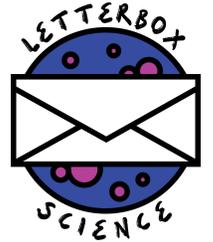


If I were a  
biologist...

# Introduction

## LETTERBOX SCIENCE



Letterbox Science is a project aiming to engage people of all ages and backgrounds with the work going on in our labs at the Gurdon Institute. The project is the work of two PhD students, Anna Klucnika and Eleanor McCartney, both of whom completed their PhD as part of the Ma lab group.

They wanted to address an inequality in the way that we engage people with research, often relying on digital and online resources to reach people. They hoped that, by creating something that is remote but non-digital, they would be able to reach new audiences and bring more voices into the conversation around research.

In order to do this, Anna, Eleanor and the institute Public Engagement Team created three postcards themed around the work done by our researchers, and beautifully illustrated by artist Ellie Shipman.

# TARGETING SCHOOLS



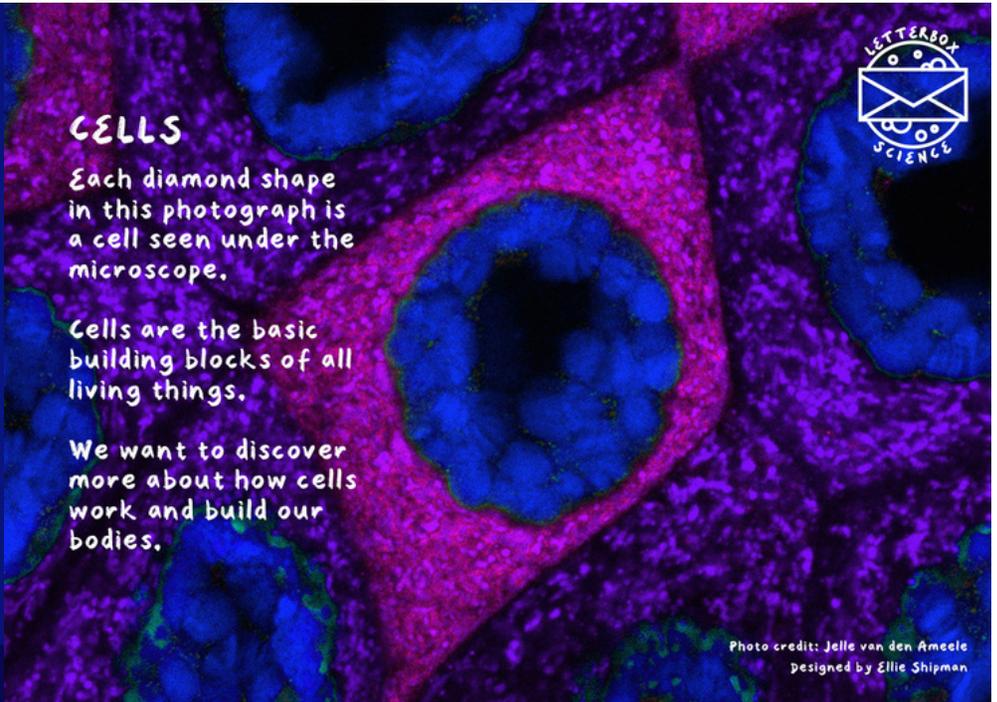
## WIDENING PARTICIPATION & INSPIRING THE NEXT GENERATION

The Letterbox Science project team were keen to target this project at schools that met some of the institute's Public Engagement Widening Participation criteria. The advertisement mainly focused on state schools (schools where students are not required to pay fees) that are situated in areas of high deprivation according to the [Indices of Multiple Deprivation](#).

While the activity is be suitable for people of any age, and therefore any school class, the team decided to target Key Stage 2 students. At this age (typically aged 7-11), children have covered enough scientific concepts in the school curriculum that they would be able to make sense of the artwork featured, and old enough to begin questioning and investigating the world around them. We thought that this age group were perfect to trial the activities, and their responses were even more insightful, inquisitive and inspiring than we had thought they would be

insightful    inquisitive    inspiring

# Postcard A: Cells



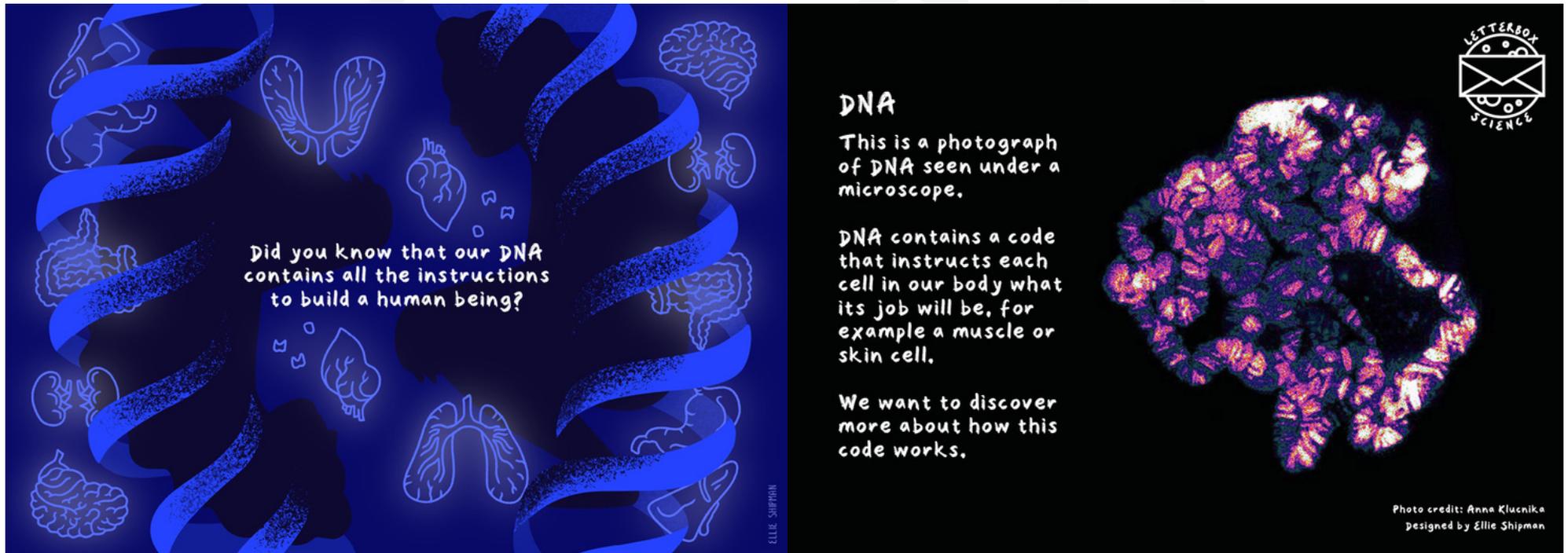
Text reads: Side 1: Did you know that our bodies are made of trillions of tiny cells? Side 2: Cells Each diamond shape in this photograph is a cell seen under the microscope. Cells are the basic building blocks of all living things. We want to discover more about how cells work and build our bodies.

