In less than 12 months, the *Cell EXPLORERS* programme has reached more than 500 children, teachers and parents.
It involves 20 NUI Galway demonstrators including 14 undergraduates, 3 postgraduate students and 3 researchers!

Cell EXPLORERS

Summary of activities — Jan 2013

What is *Cell EXPLORERS*?

A new and exciting science education programme linking university and primary schools!

Cell EXPLORERS is a **hands on programme** of discovery of molecular and cellular biology, **promoting biological and biomedical sciences**.

The aim of the *Cell EXPLORERS* programme is to develop primary school outreach in Cellular Biology and Biotechnology that involve **young children and their family** in **key scientific concepts, simple cellular biology** techniques and **experimental design activities** that are relevant to the primary school curriculum.

In the long run, *Cell EXPLORERS* **will impact on the interest of primary and secondary school students in science and technology** and on **civic engagement of general public** on biological-related problems.

Follow us on

www.facebook.com/Cellexplorers

Hands on molecular and cellular biology!

Content:

How did Cell EXPLORERS start?

Cell EXPLORERS has been **created and is directed** by **Muriel Grenon**, a research scientist in the Centre for Chromosome Biology and honorary lecturer in Cellular Genetics in the School of Natural Sciences at **National University of Ireland Galway**.
The programme started in **February 2012** as part of an **experimental activity** with **undergraduate students** with the **support** of the **NUI Galway Explore innovation initiative.**

Piloted with GETNS 5th Class

This project was developed in collaboration with **Barry McGuire**'s dynamic **5th class** at the **Galway Educate Together National School** (GETNS). The project ran for **5 sessions** and developed into an extended programme in Autumn 2012 and **during the Galway Science and Technology Festival**. This culminated in **the class winning the best general science project award** after presenting their hard work!

What do we do?

Cell EXPLORERS now provides **interactive workshops** as well as **school visits to primary school 5th and 6th classes**. We provide **teaching material to primary school teachers** with our lectures. We are also involved in the **science course of the NUI Galway** Youth Academy.

Who are Cell EXPLORERS?

The *Cell EXPLORERS* team is made of **volunteer scientists** from NUI Galway **at different stages of their career** from undergraduate and postgraduate students to lecturers and full time researchers. This **provides role models to primary school students** of real people who follow careers in science.

The programme aims at promoting biotechnology and biomedical sciences to the general public. It has a **double educational advantage by giving** university students, staff and researchers the **excitement of teaching and outreach** work, and an **opportunity to design and use learning material** relating to their studies.

Cell EXPLORERS main sponsors

We are supported by

- **NUI Galway / NUI Galway Students' Union EXPLORE Innovation Initiative**" which sponsored our pilot programme with GETNS and our first interactive workshop
- **Royal Dublin Society** (demonstration lecture bursary) for our Fantastic DNA! school visits
- **Biochemical Society** supported our interactive workshop presented on Exhibition Day at the Galway Science and Technology Festival 2012
- **NUIG Biochemistry Department**, **Biotechnology degree programme** and the **Centre for Chromosome Biology**
- **Edwin Dankert** who helped in designing the Cell EXPLORERS logo

The *Cell EXPLORERS* Workshop – 25th Nov 2012

Offered on Exhibition Day of the Galway Science and Technology Festival, this 60' show provided hands on practice of cellular and molecular biology to the general public.

Participants moved between 5 stations to perform as many activities as they wanted. For each activity they benefited from the explanation and the instruction of *Cell EXPLORERS* demonstrators – trained undergraduate and postgraduate students from Galway University.

The show is suitable for parents and children from 6-96 years old.

5 discovery activities:

Interactive!

- Extract DNA from cells
- Build a DNA double helix
- Observe your own cells
- Build a 3D cell model
- Experiment with microscopes

The 5 shows were fully booked and more than 120 participants took part in the day!

Galway Science & Technology Festival
Féile Eolaíochta & Teicneolaíochta na Gaillimhe

School visits - Fantastic DNA!

We proposed the Fantastic DNA! Lecture, supported by the RDS, to local schools in **Galway county**. We took **opportunity of the Galway Science and Technology Festival** (Thanks to Anne Casserly!) to group our visits. The lecture was **advertised on the Festival website** allowing primary schools to express their interest.

