

REPLACEMENT NEWS

September 2019: Issue 123

**ANIMAL
FREE**

RESEARCH UK



Inside

Research update: pain

Meet the researcher

Summer School and Celebration

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Animal Free Research UK

Formerly Dr Hadwen Trust
Portmill House, Portmill Lane,
Hitchin, Hertfordshire, SG5 1DJ

Tel: 01462 436 819

info@animalfreeresearchuk.org
www.animalfreeresearchuk.org

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Welcome to the future of medical research

Welcome to your latest edition of Replacement News! Your kind support is helping to advance innovative, animal free, human-relevant research so that human diseases will be cured faster without animal suffering.

Inside you'll read about the amazing early career scientists who have spent their summers in laboratories up and down the country learning the latest animal free research techniques. These brilliant students represent the next generation of animal free scientists and thanks to your support, they are kick-starting their careers with compassion.

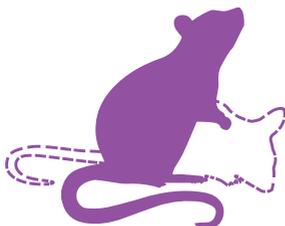
After their eight weeks in laboratories across the country, the students attended our three day Summer School where they received further training

in areas vital to succeeding in science including workshops on how to give a science poster presentation and how to communicate their research to scientists and the public.

You can also read updates on two of our other great projects that you're making possible: the amazing research into chronic pain at Queen's University Belfast that uses dental pulp from extracted teeth instead of animals, and the life-saving research into heart disease at the University of Dundee that uses donated human bodies.

We couldn't do any of this vital work without you. Thank you for your generosity and compassion.

Carla Owen, Chief Executive



Research update: pain

Your support is helping save people and animals from chronic pain

What's the problem?

Did you know almost half of all UK adults may be living with chronic pain?

Current advice from the NHS is to use a combination of physical exercise and painkillers, along with cognitive behavioural therapy to help cope with quality of life. It's clear that we need a better way to treat chronic pain for the 28 million adults who are suffering every day.

Sadly, traditional pain research inflicts considerable pain and suffering on animals.

In some experiments, balloons are inserted into rats' colons and then inflated to see how much pain the swelling of their abdomen causes them. In other experiments, once the animals have suffered through unnecessary surgery or being injected with chemicals, they undergo further tests – such as being forced to stand on a hot plate – to see how much pain they can withstand after their initial injuries.

You're bound to agree that's not the best way to do science. Experiments on animals' nervous systems may not even translate to humans, placing a huge question mark over the validity – as well as the ethics – of this research.

By using human teeth instead of animals, our team at Queen's University Belfast are the first researchers to produce human specific pain receptors from these nerve cells.



Dr Ikhlās El Karīm, Hayley McMillan, Dr Fionnuala Lundy in their laboratory

Thousands of mice and rats are used in pain research in the UK each year



How you are helping

Thanks to your generous donations, we are funding a three year project that's being carried out by Dr Ikhlas El Karim, Dr Fionnuala Lundy and their brilliant PhD student, Hayley McMillan, at the dentistry school at Queen's University Belfast.

They're working to replace the use of animals in chronic pain research by using human dental pulp instead of cruel experiments.

Sadly, animals are used by some researchers as a surrogate for human nerves because there are ethical issues associated with collecting human nerve tissue. However, Ikhlas, Fionnuala and Hayley have developed an exciting new model based on nerve cells that can be grown directly from dental pulp tissue.

Dental pulp is a rich source of stem cells from which several cell types, including nerve cells, can be grown. The big plus is that it's readily available from human tooth extraction – and only a very small number of teeth are needed to provide the tissue required.

What's the impact of the research?

Now in the third year of their novel research project, the team is working to understand the molecular mechanisms that trigger chronic pain signals in nerves. They are isolating and investigating special receptor channels in human nerve cells to see how they are disrupted. Crucially, this receptor is totally different across species, so the receptor in this research is unique to humans.

By using human teeth instead of animals, they are the first researchers to produce human specific pain receptors from these nerve cells. Their findings will help the team – as well as other researchers – to understand more about the unique pain pathways in humans without forcing animals to suffer.



Meet Hayley McMillan, chronic pain researcher

PhD student Hayley is part of the research team at Queen's University Belfast looking at chronic pain using a model made from dental pulp.

Could you tell us what you're working on?

I am working with nerve-like cells derived from extracted and donated human teeth to better understand novel pain receptors.

Why is your pain research so important?