# Postcard B: Mitochondria

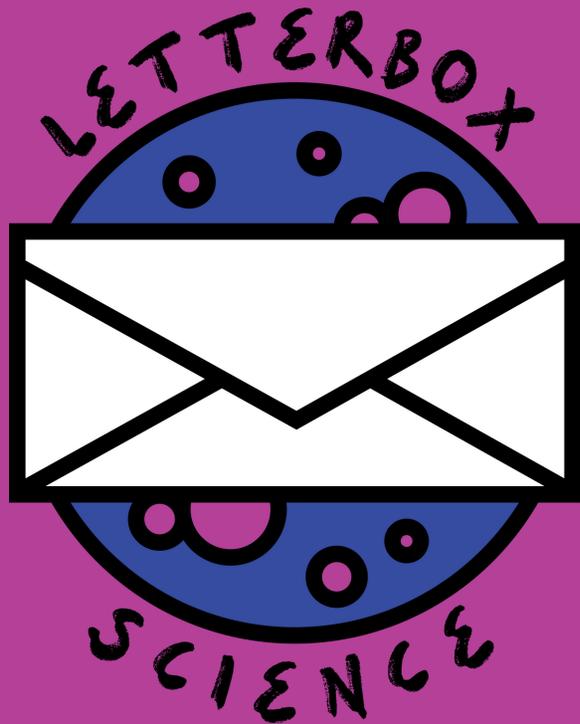


Text reads: Side 1: Did you know that the mitochondria in our bodies provide us with energy? Side 2: MITOCHONDRIA The tubes in this photograph are mitochondria seen under a microscope. Mitochondria are like tiny factories that produce energy from the food we eat. We want to discover more about how mitochondria can power our bodies.

# Postcard C: DNA



Text reads: Side 1: Did you know that our DNA contains all the instructions to build a human being? Side 2: DNA This is a photograph of DNA seen under a microscope. DNA contains a code that instructs each cell in our body what its job will be, for example a muscle or skin cell. We want to discover more about how this code works.



# School Responses

Key Stage 2: Age 7 - 11



# Human Body

If I were a biologist, I would discover...

"Human body, because it could give me some things to think about my self."

- Oren

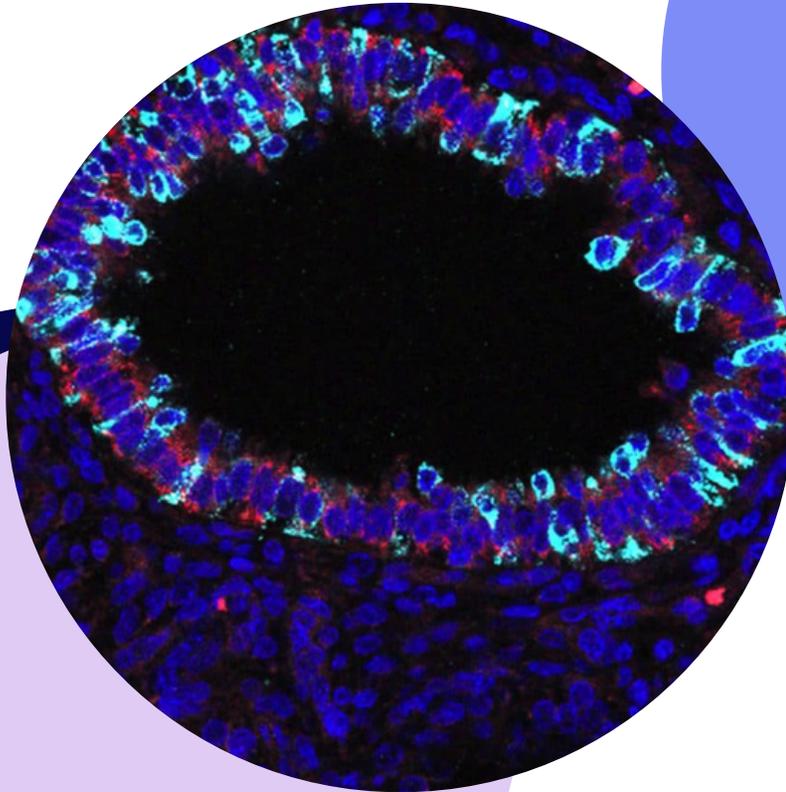


Photo: (right) Emma Rawlins, Gurdon Institute Senior Group Leader. The Rawlins lab group explore how stem cells build and maintain the lungs, with a longer-term aim of directing endogenous lung cells to repair, or regenerate, diseased tissue. Photo (left) 17-weeks-gestation human embryonic lung, credit: Dr Kyungtae Lim.