The *Cell EXPLORERS* team of demonstrators could lecture for **3 afternoons on the 15th, 16th and 23rd of November**, during Science Week and the Science Festival.

One strong positive aspect of the Fantastic DNA! Lecture is its "hands on" approach, which is greatly helped by our **demonstrators working with small group of children** in the visited classes.

In total, we have visited **9 5th classes 6th classes** in **5 schools:** Briarhill NS, Scoil Iognaid, Scoil Fhursa, Scoil Rois and Scoil Ide.

More than **320 children have performed** the Fantastic DNA! experiments. We have 5 more schools on our waiting list!

What did the school children learn?

The Fantastic DNA! lecture gives the school children a basic **understanding of DNA**, the key to life and human health. By **preparing DNA** from banana and by listening to an interactive presentation, children learn that DNA is **located in the cell** nucleus and contains the **key information for life**.
By **building a DNA model**, children discover the main constituents of DNA and how they can shape as a **double helix**.
The children go home with a test tube containing the banana DNA that they have prepared and a summary leaflet with the performed activities.

Youth Academy –Jan 2013

With the Youth Academy science programme, 18 students have discovered the fascinating world of cells and DNA through the engaging *Cell EXPLORERS* programme of 3 sessions, taking place in the Biochemistry Department teaching laboratory.

- In the first session, participants have been initiated to cell biology by discovering what is a cell as well as microscopy as its main observation technique.
- The second session was dedicated to microorganism, and the practice of the scientific method through experimental design activities within this topic.
- In the last session, participants discovered molecular biology by discussing the role and structure of DNA.

Finally, the young *Cell EXPLORERS* are awarded with a certificate of achievement and took with them the *Cell EXPLORERS* booklet containing the facts they learnt and their scientific write up.

Cell EXPLORERS 4th year project Jan – Mar 2013

Gary Sweeney is currently developing two novel sessions on fluorescence and cellular respiration as part of a project for his biochemistry degree. Gary will run his sessions though GETNS 5th class in March 2013.

Participant's Feedback

Children!

"I used to not like science but now I love it too much!"

"It was very very good!"

"Thank you"

"It was cool!"

"I learned a lot – amazing!!"

"Awesome

"Excellent!"

"It was fun and helped me understand the science of DNA."

" I liked to be like a mini-scientist!"

"The demonstrators were very good at explaining the topics!"

Teachers!

" I can't wait until secondary school for more science"

"The children were immediately engaged and interested."

"I was very impressed with how organised the whole session was. There was just the right mix between presentation and hands on work."

"Age appropriate, imaginative, highly stimulating and educational! The children adored the hands on, 'college level' process!"

"It was pitched at the children's level."

Parents!

"I want to in particular compliment the *Cell EXPLORERS* team. Their workshop on Sunday was outstanding. It really made biology interesting. My three children 12,10 and 8 really enjoyed it as did I…"

"Brilliantly presented by enthusiastic scientists. Can't wait for next year! My sons loved it!"

"Excellent staff/demonstrators"

"Well organized, flowed perfectly, well done!"

Cell EXPLORERS team members

Barry Brennan	4th year biotechnology
Loretta Breslin	Final year PhD student – Lead student on Exhibition day
Colin Burke	2nd year biotechnology
Kathleen Clancy	2nd year biotechnology
Samantha Chui-Sang Lee	1st year PhD student – Speaker at school visits
Emma Conelly	2nd year biotechnology - GETNS
Sarah Connolly	2nd year biotechnology – GETNS/Youth Academy
Anne Doyle	Research assistant
Shauna Flanagan	2nd year biotechnology
Fergal Gillespie	1st year science
Eleanor Glancy	4th year biochemistry
Muriel Grenon	Research Fellow/lecturer – Cell EXPLORERS director
Inez Hargaden	4th year biochemistry
Fintan Kearney	2nd year biotechnology - GETNS/Youth Academy
Osman Mahmud	3rd year biotechnology – Speaker at school visits
Enda McGrory	2nd year PhD student
Veasna SumCoffey	2nd year biotechnology – Lead student GETNS project/Youth Academy
Gary Sweeney	4th year biochemistry – Youth Academy/ New activities
Muriel Voisin	Postdoctoral scientist – Group leader and speaker at school visits
Cian Walshe	1st year biotechnology
Reece Walter	1st year biotechnology