Chronic pain is a major healthcare problem. Most of the drugs on the market to treat chronic pain are associated with many unwanted side effects. The main reason for this is because their targets are expressed both inside and outside the pain pathways.

The pain receptor (Mas related gene receptor μ X1, MRGX1), I am researching is different because it is solely expressed in sensory nerves and therefore could lead to limited or no side effects.

Your research is completely animal free. Why is this crucial?

Not only is MRGX1 solely expressed in sensory nerves, its expression is also specific to humans. This means that animals do not possess the receptor and therefore do not represent the human pain situation accurately. For example, selective ligands (substances that binds to other molecules) for MRGX1 have been shown to produce hypersensitivity to pain in a study with humans, whereas MRGC receptors in mice (which have the closest shared ancestry to human MRGX1) actually inhibit pain. This is a clear example of how animals experience pain differently to humans. **I think we should be using human models to study human disease.**

Has anything shocked or surprised you so far?

Yes, the statistics on the amount of animals used in research really shocked me.



Hayley meeting a new friend!

What motivates you?

The idea that my work could contribute to improving the quality of life of people living with chronic pain.

What do you like to do in your spare time?

I like going to the gym in my spare time or going to the cinema.

The final word

I would like to say a massive thank you to supporters of Animal Free Research UK. My work would not be possible without your help.

Please support Hayley's amazing work by donating using the form on the back of your letter, calling us on 01462 436819 or visiting animalfreeresearchuk.org/make-a-donation. *Thank you.*

Fabulous fundraisers

Thank you so much to everyone raising funds and awareness about our work. You are all stars!



Amanda Holley had a great time holding a stall at Wakefield Vegan Fair. She raised a fantastic £176.25. Thanks so much, Amanda. You're a star!

Back in May, Sophie Hanry laced up her trainers and embarked on the Edinburgh Half Marathon, raising money and awareness for Animal Free Research UK in the process!

From everyone here, we want to say a massive thank you – we are so glad to have you on our team!



A massive thank you to Andrea McLoughlin, a long term supporter whose recent supermarket collection brings the total she has raised to over £3,000! Thank you so much, Andrea! You're amazing!



Never a dull moment for Bude support group!

Steph, the leader of the Bude group, shares their latest news



Our Bude group has been characteristically busy since member Jackie Diffey completed her phenomenal challenge of a 20k paddle on Bude canal in April. This was an amazing feat and set the scene for things to come this year.

Bude Animal Friends held its inaugural awareness day in June raising awareness and much-needed funds. The event was so successful that the 2020 date is already booked.

The group also had an Animal Free Research UK float at Bude Carnival. Lots of families dressed up so the street was flooded with animal fancy dress costumes.

We've also held a supermarket collection and emptied the collection pots that we've placed around the town.

Later this year, we will also be attending Health and Harmony Fair, North Cornwall's first ever Vegan Fair, and if that isn't enough, autumn plans are already in full swing with a Halloween fancy dress event and several exercise fundraisers.

The Bude group has chosen to support the diabetes research at Exeter University Medical School this year, so we were thrilled to have lead researcher, Dr Nicola Jeffery, visit to give a talk to Bude U3A. They really enjoyed the talk and we were bursting with pride to be a small part in helping fund this groundbreaking research. The local paper sent a reporter to the talk and so Bude residents who could not attend were able to 'read all about it'.

Steph Jones-Giles, the group's leader, said: *"We have raised £2,800 so far this year and there is still much to do so watch this space. If you are sitting reading this wondering how you can help the charity, then I would say find one other person interested in helping you and spread the word. That is what I did in 2016 and to date we have raised over £25,000 and put Animal Free Research UK well and truly on the map in our town."*



Thank you so much to Steph for all her support, including writing this article, and to all the Bude group members. You are all fabulous!

Summer School and Celebration

Thanks to kind people like you, we started our unique Summer Student programme in 2012 to help early career scientists gain valuable laboratory experience in animal free research. Last year, we expanded the programme by introducing a three day Summer School to give the students additional training. The school was extremely well-received with all the students agreeing it gave them extra skills, experience and confidence to pursue their dreams of an animal free research career.

The Summer School this year built on those foundations, delivering inspirational workshops to help the students succeed in their careers. One of the workshops showed the students how to present a scientific poster and to discuss their science with other researchers and with the public – a crucial part of being a successful scientist.





The students also had an evening to celebrate their achievements, network with other scientists and display their research posters to the audience. Brain tumour research expert, Professor Geoff Pilkington, delivered an inspiring keynote speech about his career to the room full of bright young scientists.

Your continued support has helped the Summer Student programme grow into a hugely valuable initiative to help researchers kick-start their careers with compassion and provide them with the tools to embark on a successful animal free career. Thank you.