# Health and Disease



If I were a biologist, I would discover...

I would like to have a cure for all illnesses and diseases.

- Viktorija

About disease and how do they come.

-Aiden

Medicine for diseases, how viruses attack cells.

- Shradheya

How virus grows and affects living things.

- Effa

A way to help sick and seriously ill animals immediately.

- Ralph

More things about bacteria so we can find a cure for the illnesses they make.

- Alejandro

Cures for things like a disease like Covid or the flu or tummy bug. I would look as cells under a microscope and try to figure out why people's cells go poorly or get a disease.

- Lilly-May

# Health and Disease

I would like to help people by  
looking at cells under a  
microscope to find a cure for  
a disease.

- Jasmine



We have a dedicated imaging team on site at the Gurdon Institute who work to help our researchers solve problems and answer questions using innovative microscopy techniques (pictured: Edward Allgeyer, Senior Research Associate).

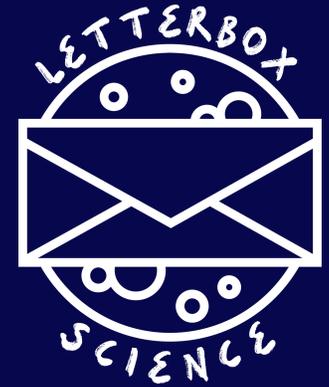
# Health and Disease

If I were a biologist, I would discover... cures to diseases because thousands of people suffer from illnesses and I think that needs to be fixed. Also, animals need to be cured as well to stop them from going extinct.



Text reads: If I were a biologist, I would discover... cures to diseases because thousands of people suffer from illnesses and I think that needs to be fixed. Also, animals need to be cured as well to stop them from going extinct.

# Health and Disease



I would like to help people by looking at cells under a microscope to find a cure for a disease.  
- Jasmine

Why people were born with no limbs and why healthy cells turn into bad cells and why the bats caused coronavirus.  
- Hubert

...cells because it can help stop viruses. If you put a virus in a body we can see how the cells can react. And you can see the parts of the cells and how they go wrong.  
- Aiden

How people get diseases like deafness, blindness and cancer. I want to know how your lungs turn black when you blow cigarettes.  
- Fathima

A way to stop cells getting diseases and becoming unhealthy. I would also like to study plants and stop them from dying from diseases.  
- Frida

...animals like the life cycle and more especially curing people. I like healing people. Thank you for teaching you are all wonderful people.  
- Hannah

# Cancer Research

I would try to find a way to turn  
cancer cells into healthy cells on a large  
scale.

from No..h.  
.....



Photo: Steve Jackson, Head of Cancer Research UK laboratories and a group leader at the Gurdon Institute. Steve's research aims to characterise the cell biology and mechanisms and to identify ways to translate this knowledge to better understand and treat human diseases.

# Cancer Research



*If I were a biologist, I would discover...*

...a cure cancer. This would be so that people who have cancer wouldn't have to have month of chemo therapy. Also this would be so that in America they don't have to pay for every time they have chemo therapy as they don't have anything like the NHS.

- Charli

How to create a better cure for brain cancer because usually people who have this die very quickly and I would like to create a type of medication or treatment to prevent people from dying.

- Pauline

The cure for cancer. To stop cells from dying.

- Mala

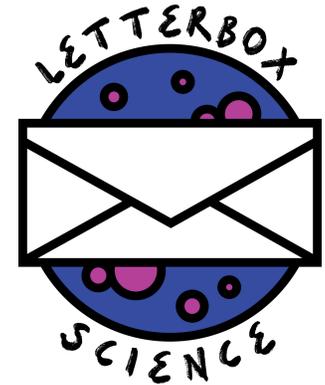
How to stop cancer cells from going bad and making people ill.

- Frances

A cure for sick animals or to stop cancer. I think it is quite interesting.

- Nessa

# Cancer Research



**If I were a biologist, I would discover...**

How to find the cure to cancer because lots of people have lost their lives because of cancer. Even though cancer has been in existence for a long time, it would be amazing if someone found the cure for it! I wanna be that person if I was a biologist.

-Deon



The cure to cancer because it kills millions of people a year around the world.

- Mark



Different cures for cancer or Alzheimer's. This is because these are the most common diseases meaning it kills the most.

- Branden

A cure for cancer and/or covid because less people would die and lose their friends/family.

- Julian

A cure for many sicknesses such as cancer. This is because so many people get this sickness and if there were a cure for this I think that it would make the world a better place.

- Ollie

# The Brain

If I were a biologist, I would discover... How  
Many brain cells someone has and  
what is in a brain cell.

