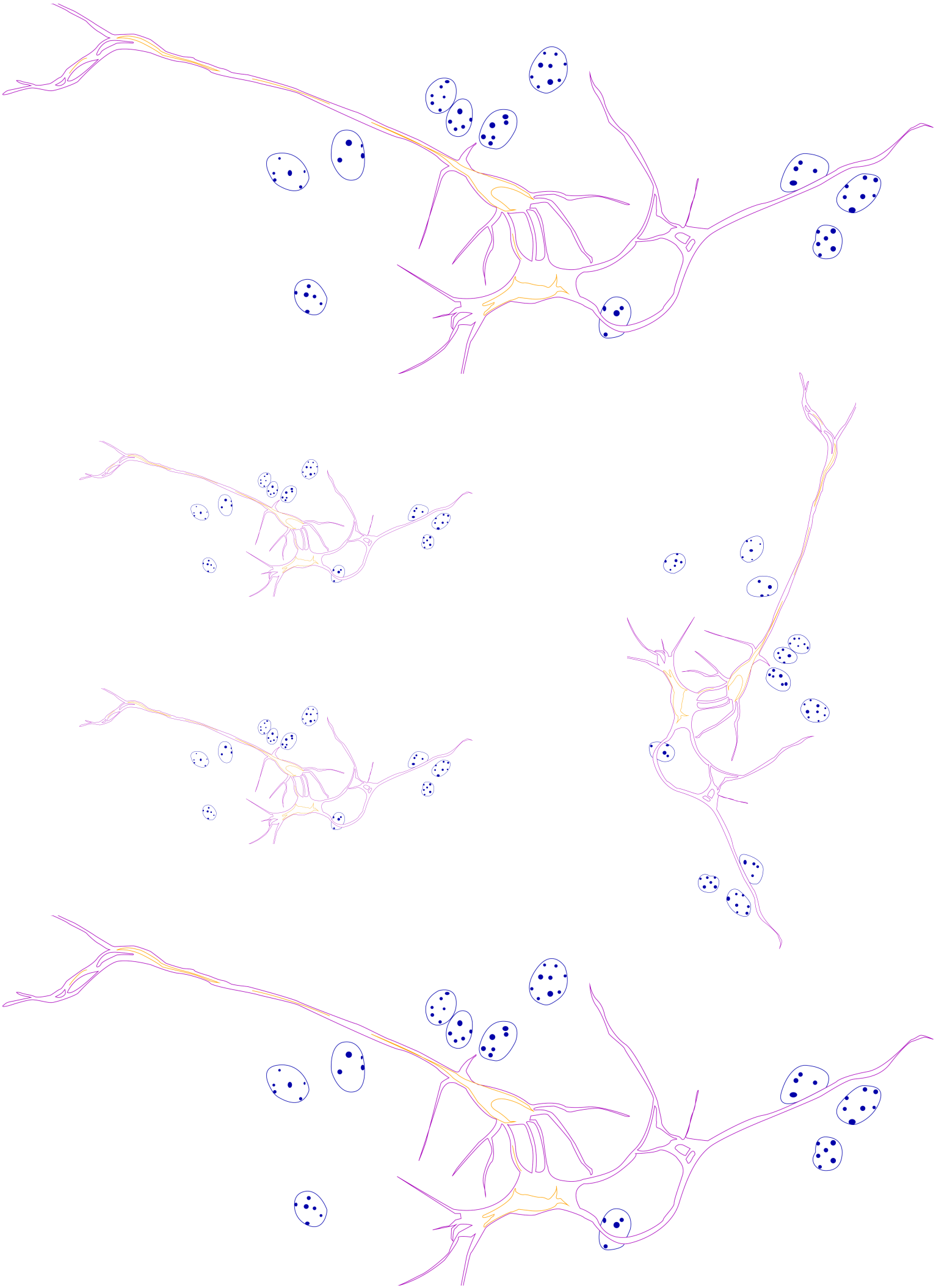
Bring needle up at 1, down at 2, then back up right next to 1 and down right next to 2. Place stitches closely together to fill in area. Be sure the thread lays flat & without any twisting to produce a smooth look.

