Cytoplasm

- The cytoplasm is often called the space inside the cell, but its actually packed full of interesting things - more like a soup!

- Lots of other cell parts (known as organelles) are found inside the cytoplasm, including ribosomes, vesicles and mitochondria.

- Also packed inside the cytoplasm is the ‘cytoskeleton’ - a network of tiny fibres that link together to help the cell keep its shape.

- The shape of a cell depends on what it is used for - our crochet cell represents a skin cell, which is rectangle shaped, so that it can fit together in a line with other skin cells and form a protective layer.

- The network of cytoskeleton fibres is also important for lots of other things, including sensing the cell’s environment, moving the cell around, guiding brain cells to connect with each other, and healing wounds.
In my lab we are working to understand how the cytoskeleton shapes the cell. We look at actin filaments, one part of the network of tiny fibres that makes up the cytoskeleton. They can bundle together and push on the cell membrane. An example of this is when cells send out ‘spikes’ from their surface, known as filopodia. When cells move, filopodia can act like antennae, sensing where to go and leading the cell in a specific direction.

Understanding how actin and filopodia work is important because some diseases can hijack filopodia for their own purposes. For example, viruses can use filopodia to enter cells, and cancer cells can use filopodia to move around, which makes the cancer spread.

We have developed a technique that allows us to grow filopodia on a glass dish outside the cell. To do this we harvest cytoplasm from frog eggs and make the bundles of actin filaments light up using fluorescent dyes. We use this technique to help us understand how filopodia grow. Watch Jenny’s research video or take a look at our website to find out more!

Meet the Researcher
Jenny Gallop - Gallop Lab

Photograph of filopodia growing on a glass plate

Crochet Your Own Cell!

Join us and stitch along to make your very own crochet cell! Each installation of Stitching Science will include instructions to make a different part of the cell - known as organelles. We’ll also let you know a bit about what each ‘organelle’ does, and some of the cutting-edge research that scientists are doing to find out more about how cells work. Join our mailing list, Facebook group or Ravelry group to keep up to date with patterns, share your creations and chat to like-minded crafters and scientists.

Happy Crocheting!
Stephanie Norwood, Creator of Stitching Science

Instructions Part 1: Cytoplasm

Follow our quick guide if you are familiar with UK crochet terms. Otherwise, follow our illustrated instructions below.

QUICK GUIDE
Make a rectangle 20 x 40 dc stitches. All terms are UK crochet terms.
Row 1: ch 20, ch 1 to turn
Row 2: dc 20 starting in second stitch from hook, ch 1 to turn
Row 3-40: (dc 20 starting in first double crochet, ch 1) x38, finish off

1. START BY MAKING A SLIP KNOT

<table>
<thead>
<tr>
<th>TAIL END</th>
<th>WORKING END</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make a loop about 10cm from the tail end (loose end) of the yarn</td>
<td>Pull the tail end through the loop to make a second loop</td>
</tr>
<tr>
<td>Place your crochet hook through the loop</td>
<td>Tighten by pulling on both ends</td>
</tr>
</tbody>
</table>

©️©️©️ Stitching Science by Stephanie Norwood is licenced under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International Licence
2. HOLD THE HOOK AND YARN READY TO START

Hold the slip knot between the thumb and index finger of your left hand. Let the tail end hang down and loop the working end over your index and middle fingers, under your ring finger, and over your little finger. Stretch out the yarn between your index and middle fingers. Keep tension in this part of the yarn as this is the part you will hook. Hold the hook in your right hand, gripping the flat part with your thumb and index finger.

3. MAKE TWENTY ONE CHAIN STITCHES (ch 21)

Move your hook from left to right under the yarn stretched between your index and middle fingers. This is known as yarn over (yo). Pull the hook down, grabbing the yarn and pulling it through the loop on your hook. Repeat twenty times.

4. MAKE TWENTY DOUBLE CROCHET STITCHES STARTING IN THE SECOND STITCH FROM THE HOOK (dc 20)

Put your hook through the top loop of the second stitch from the hook (green). You will now have two loops on your hook. Yarn over (as in Step 3). Pull the yarn through the first loop on the hook. You will now have two loops on your hook again. Yarn over again and, this time, pull through both loops on your hook. You will be left with one loop on your hook.

This completes one double crochet (dc). Repeat this nineteen times, working back along the chain that you made in Step 3.
5. MAKE ONE CHAIN STITCH TO TURN (ch 1)

At the end of the row, repeat Step 3 to make one chain stitch (green). This stitch is added to allow space to turn. Then flip the fabric over ready to start the next round.

6. MAKE TWENTY DOUBLE CROCHET STITCHES STARTING IN THE SECOND STITCH FROM THE HOOK, THEN ONE CHAIN STITCH TO TURN (dc 20, ch 1)

After the first round, double crochets are worked in both loops of the stitch. Starting in the second stitch from the hook (green), put your hook through both loops of the stitch. You will now have three loops on your hook.

Yarn over and pull through the first two loops on the hook. You will now have two loops on your hook.

Yarn over again and pull through the next two loops (green). You will now have one loop left on your hook. This completes the double crochet.

Repeat nineteen times, to reach the end of the row, then make one chain stitch to turn.

7. REPEAT TWENTY DOUBLE CROCHET, ONE CHAIN STITCH PATTERN THIRTY EIGHT TIMES ((dc 20, ch 1) x38)

Repeat Steps 5 and 6 thirty-eight times, flipping the work over after each chain stitch. Don’t worry if you lose count, the aim is to make the fabric approximately twice as long as it is wide. Omit the final chain stitch.

8. FINISH OFF

To finish off, pull the hook away from the fabric to make the loop on the hook much larger. Cut the working end of the yarn, leaving about 5cm spare, then pull this end through the loop.

Pull on the end to tighten the loop and make a knot. Use your hook to weave the loose ends into the fabric then cut.

Congratulations! You have completed your cytoplasm!

Sign up to our mailing list to keep up to date with new patterns: bit.ly/stitching-science

and share your creations with us on social media:  

Stitching Science by Stephanie Norwood is licenced under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International Licence