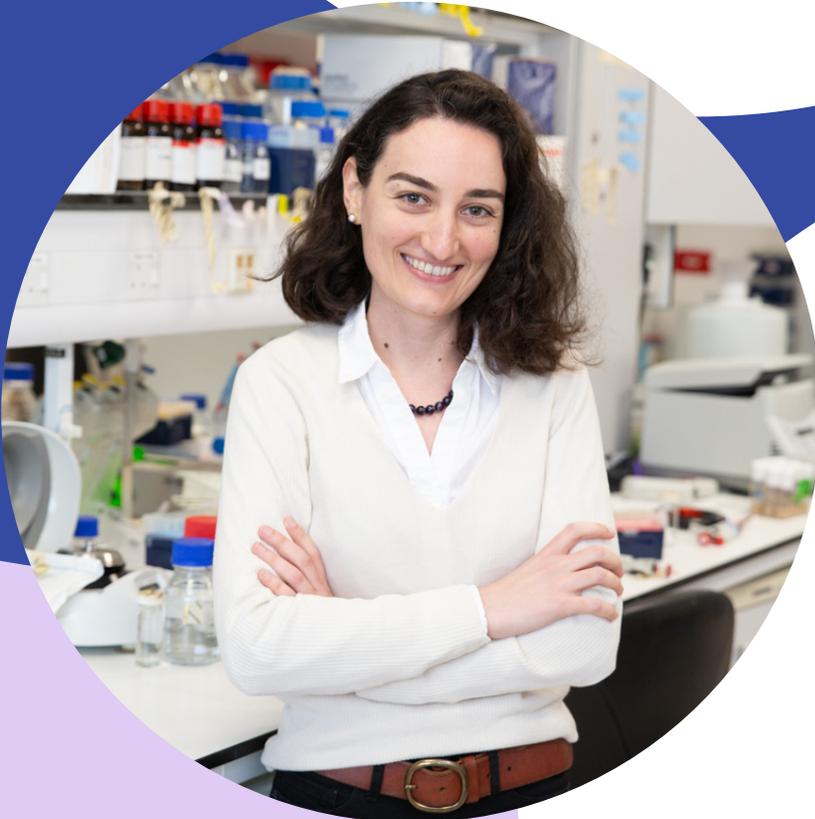


Photo (left): Sumru Bayin, Gurdon institute Group Leader. The Bayin lab group research molecular mechanisms that regulate stem cell behaviours and age-dependent regenerative mechanisms in the brain. One of the questions their group are investigating is whether they can facilitate regeneration in the brain.



# The Brain

## If I were a biologist, I would discover...

Brain cells because I find them interesting. I want to know more about what are in the cells and what they do. In my opinion, I don't want to be a biologist anyways.

- Harry

How an animal's brain cell would react when it is placed in another animal's brain. I would also attempt it on a more intelligent animal such as a dog. If it fails, then I would find out why.

- Kitty-mae

About the brain because I would like to know how the brain dies and somehow gets diseases. Additionally, I would like to know why the brain controls our bodies when it is at the top of our head.

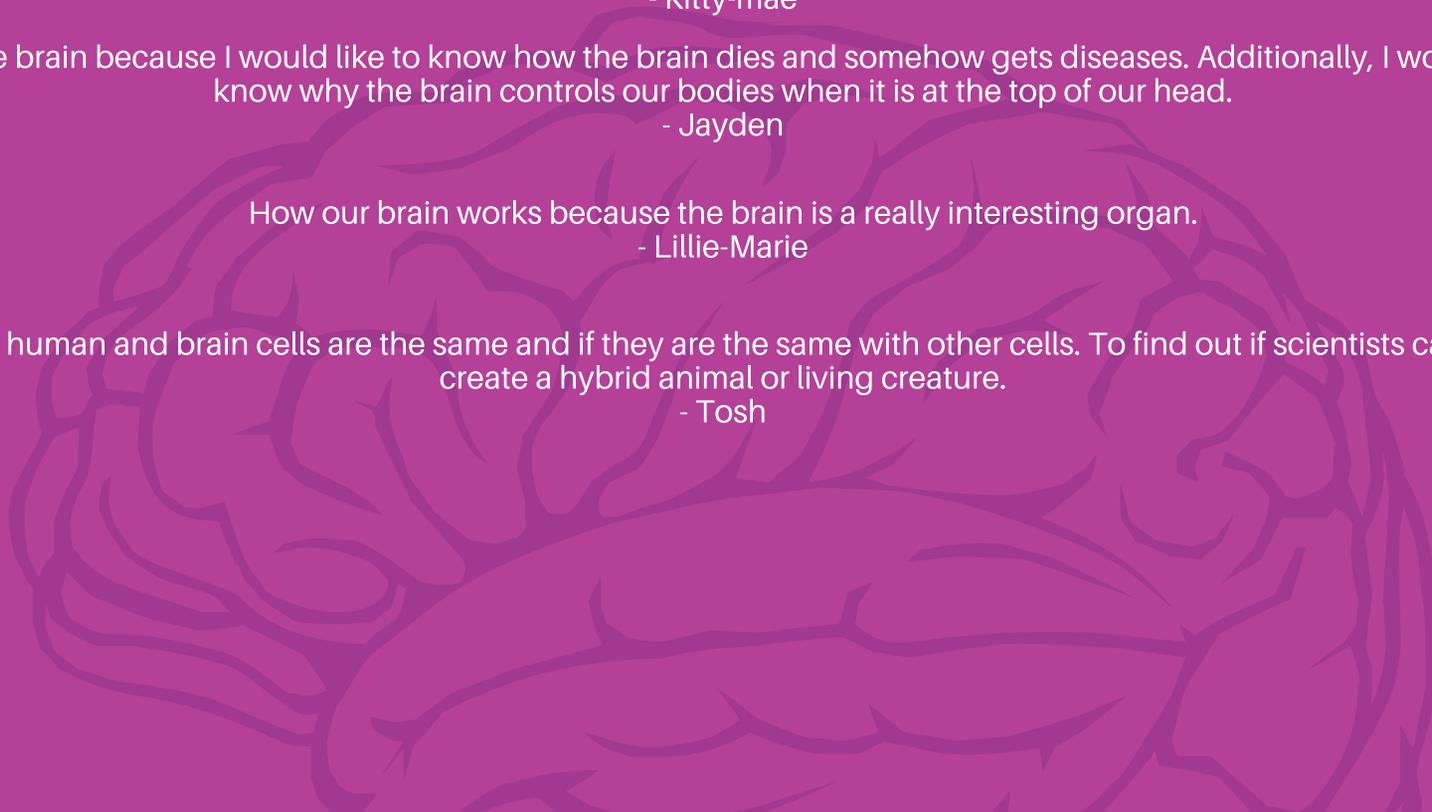
- Jayden

How our brain works because the brain is a really interesting organ.

- Lillie-Marie

If human and brain cells are the same and if they are the same with other cells. To find out if scientists can create a hybrid animal or living creature.