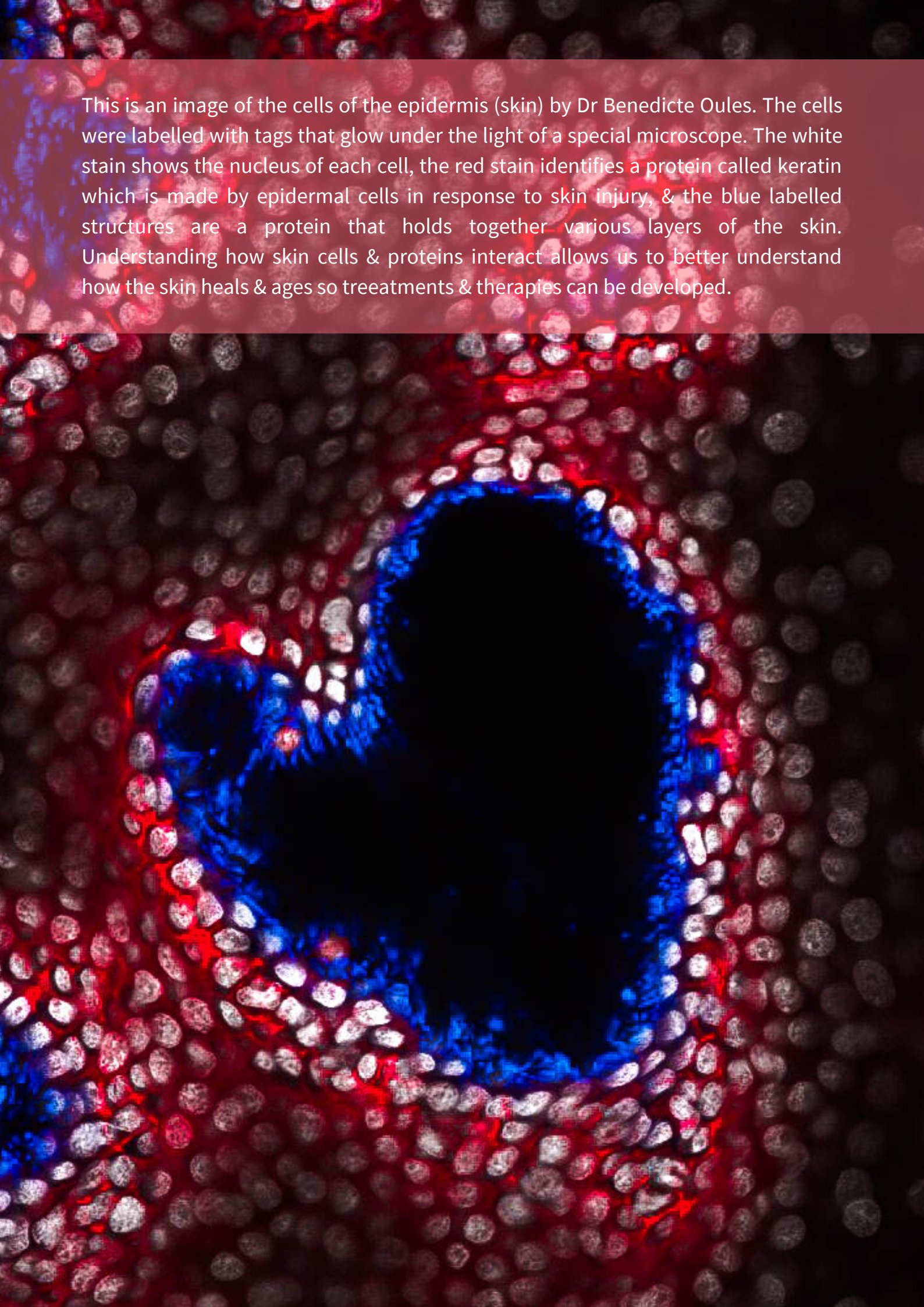
Templates

We've included our most popular research image templates used by participants in our Stitch 'n Stem embroidery workshop.There's event differ image sizes for you to choose from! Pick your favourite & print it out, either onto adhesive transfer embroidery paper, or on normal paper to trace the design on to your fabric as described above.