Contact: cellexplorers@gmail.com





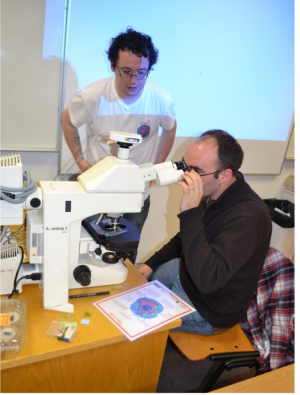








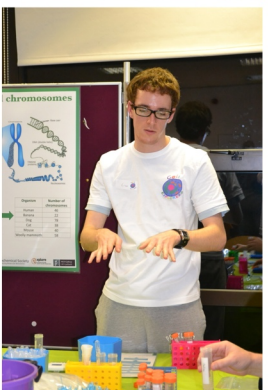
Cell EXPLORERS workshop - 25 November 2012
Galway Science and Technology Festival




romosomes


The Cell

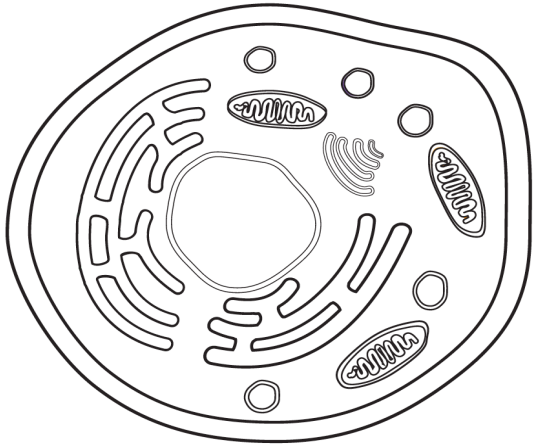

DNA structu


chromosomes


COOL
Science
EXPERIMENTS

Colour me in!

Can you name my components?



Wordsearch

1. What is the basic unit of living organisms?
2. Cells were discovered in 1665 by Robert _____
3. What is the "brain" of the cell called?
4. The energy rooms that powers the cell are called _____
5. Cells are too small to see with the naked eye. You need a _____ to see them.
6. DeoxyriboNucleicAcid is abbreviated as _____
7. The structure of DNA was solved in 1953 by James _____, Francis Crick and Rosalind Franklin.
8. The nucleus contains _____. They are made of DNA.
9. What is the structure of DNA? (2 words. Hint: it looks like a spiral staircase.)
10. Adenine, thymine, guanine and cytosine are called the 4 _____ of DNA.
11. DNA is held together by the sugar-phosphate _____

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O	A	W	E	J	E	C	W	N	I	E	T	U	N	H	M
F	F	R	A	M	N	W	F	F	N	T	E	P	E	E	H
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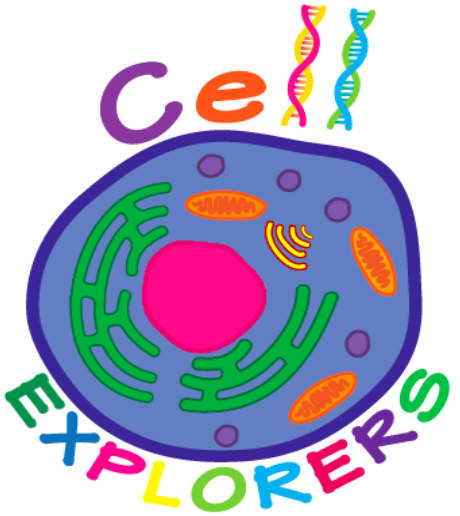
Galway Science & Technology Festival

Féile Eolaiochta & Teicneolaiochta na Gaillimhe



Hands on Molecular and Cellular Biology

- Extract DNA from cells
- Build a DNA double helix
- Observe your own cells
- Build a 3D cell model
- Experiment with microscopes

Exhibition Day
Sunday 25th of November 2012

Biochemical Society
Advancing Molecular Bioscience

xplore
Innovation through student & staff collaboration

NUI Galway
OÉ Gaillimh

WHAT IS A CELL?

Cells were discovered in 1665 by Robert **Hooke**.
They are **the basic units** of all living organisms.

DID YOU KNOW?