- Tosh



# Body and Physiology



Animal organs. I don't know about animal organs. I just want to explore about them. The second thing is about covid-19. I want to explore more and in detail about it. How it gets to your body and how it makes you sick?  
- Feslina

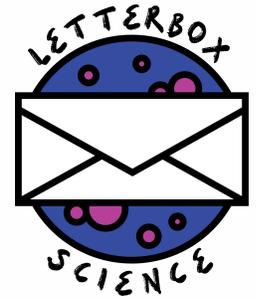
All of the body parts of the chemicals in the body like heart beat and discover the pain in the body.  
- Vishrut

I would discover bones and bodies because to find and learn different body parts and different bones.  
- Hooriy

How the chemicals work in our blood cells and discover how they react.  
- Sebastian

# Body and Physiology

If I were a biologist, I would discover... as a baby did we have less bones in our body? If so how did we end up with so many? I also want to know if a person who normally doesn't wear glasses, wears them for a long time will they get used to it?



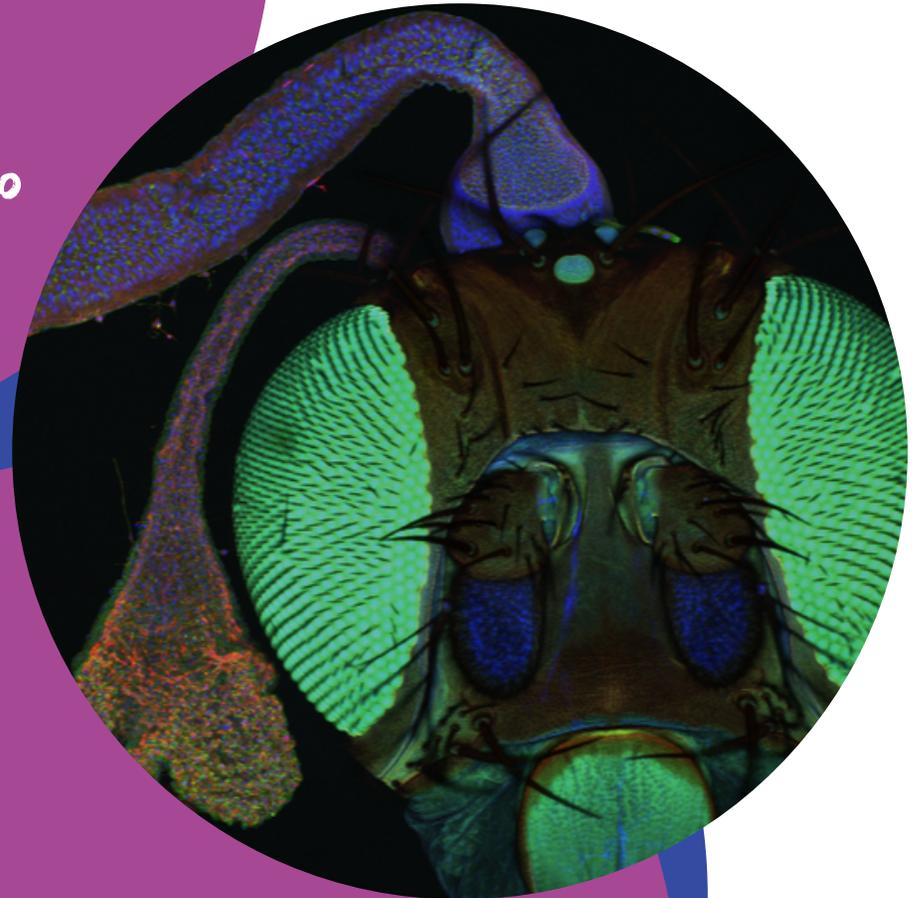
Text reads: If I were a biologist, I would discover... as a baby did we have less bones in our body? If so, how did we end up with so many? I also want to know if a person who normally doesn't wear glasses, wears them for a long time will they get used to it?

"Insects and look at  
their DNA and cells to  
see what it does."  
- Yaron

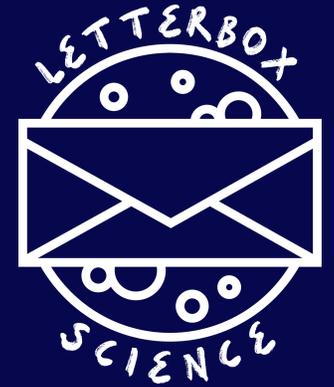
# Models



Photo (left): Daniel St Johnston, who's lab group are researching how cells know up from down (known as cell polarity) using the fruit fly as a model. They use special fluorescence microscopy techniques to view the cells in various fly organs to better understand how our own human cells determine which way is up and what happens when this process goes wrong. The loss of cell polarity is linked with the formation of certain tumour types. Photo (right) credit: Jia Chen.



# Disability



If I were a biologist, I would discover...

A cure for deafness

- Adam

How to cure others who have difficulties. Deafness (I got it) Sight (I got) Losing body parts.

- Atharv

How to heal deafness and discover why they are both like this.

- Luca

I would like to discover a vaccine and medicine to help deafness losing limbs and other things.

- Camille

How to cure blindness

- Jack

I would find out how to cure Tourette's syndrome

- Jasmine

How to make a cure for the blind.

- Shea

# Animals



If I were a biologist, I would discover...

...animals because I am interested in their body parts and how they are different or the same.

- Joe

About different animal species because I find them very interesting and very distinguished as there is a wide range of them. We can expand our knowledge on animals as they are very essential and there are still many vibrant ones waiting to be found.

- Saketh

About cells of an alligator snapping turtle because I found animals interesting.

- Christen

How a giraffe balances their body weight when running.

- Megan

New species because we get to find new breeds. Then, we'll have a close look at them.

- Saiguhan

A new big cat called a tryangled leopard – a leopard with triangles instead of spots.