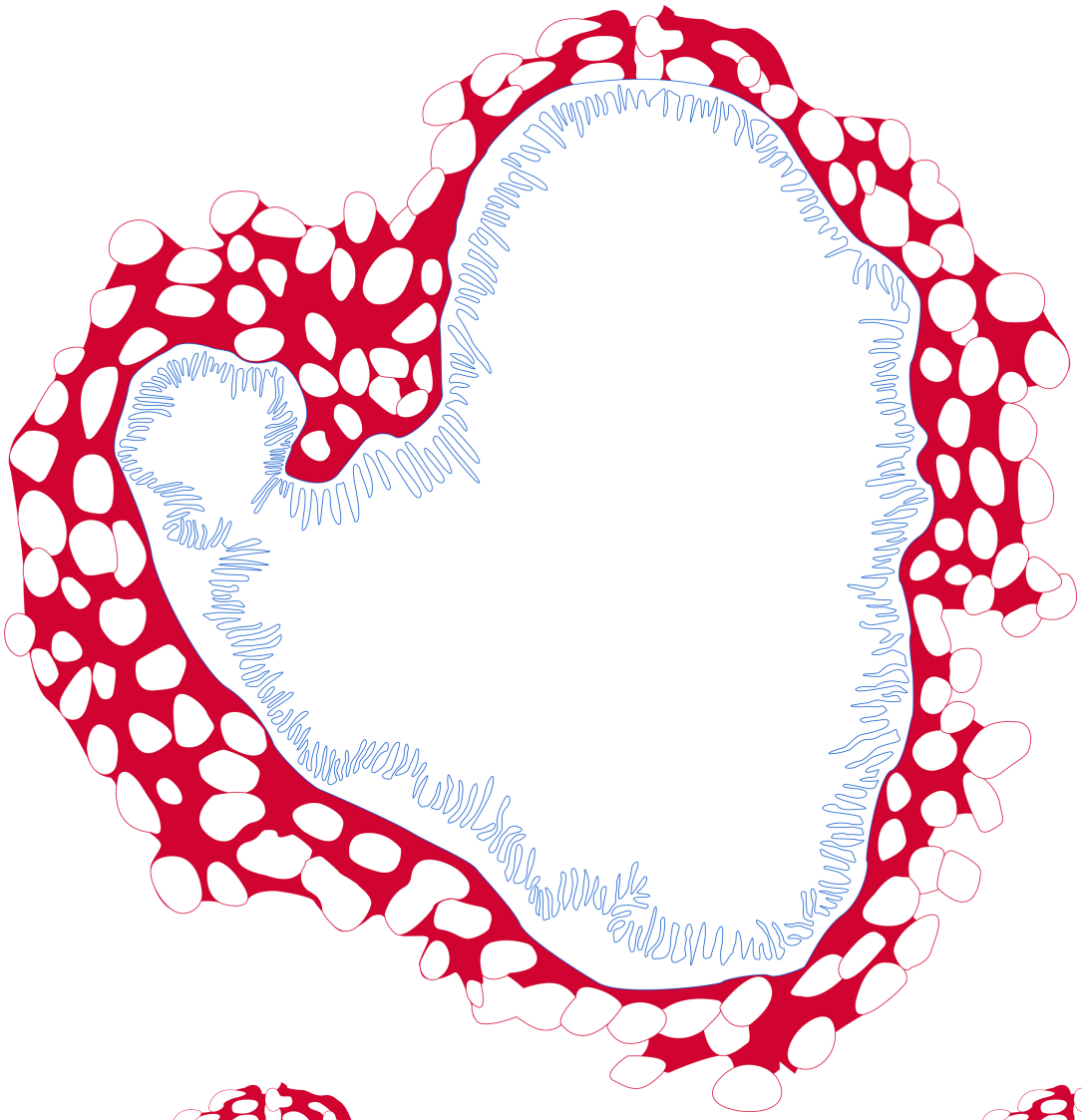


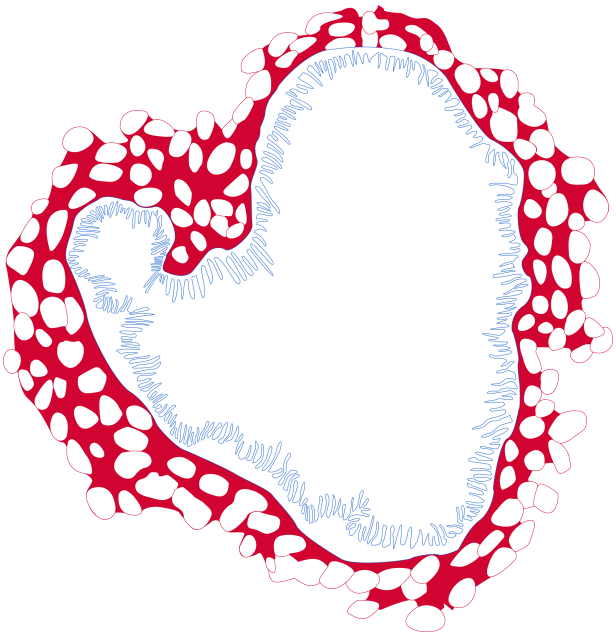
This image is by PhD student Ieva Berzanskyte. She grew these nerve cells (neurons) from human embryonic stem cells. They have been stained to show that they are a specific type of nerve cell: interneurons. Interneurons act as the cell which communicates messages between sensory nerons (those that sense the outside world) & motor neurons (neurons that respond to senses & tell muscles to move). By growing these cells in the lab, she hopes they will one day be used to repair damaged nervous systems of patients with paralysis.

