The Royal College of Pathologists
Pathology: the science behind the cure

Explainer Sheet

Who are 'Discovering cells' resources for?

We have developed new resources to inspire people of all ages to learn about the building blocks of our body: cells. This may be useful if you want to learn for yourself, to teach others (KS3, GCSE or A-level), or if you are a patient wanting to understand more.

What are cells?

Our body is made of cells which is the basic unit of all life. We are made of trillions of cells. Robert Hooke first drew cells which he saw through a microscope in 1665. He noticed tiny 'rooms' in a piece of cork which he thought looked like monks' rooms or 'cells'. Since then scientists have learnt about the astonishing complexity and beauty of cells.

'Discovering cells' resources

First, you will be taken on a journey to learn about the components of cells and compare a human and plant cell. Second, you will consider what can go wrong with cancer cells. Third, you will see drawings of different cells in the body to scale relative to each other to colour in. Fourth, you will fold yourself a DNA helix model based on the genetic material found inside the cells of your body. Resources are accompanied by colourful microscope images to inspire colouring-in. There are accompanying films with demonstrations of the activities and interviews with pathologists and clinical scientists about the relevance of cells. You can also watch films and read about the remarkable Robert Hooke.

How to use 'origami cell'

This resource consists of 2 pages to print. You will learn about the components, colour them in and make a 3D view looking into a cell. We also have supporting films showing how to *fold the cell*. At a tiny scale, cells in our body lack colour (red blood cells are an exception) so dyes are needed to see different parts down a microscope. While colouring you can listen to a pathologist *talking about cells* and *how they became a pathologist*.

How big is a cell?

It depends on the type of cell. They are generally tiny and can only be seen with a microscope. The origami cell is based on a human cheek and plant palisade cells which measure around 70 micrometers (around the width of a human hair). A red blood cell is much smaller measuring a tenth of this diameter (7-8 micrometers).

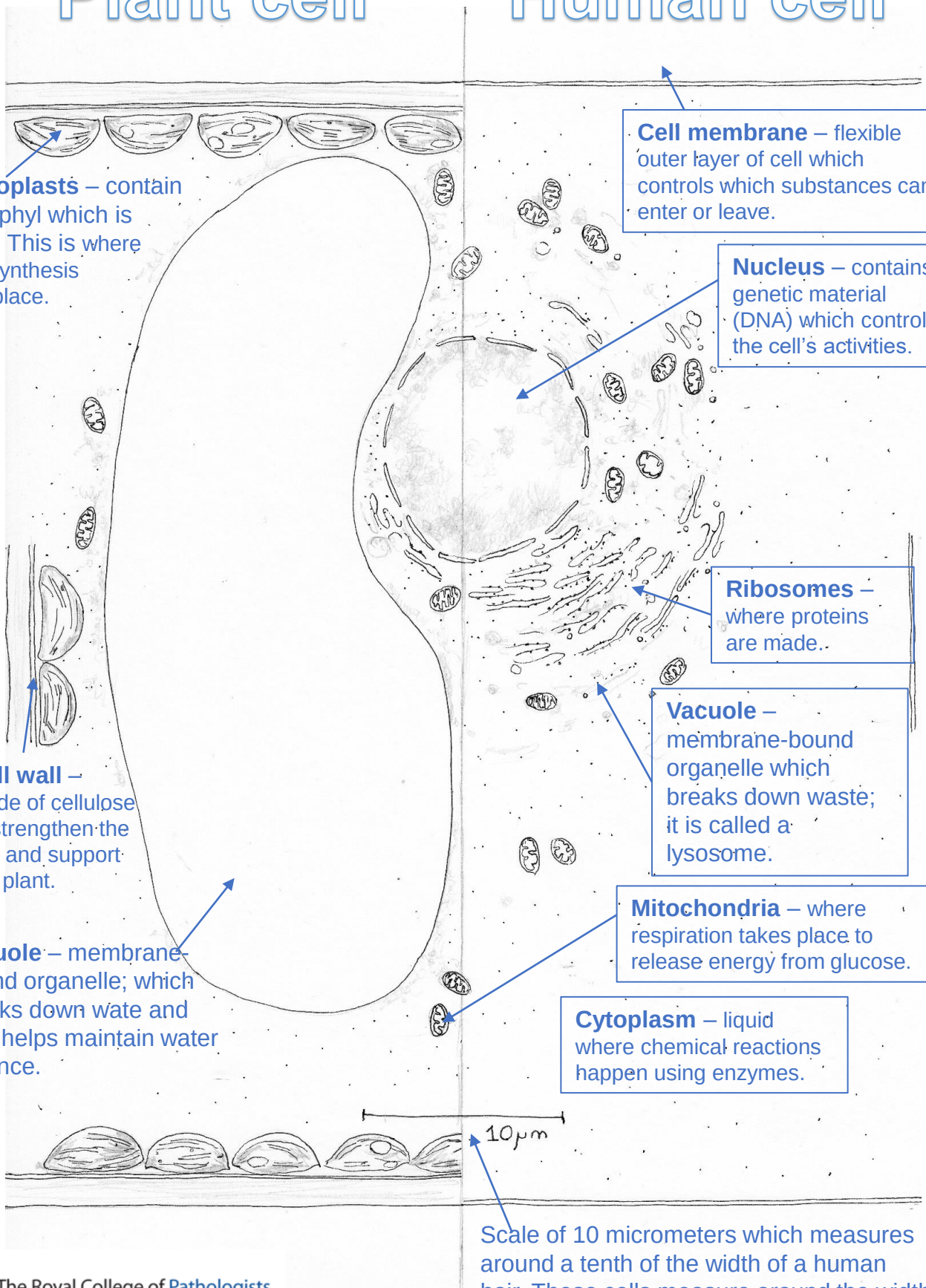
History of cells – Robert Hooke

Take a look at *films with an historian* explaining how microscopes started a revolution in the way we see the world in the 1660s. Find a short quiz of Robert Hooke's remarkable drawings and guess what they reveal at rcpath.org.discoveringcells.

The ‘origami cell’ is unlabelled for students to guess the components. This explainer sheet gives some answers! BBC Bitesize gives a good guide for cell components and students could be encouraged to take a look online or in a text book to identify the parts.

Plant cell

Human cell



Chloroplasts – contain chlorophyl which is green. This is where photosynthesis takes place.

Cell membrane – flexible outer layer of cell which controls which substances can enter or leave.

Nucleus – contains genetic material (DNA) which controls the cell’s activities.

Ribosomes – where proteins are made..

Vacuole – membrane-bound organelle which breaks down waste; it is called a lysosome.

Cell wall – made of cellulose to strengthen the cell and support the plant.

Vacuole – membrane-bound organelle; which breaks down wate and also helps maintain water balance.

Mitochondria – where respiration takes place to release energy from glucose.

Cytoplasm – liquid where chemical reactions happen using enzymes.

Scale of 10 micrometers which measures around a tenth of the width of a human hair. These cells measure around the width of a human hair.