- Thomas

# Understanding DNA

Why cells' DNA is only stored in the nucleus and why they turn bad.

- Sayuni

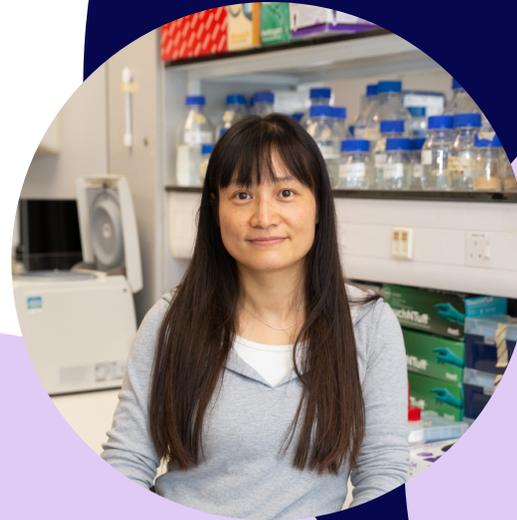
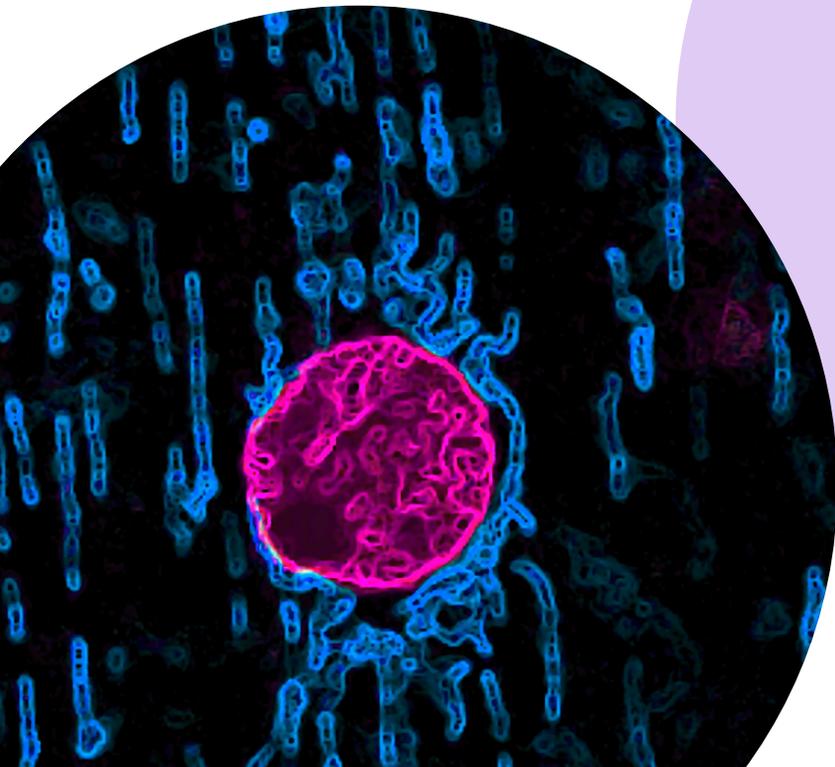


Photo (right): Hansong Ma, Gurdon Institute Group Leader. The Ma lab group research the DNA stored in our cells outside of the nucleus, specifically in the mitochondria. By studying mitochondrial DNA its associated mutations, we can better understand mitochondrial disorders in humans. (Left): microscopy image showing nuclear DNA (pink) and mitochondrial DNA (blue) - credit Andy Li



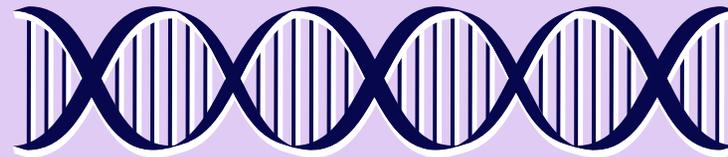


# Understanding DNA

If I were a biologist, I would discover...

About cells of the human body. I would also like to discover things to do with animals. In addition, I would mainly like to learn about the DNA.

- Layla



The DNA of animals and humans and of other things found in the world. Because *it's nice to learn new things.*

- Kyle

Animal DNA and dinosaurs

- Miles



# The Environment

If I were a biologist, I would discover...

Different flowers and animals, trees, body parts...  
- Ivy-Grace

How to make flying electrical car and how to make a medicine for covid 19  
- Saad

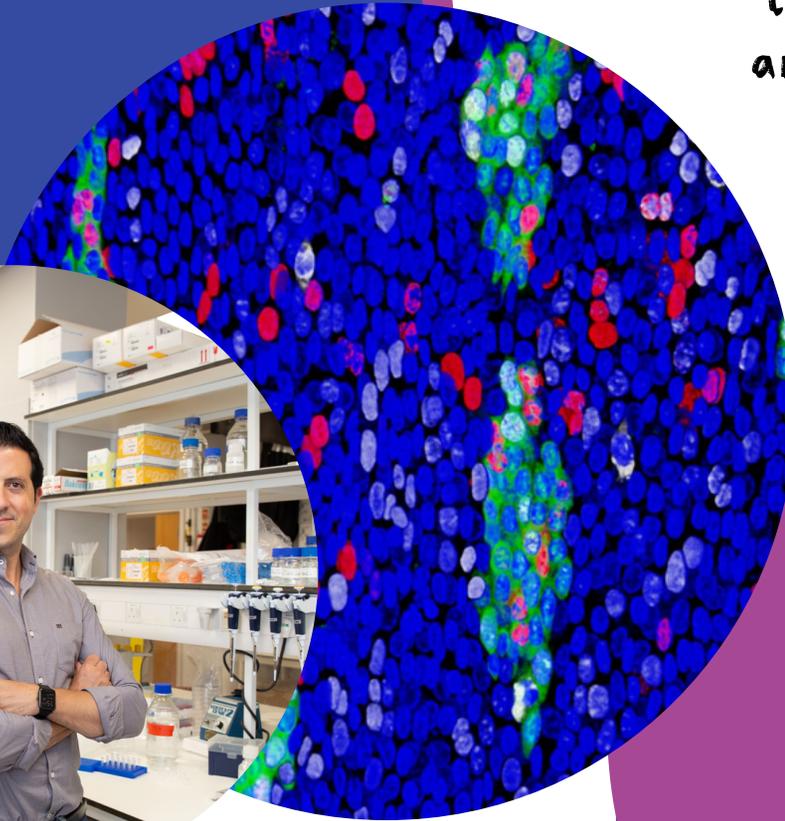
A new plant called ladosaurus and it's shaped like a dinosaur  
- Wiktor