“
Now I know the importance of replacing animals, I will gladly be part of saving animal lives.
”

“
Thank you for giving me this opportunity. It has been invaluable and I have really enjoyed it.
”

Your 2019 Summer Students

Abigail Wright, Coventry University

Abigail's research could advance our understanding of **Parkinson's disease**, potentially leading to the development of treatments that tackle the cause of the disease, rather than its symptoms, and help to replace cruel animal experiments.



Dylan McClurg, University of Aberdeen

Dylan's research has the potential to develop into a simple, cost effective way of determining which cancers are likely to spread at a very early stage. This could also help doctors determine which patients are at greater risk of **cancer spread**, allowing for a more personalised approach to patient care.



Deyna Jenkins, Sheffield Hallam University

Deyna has been using human cells and proteins to develop a novel 3D model of skeletal muscle, which has the ability to contract and mimic what happens to muscles when you exercise. This animal free model of **muscle contraction** could accelerate knowledge about the mechanisms behind the benefits of exercise as well as helping replace experiments on rats and mice.



Faris Osman, University of Hertfordshire

Faris has been developing an entirely synthetic antibody that can detect the **HIV** virus immediately. His project could lead to a completely animal-free diagnostic test for HIV that is cheaper, faster, more stable and far less cruel than using antibodies extracted from animals.



Intisar Salah, University of Hertfordshire

To replace experiments on animals to produce antibodies for **detecting cancer**, Intisar has been creating tiny particles, called fluorescent nanoparticles, which can identify where tumours are in the body. Her fluorescent nanoparticles could also be loaded with drugs to deliver them to diseased areas within the body, thereby starting cancer therapy straight away and avoiding damage to healthy tissues.



Nilab Haydare, University of Hertfordshire

Nilab has been developing an animal free, 3D model of the **human eye**, using human cells from the cornea and immune system. She has then been testing substances on the model that are known to cause irritation and assess the response of the model to determine its accuracy to predict inflammatory responses in the human eye.



James Philpott, University of Hertfordshire

In his summer research project, James has been developing mathematical equations and computational models to predict if a molecule could be **psychoactive**. His research has the potential to help replace animal experiments in the preliminary stages of drug design.



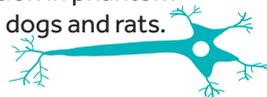
Samantha Lindsay, University of Hull

Skin repair experiments typically involve cutting open animals and examining how their wounds heal over time. Samantha has been developing an animal-free human skin culture model to more accurately study **wound repair** and infection in humans. Samantha's human skin culture model could greatly improve the reliability of disease treatments.



Zachary McNeill, Newcastle University

Zachary has been investigating sensory perception in humans by non-invasively stimulating nerves using electrical pulses applied through the skin and monitoring their response. This work could provide people with an improved ability to control their **prosthesis**, greater sensation, spatial awareness and reduction in phantom limb pain and help replace the use of painful experiments on cats, dogs and rats.



Kathryn Bailey, Leeds Beckett University

Antibodies are used to detect the presence of certain microbes that may be a marker of **Alzheimer's disease**. Unfortunately, millions of animals worldwide are forced to produce antibodies. Kathryn has been generating synthetic compounds, called aptamers, that can be used to measure microbes without experimenting on animals. This new method could help to replace antibody production in animals if universally adopted.



Keerthana Sasitharan, Animal Replacement Centre of Excellence, QMUL

Keerthana has been using human tissue samples and computational biology to replace experiments on animals in her research of **oral cancer**. She has used artificial intelligence to predict whether a tumour will spread or not by identifying specific oral cancer stem cells in patient samples. As well as being cheaper and more ethical than cruel experiments on animals, this can potentially speed up the rate at which oral cancer treatments reach patients.



Katherine Bexley, University of Manchester

Skin repair research often involves injuring live animals, often down to the fat, muscle or bone, to see how their injuries heal over time. Katherine has been using human skin removed during surgery to investigate if she can make **wounds** heal faster or with less scarring. By keeping the human skin alive in a dish and then monitoring how well each wound heals after adding different drugs, she could closely observe their effectiveness.



Josan Gandawijaya, University of Exeter

3p deletion syndrome is a rare condition that can result in **autism**. Josan has been generating human cells which have three genes missing to mimic 3p deletion syndrome then editing the DNA by using a new technology called CRISPR-Cas9. The consequences on cell shape, growth and lifespan, and also its effect on other genes can then be studied. Josan's research could lead to a clearer understanding of the role of genes in autism and ultimately, help replace experiments on animals.