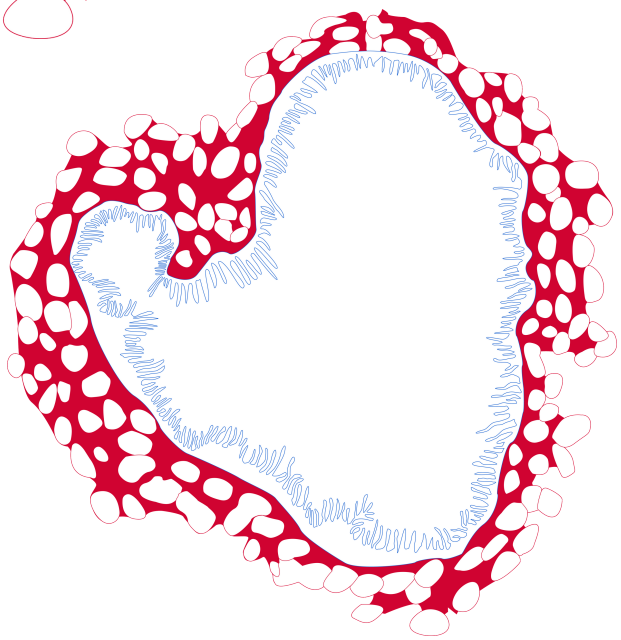


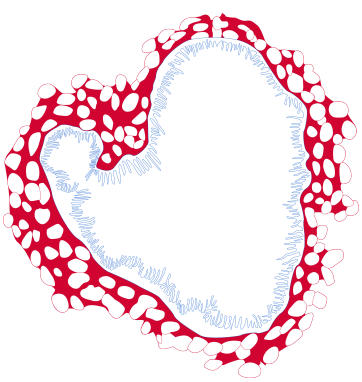


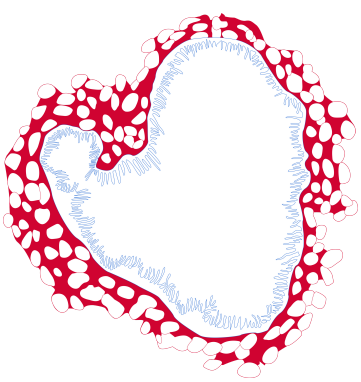
This is an image of the cells of the epidermis (skin) by Dr Benedicte Oules. The cells were labelled with tags that glow under the light of a special microscope. The white stain shows the nucleus of each cell, the red stain identifies a protein called keratin which is made by epidermal cells in response to skin injury, & the blue labelled structures are a protein that holds together various layers of the skin. Understanding how skin cells & proteins interact allows us to better understand how the skin heals & ages so treeatments & therapies can be developed.