A lot of massive deadly plants because the cells can be poisonous and I want to turn poisonous cells to healthy cells so the environment is clean.  
- Seb

# Cell Biology

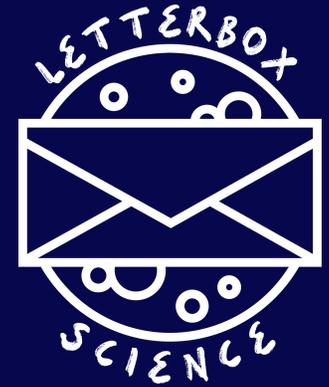
How good cells turn into bad cells. To investigate I will put the good cell into a capsule and grow it in a warm place,

- Takeshi



Researching how cells grow and develop is key to the work of many of our scientists, including the team in David Fernandez-Antoran's lab (pictured). They explore the effects of radiation on cell competition, clonal evolution and tissue dynamics and their relation to cancer development. Microscopy image (right) shows the fight for space during ionising radiation exposure.

# Cell Biology



## If I were a biologist, I would discover...

Body cells on ants because I want to know how many cells. Ants are my favourite animals and how many cells they have.

- Kayla

Cure for bad cells and discover how cells turn bad. I would discover how to cure deafness and other stuff.

- Aranya

What is the difference between plant cells and human cells like why it takes longer for plants to grow unlike a person growing.

- Luis

Plant cells since it would be cool to know what it going on inside different plants like flowers, grass and other types of plant like venus fly traps. It would help me see plants in a different way.

- Natasha

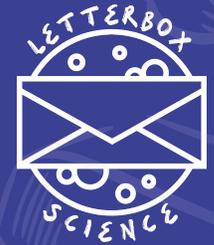
Why bodies have broken cells and what does it take to fix it.

- Ananya

What types of cells dinosaurs had and what they helped them with. I also want to find our if their cells are similar to their evolved form.

- Sohum

# Cell Biology



If I were a biologist, I would discover...

Cells because you get to look at cells with a microscope and you get to look at unhealthy and healthy cells to see what's wrong. Also, you get to test them so you can see what happens.

- Josh

Animal cells, dogs in particular because I have always liked dogs.

- Lola

Human cells to learn more about them. Furthermore, I would like to discover animal species cells.

- Kristopher

New cells in human and animal bodies which form our skin so that we can expand our knowledge on extinct animals and how they would live in their habitat.

- Joel

Cells to discover different kinds of cells, and if they have a disease it will be interesting. Experiment how they will get better. I want to figure out how they will get better from cancer.

- Raizel



# How things grow

**If I were a biologist, I would discover...**

*# animals, insects, human body,  
Plants and fruits and vegetables.  
I choose these to discover how  
they grow.*



Photos (right): frog eggs (left): Jenny Gallop - Gurdon Institute group leader. The Gallop lab group have developed cell-free systems using phospholipid bilayers and frog egg extracts that allow them to find out how signalling lipids in the cell membrane precisely control the molecular events of actin assembly.



# Other Suggestions

## If I were a biologist, I would discover...

...the lives and adventures of animals that lived in the past. At home we watch programmes about people using knowledge of science and tech to find out about the way whales, ichthyosaur and so on lived. When I am older, I would love to grow up and be like them. Wouldn't it be cool? Then I could discover things no-one knows! **Have you ever found out about something unbeknownst to others?**

- Akshadha

How life on earth was made.

- Slava

Find out how to bring people back from the dead and keep them alive for a few more years so we stop losing people.

- Aditi

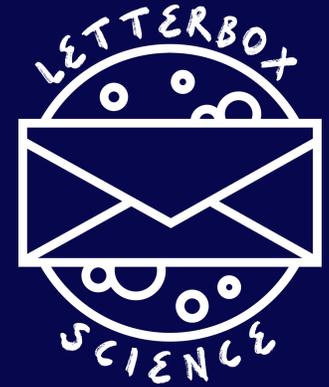
Many lots of living things and discover lots about animal cells and I would like to discover about non-living things.

- Ritaf

How the dinosaurs died and why?

Who was the first biologist?

- Paige



# Other Suggestions

If I were a biologist, I would discover...

Cells, animals and their fossils. I will study animals, plants and fungi. I will study animals' skin and bones.  
- Aaron

About something that is interesting for everyone.  
- Fleming

Cells, poppy seeds, oxygen, trees, medicine for cancer, fungi and oranges.  
- Sky

More things in space. I'm interested in if there is more to what we know. In addition, I would also like to know more about the ocean as we only know 5% of it at the moment.  
- Sienna

Animals and animals' poo as well. Frog bones and I don't think people didn't see frog bones. Maybe we can make the rainforest really alright and we can make a new dinosaur species and as well animals species.  
- Isaac

Fossils, animals, bodies and stuff that were buried for a long time.  
- Kacie & Kayla



# Other Suggestions

If I were a biologist, I would discover...