Global replacement news

Is the UK finally turning its back on mouse testing?

In June, the Medical Research Council recommended the closure of the Harwell Institute's Mammalian Genetics Unit which uses mice in an attempt to study the role of genes in the development of diseases and disorders. They have also advised pulling out of an international project aimed at mapping mice genes and their human equivalents.



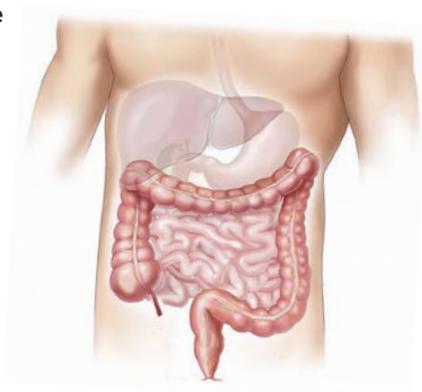
Earlier in June the Sanger Institute in Cambridge also scaled back its involvement in mouse testing to shut down its animal breeding facility altogether.

We hope that this is the start of a trend away from using mice in experiments in favour of animal free research techniques.

Animal free “mini organs” help in fight against coeliac disease

Coeliac disease is an autoimmune condition in which digestion of gluten, a protein found in wheat, rye and barely, can lead to damage of the digestive system and inflammation in the body. The disease impacts about 1% of the general population but there may be many more people undiagnosed.

In the quest for a model to research the condition and develop treatments, researchers at Massachusetts General Hospital turned to intestinal organoids (miniaturized and simplified versions of an organ that shows realistic micro-anatomy) to develop an animal free model. This allows the researchers to understand coeliac disease using a directly relevant novel human model to discover ways to treat and manage the condition.



www.nature.com/articles/s41598-019-43426-w

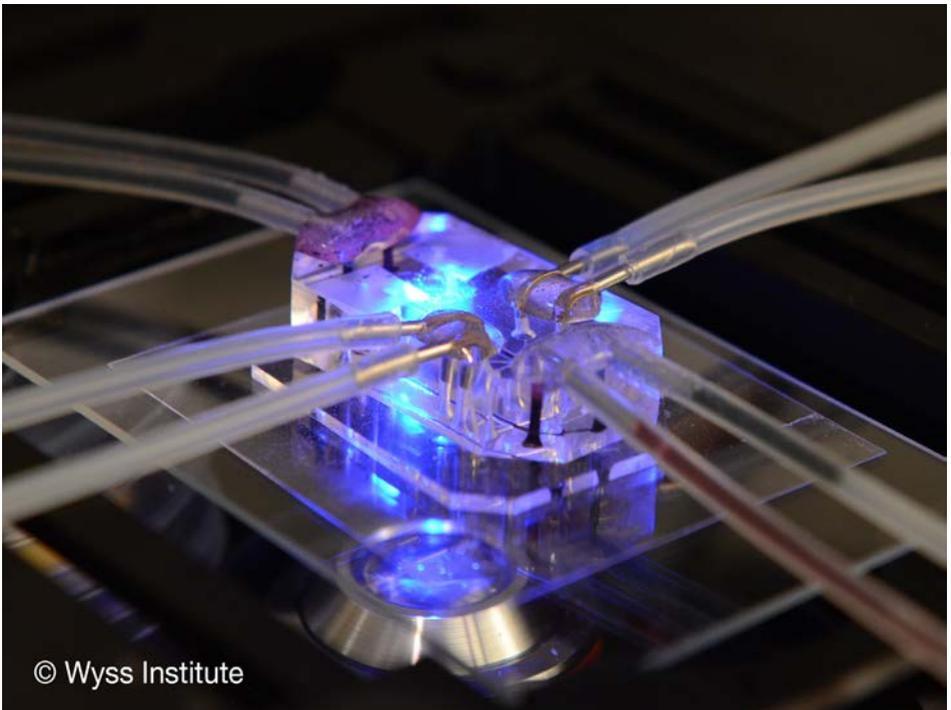
Organs-on-a-Chip at a Barbican Centre

An exhibition in London's Barbican Centre this summer which told the rapidly developing story of artificial intelligence featured two human Organ Chips developed at the Wyss Institute at Harvard University and Emulate, Inc, a start-up that is making them available to scientists in academia and industry worldwide.

“Organ Chips allow us to go beyond animal models to study human physiology and one day they could be used to determine exactly which drug is most likely to help a patient with a certain disease, which could revolutionize the way we develop medicines and treat diseases” said Geraldine A. Hamilton, Ph.D., the President and Chief Scientific Officer of Emulate.