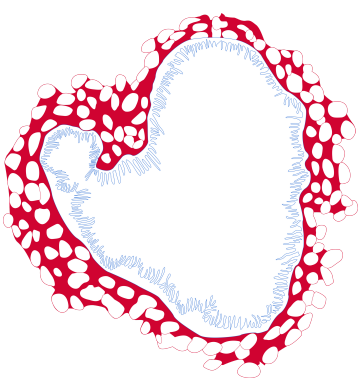


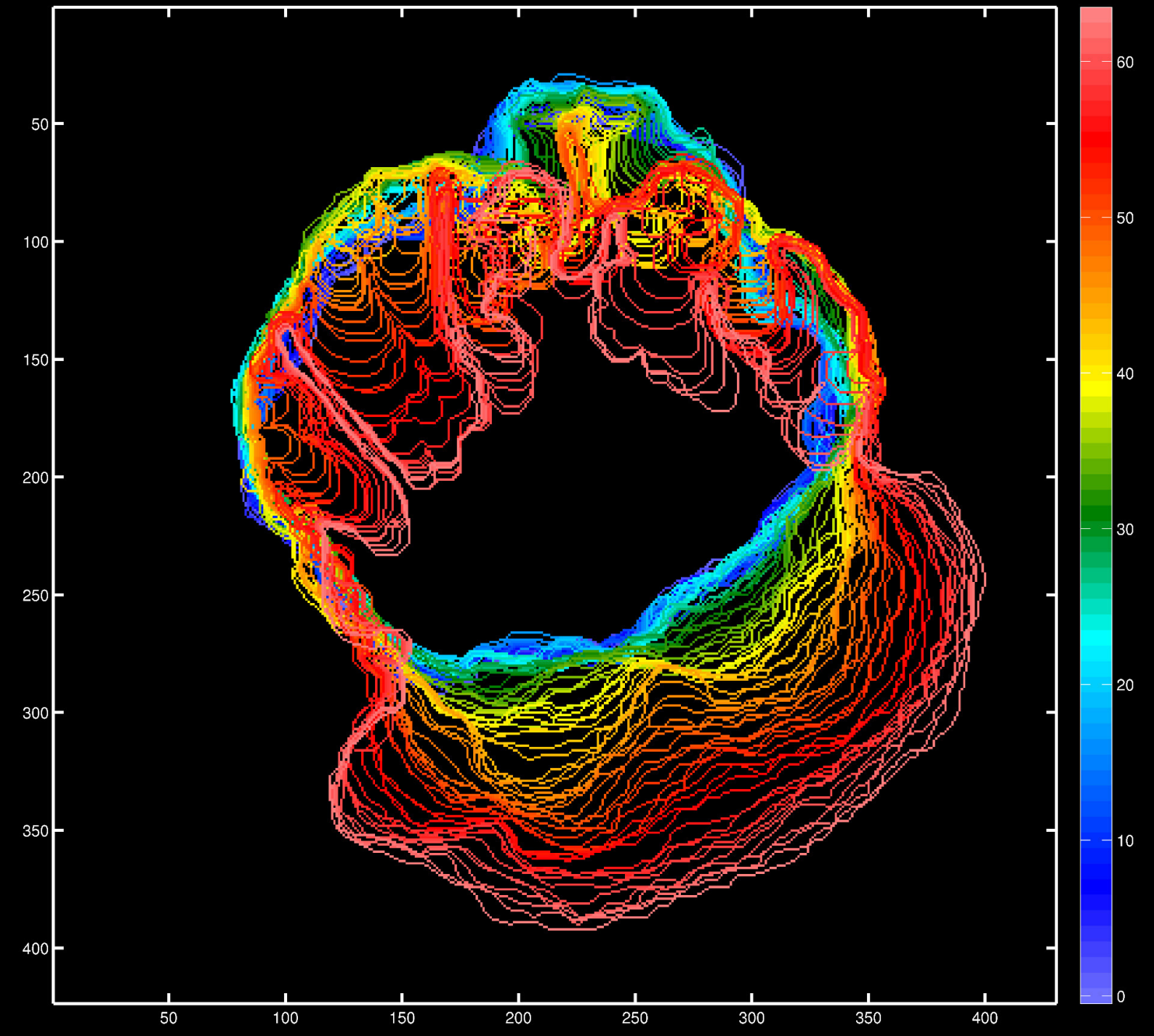




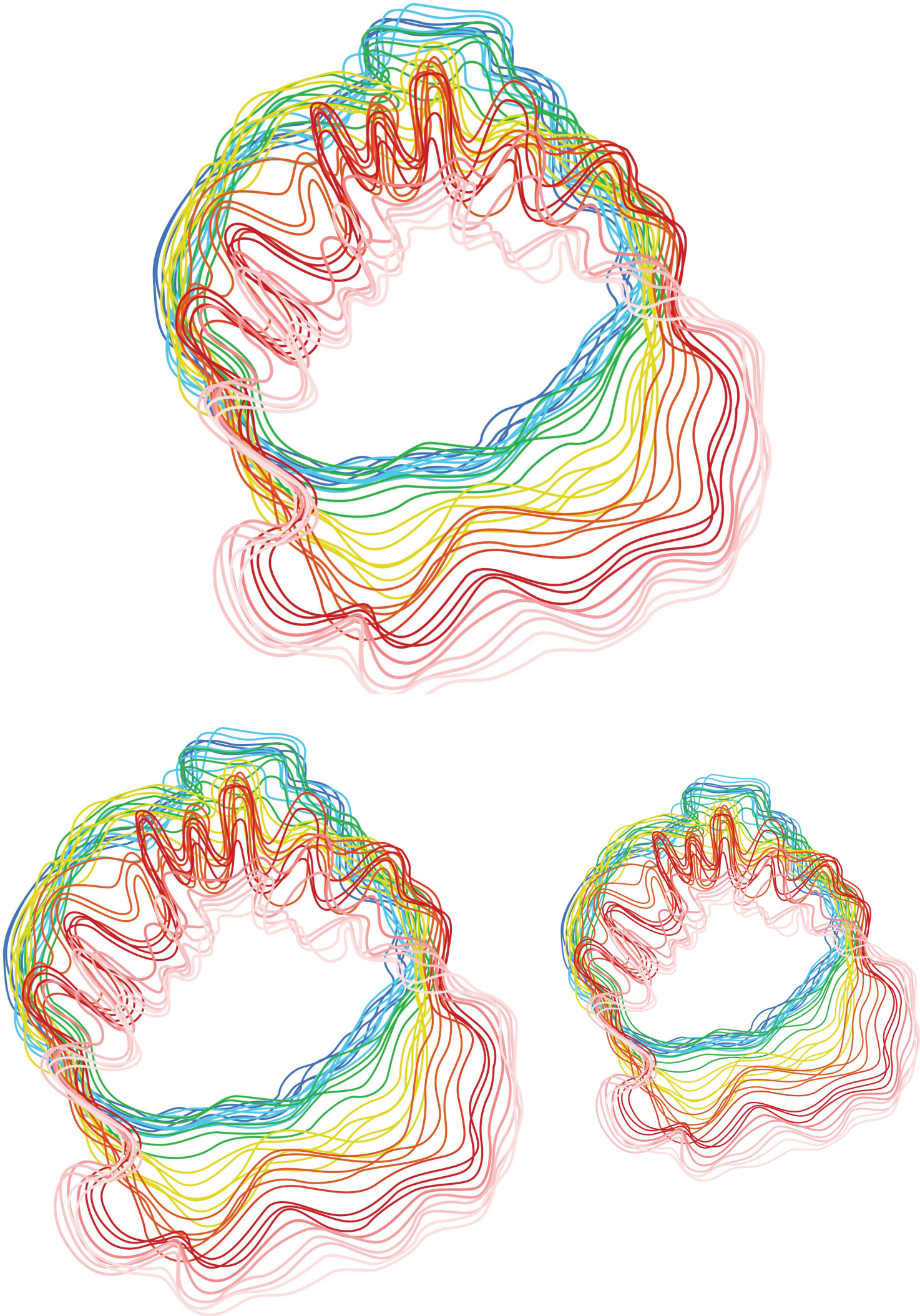




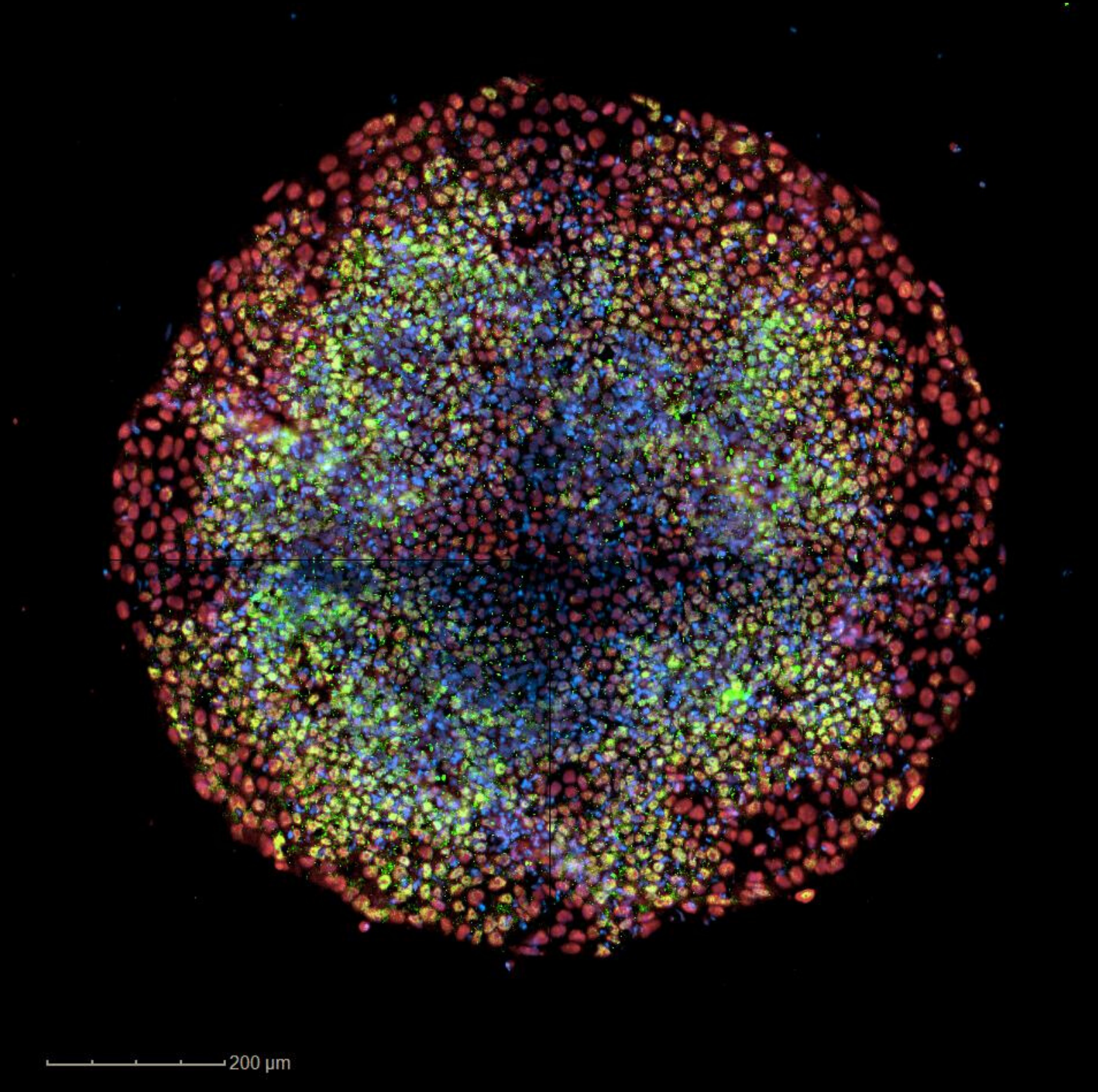


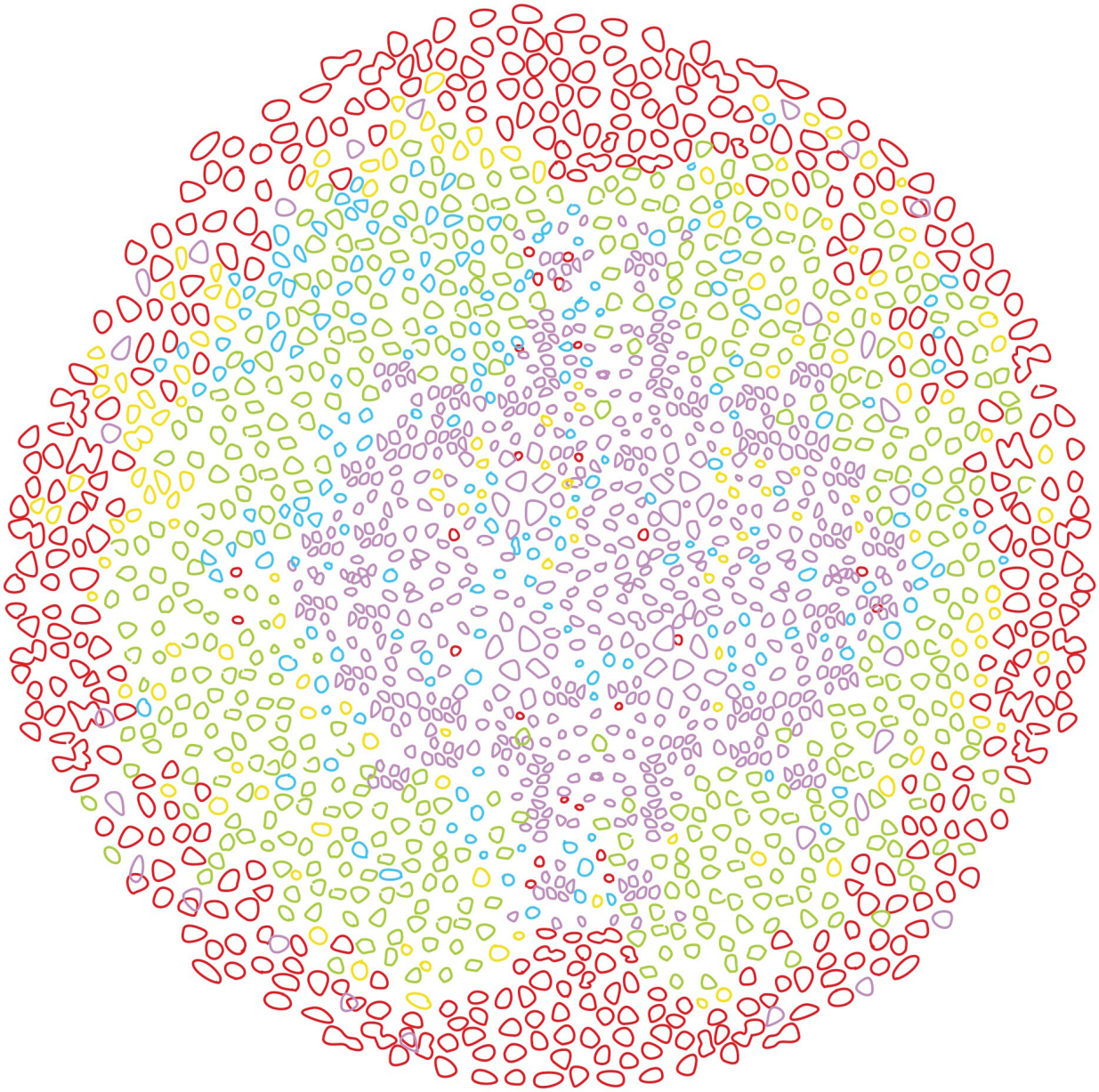


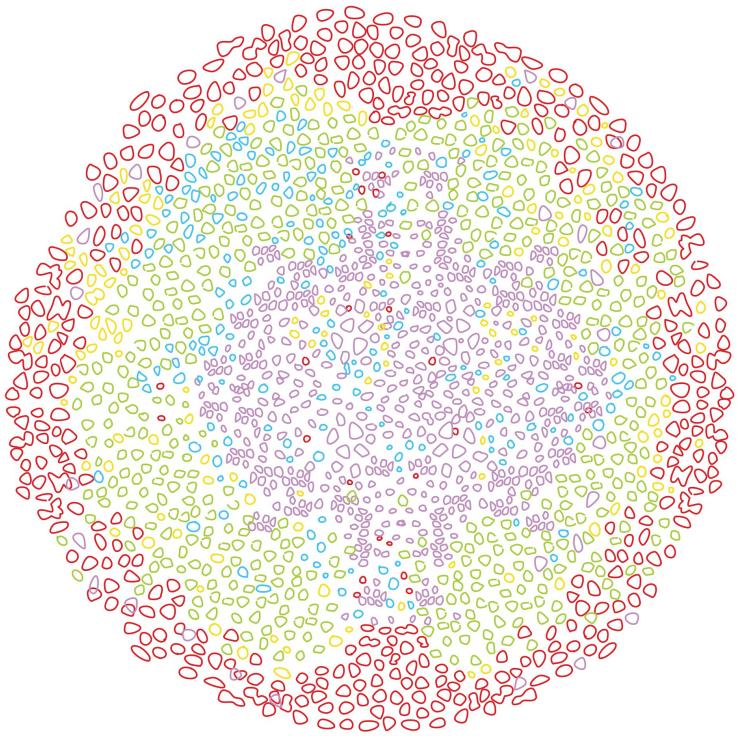
This image by Dr Alexis Lomakin shows the movement of a human skin stem cell responding to skin injury. Damaged skin cells send chemical signals to skin stem cells which initiates their migration to the site of the injury to replace the damaged tissue. Alexis was able to record this behaviour using digital video cameras connected to a microscope looking