What causes a new species of plants and animals to appear because if we do so, this could help on the creation of life in a lab.  
- Allen

How to put an immortal jellyfish's cell into a human's body to make them immortal! Because people who die make the people related to them very sad. So, I would do that so they wouldn't have that feeling ever again.  
- Matthew



New living things and how to use cells to bring things to life (dinosaurs, relations).  
- Phoebe

Why bees prefer some plants over others. I would also like to discover a cure for different types of illnesses to help a lot of people or animals.  
- Zosia



# Other Suggestions

*If I were a biologist, I would discover...*

Lots of animals life cycle and where they live because there are so much to see.

- Millie-Leigh

A never known plant. A cure for a disease.

- Joseph

Life in space. Why cells turn bad.

- Connor

Some corona version which is stronger than all and smash all the bad bacteria (and a new shark).

- Oranth

How small or big animals' brain cells are. I also would discover how many cells wasps and bees have, and how many cells dogs and cats have.

- Lilly-Rose



"Letterbox Science has been so much fun for me, especially when we received postcards from the children with really sweet or insightful thoughts. It felt amazing to work on a project that helps connect people with science whilst also gaining by improving my communication, organisation and teamwork skills along the way."

*Eleanor*

Project Co-Lead

follow us!



[www.gurdon.cam.ac.uk](http://www.gurdon.cam.ac.uk)



@GurdonInstitute

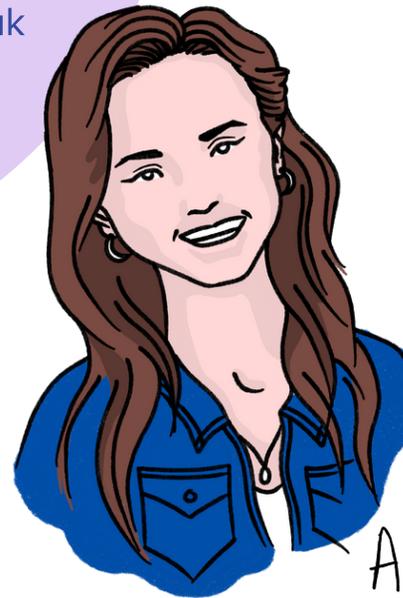
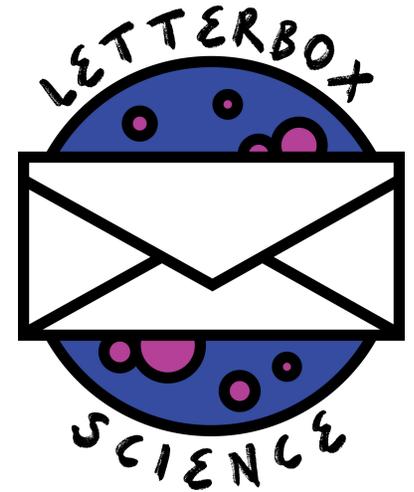


@gurdoninstitute

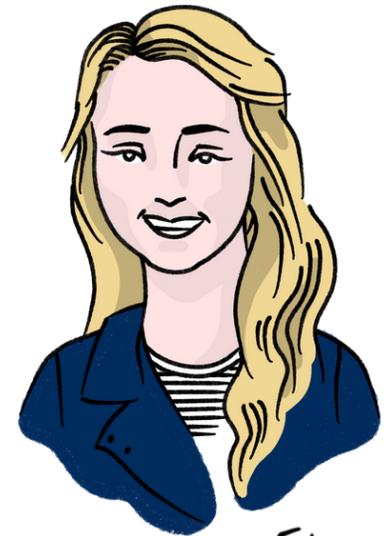
# Get in touch!

If you know of a group that might be interested in being part of the Letterbox Science project, please don't hesitate to reach out to the team!

[public-engagement@gurdon.cam.ac.uk](mailto:public-engagement@gurdon.cam.ac.uk)

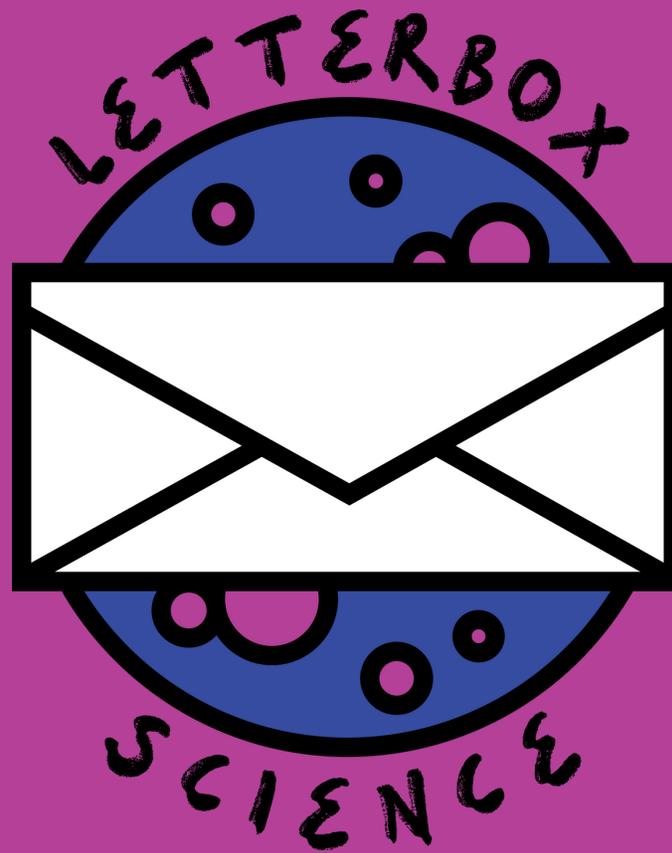


Anna



Eleanor

Best wishes from Anna, Eleanor & the Letterbox Science Team!



UNIVERSITY OF  
CAMBRIDGE



Gurdon  
INSTITUTE