We're delighted that the Barbican has helped spread the word about how this type of technology is helping to remove animals from laboratories.

wyss.harvard.edu/organ-chips-featured-at-barbican-centre-in-london/



© Wyss Institute

Research update: heart disease

Thanks to support from kind people like you, Professor Graeme Houston and Helen Donald-Simpson are testing medical devices to treat heart conditions using donated human cadavers and a special embalming technique that saves animals from being used.



Helen Donald-Simpson

Sadly, testing new medical devices often involves experiments on live pigs, dogs, rabbits and sheep.

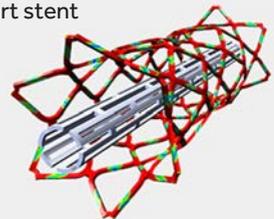
After being cut open and having devices that they don't need implanted into their arteries, these otherwise healthy animals are killed.

Yet medical devices for humans simply cannot be accurately tested in animals. Humans have a different anatomy and animals lack the diseased blood vessels that have lived the wear-and-tear of human life.

The problem?

With life-threatening cardiovascular conditions such as heart attacks and strokes affecting more and more families in the UK, medical devices such as stents offer a less invasive alternative to stressful complex surgery. Stents are inserted inside blood vessels to hold them open and are widely used to treat narrowed arteries in the heart and rest of the body.

Heart stent



Your help

Thanks to our wonderful supporters, Graeme and Helen can use donated human bodies embalmed in a special way to test medical device treatments for diseases and to train doctors in how to carry out procedures.

Named after its inventor, Thiel embalming ensures the cadavers maintain a life-like flexibility. The researchers use a special fluid that simulates blood being pumped around the body which can then be used to test medical devices to treat patients suffering with cardiovascular diseases.

Thiel embalming allows Graeme and Helen to conduct research on the human body and get results that are more comparable to the living body than experiments on animals. This will help in the development of better treatments.

Their cutting-edge model can also be used to conduct a simulation of a patient getting a medical procedure to train doctors in new medical techniques.



Professor Graeme Houston

The impact of this research

The special way the cadavers are embalmed means that procedures can be carried out multiple times by doctors for training purposes or for testing the effectiveness of new devices in treating diseases.

This unique feature means that this innovative research is saving the lives of an estimated 4,000 animals per year.

Isn't it amazing that so many animals can be saved simply by testing new medical devices in a small number of human cadavers kindly donated for medical research?

What is Thiel embalming?

Instead of using traditional formaldehyde to embalm a body, a special mixture of salts is used in Thiel embalming, which leaves the body softer and more flexible than traditional embalming.

Fundraising while you shop

Amazon Smile

If you shop at Amazon, you could help raise valuable funds for us at no extra cost to you! Simply use the AmazonSmile link below and select Animal Free Research UK as your charity to support. We will then receive a donation every time you shop.

We've already received a whopping £30,000 from AmazonSmile, so it's a great way to raise much-needed funds from the comfort of your home. Please ask your friends and family to sign up too.

[smile.amazon.co.uk/ ch/1146896-0](https://smile.amazon.co.uk/ch/1146896-0)

Thank you!



EasyFundraising

If you don't shop at Amazon, you can still support Animal Free Research UK when you shop online. You can turn your everyday online shopping into donations for us by registering with EasyFundraising. You can shop at thousands of online retailers and raise funds for us at the same time – at no extra cost to you!

easyfundraising.org.uk/causes/animalfreeresearchuk

Thank you!

Latest statistics

Small decrease in numbers of animals suffering in research

The Home Office announced in July that there was a decrease of 7% in experiments on animals in British laboratories in 2018. There were 3.5 million experiments in 2018 compared to 3.8 million in 2017.

While we cautiously welcome that the drop in research on animals is going in the right direction, it's clearly far too little too late for the animals still suffering in laboratories.



**3,207 EXPERIMENTS
ON MONKEYS**



**159 EXPERIMENTS
ON CATS**



**4,481 EXPERIMENTS
ON DOGS**



**2.57 MILLION
PROCEDURES ON MICE**

With your continued support, we will create a world where human diseases are cured faster without animal suffering.

A large black and white spotted dog is shown on the left side of the image, looking down. A small ginger tabby kitten is sitting on the right side, looking up at the dog. The background is a solid teal color.

**Large or small,
leaving a gift in
your will can make
a big difference.**

If the time is
right, please
consider
leaving us a
gift in your will.
Thank you.



Download your free legacy guide at
animalfreeresearchuk.org/leave-a-legacy/