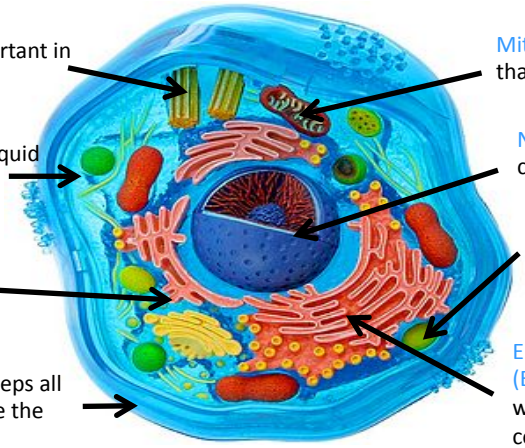
All cells have different roles, including

- Build the body (bone/muscle/skin)
- Clean the body (kidney)
- Carry things around (oxygen)
- Defend the body (immune system)

Our body contains over 200 types of cells e.g.

- Red blood cells
- Brain cells
- White blood cells

ALL CELLS HAVE THE SAME COMPONENTS



Centrosome: Important in cell division

Cytoplasm: Thick liquid that fills the cell

Golgi: Works with the ER.

Cell membrane: Keeps all the cell parts inside the cell

Mitochondria: Energy room that powers the cell

Nucleus: "Brain" of the cell. Contain DNA

Vesicle: Used as a transport around the cell

Endoplasmic Reticulum (ER): Acts as a factory which makes cell components

FUN FACTS!

- Your body contains **A LOT of cells** - More than 1 000 000 000 000 cells - 10 times around the earth!
- Cells **live** and **die** to renew your body - 300 million of our cells die in our body every minute - 10 thousand million new cells every day.

WHAT IS DNA?

DNA stands for **DeoxyriboNucleic Acid** and is found in the **nucleus** of the cell.

Watson Crick Franklin

DID YOU KNOW?

- DNA is **a double helix** which looks like a spiral staircase.
- The stairs are the **bases** - the instructions - and the handrail is the sugar/phosphate **backbone** that holds it all together.
- The arrangement (sequence) of the bases **encode a set of instructions**. The code is a bit like Morse code that only the builders of life within cells would understand.

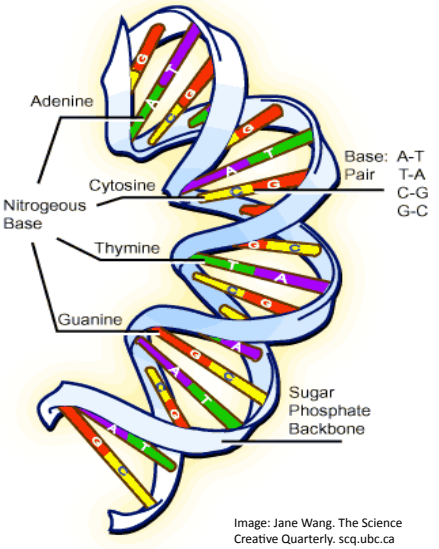
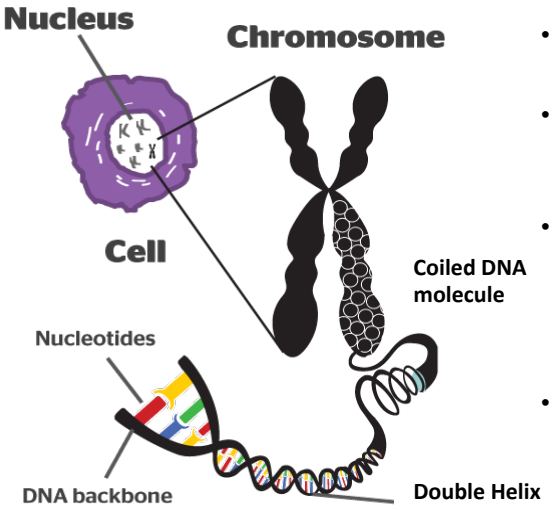


Image: Jane Wang. The Science Creative Quarterly. scq.ubc.ca



FUN FACTS!

- DNA was **first isolated 143 years ago** by Friedrich Miescher.
- The structure of DNA was solved in **1953** by James **Watson**, Francis **Crick** and Rosalind **Franklin**.
- If unwound and tied together, the **length of DNA** in **one cell** would stretch almost **1.8 meters** but its width is 32 thousand time less than one human hair.
- Each **human cell** has **46 chromosomes**, kangaroos have 16 and bananas have 22.