at an individual human skin stem cell. The cell edge was tracked over time, & the outlines were used to measure how the cell shape changed in response to wound alarming signals. The cell edge outlines at different time points were overlapped & color-coded so that early time points are represented by cold colours (blue), & late time points by hot colours (red).

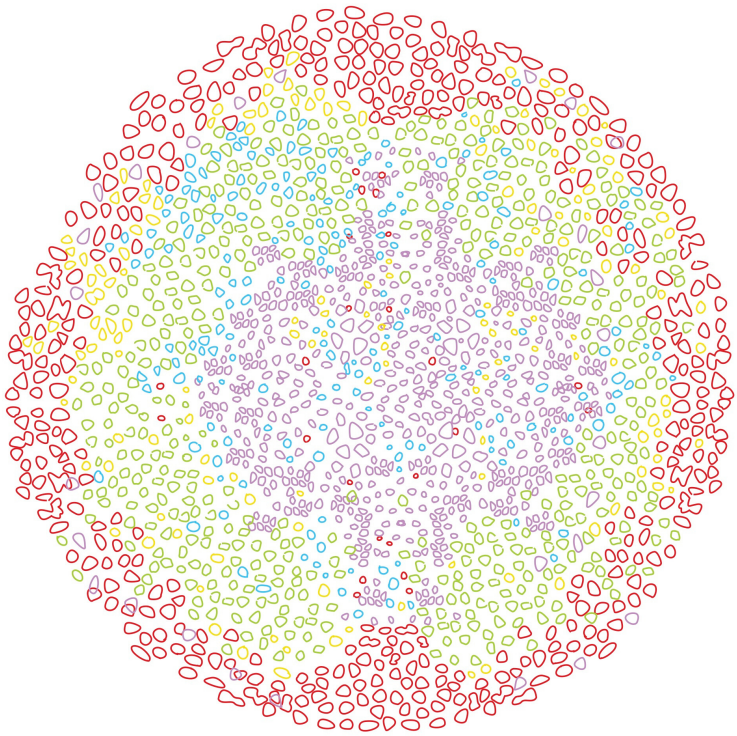


The below image is by PhD student Alice Vickers. The beautiful cluster of cells is called a gastruloid - an early stage of a developing embryo. To capture this, Alice used stem cells derived from donor tissue (induced pluripotent stem cells) & grew them in conditions to recreate human embryonic development. They were then stained to show the presence of proteins that are typically found in the three germ layers (endoderm, mesoderm & ectoderm), which are the first distinct cell types that come from stem cells in a developing embryo. Cells stained red are endodermal, & go on to form tissues such as the lung, lung & pancreas; the cells labelled green are mesodermal, which will form red blood cells & cardiac cells; & the blue colour labels the cell nuclei. These experiments allow us to understand how embryos develop after fertilisation.









Stitch 'n Stem

Thank you for downloading this DIY stem cell embroidery pack! We would love to hear from you about your projects! Don't forget to tag us in your social media posts with the #StitchnStem hashtag! Follow our accounts to find out when the next workshops at the Centre will take place. Get in touch If you have any questions about the images & to find out more about our research.

Facebook: @CSCRM
Twitter: @KCLStemCells
Instagram: @KCLStemCells
Email contact: Jessica.Sells@kcl.ac.uk
Website: https://www.kcl.ac.uk/bmb/our-departments/centre-for-stem-cells-regenerative-medicine