



# **Biochemical Society Outreach Grant: CELLsplorers**

Event Report

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### **Event Outline**

On the 20<sup>th</sup> June 2016 two Aberdeenshire primary school classes (from Inverurie Market Place School) had the opportunity to attend an event being hosted at the University of Aberdeen. Original plans for this event were to run hands on science experiments and workshops at the school, but due to unforeseen circumstances this was changed to an event in which the pupils from the school would visit the University. Pupils were aged 9-10 and were in their fifth year (P5).

The event, entitled CELLsplorers, consisted of five different stations that covered cell structure, cell function and related topics. Following a brief introduction on cells and health and safety in the lab, the four groups of pupils embarked on completing the events. Each of the five activities were planned to last 30 minutes and upon completion the pupils received a stamp in their CELLsplorers Passport (see Fig. 1) – their mission for the day was to collect all five stamps in order to fill their passports.



Crafty Cells: An art and craft session centred on drawing

and making a model of a cell (see Fig. 2). We had several model cells on display to help the children make their design which they embellished with art and craft materials.



Figure 2 – Crafty CELLsplorers

**Sticky Cells:** Slime made from alginate (an algal polysaccharide) was added to calcium chloride solution to make gel spheres. These 'cells' were used to demonstrate how tissues form within our bodies and can be assembled from many different cell types.

**Cells'R'Us:** An experiment to test various scenarios where you might find bacteria and other microorganisms. Most samples were from fingerprints but some pupils chose to test samples from under their fingernails, from in their ears and even from up their noses! Agar plates were used for inoculation of the various samples which were then sealed and incubated over several days in the pupil's classrooms for them to analyse and classify the bacterial and fungal colonies that developed.





**Cells Alive:** Microscopy-based experiment to visualise plant cells (from onion) and mammalian cells (from the pupil's cheek cells). Onions were peeled and the epidermal layers between each layer of the onion were mounted with aqueous mounting media to visualise live cells. This allowed the pupils to see organelles moving within the cells. Cheek cells were stained with methylene blue in order to provide contrast when viewed under the microscope. Both cell types were accurately drawn by the pupils with them highlighting the main structures such as nuclei and cell walls/membranes (see Fig. 3).

**DNA – The Stuff of Life:** DNA extraction from the pupil's own cheek cells. A simple DNA extraction was performed using cheek cells. The cells were lysed with Triton detergent and then treated with proteinase K before an ethanol



precipitation step to visualise the purified DNA. DNA

samples were then placed into snap-top autosampler vials for the pupils to take away.

Overall, each session lasted approximately 30 minutes with the DNA extraction experiment proving to be the longest to run at around 40 minutes per group. All pupils completed three of the sessions before lunchtime and then completed the remaining two sessions after lunch.

### How did it go?

Right from the off the pupils were enthusiastic, full of beans and raring to go! As you can see from the photographs (above and on the back page) the pupils were suitably attired in lab coats and were already talking about being scientists for the day prior to starting. Each station was run by a PhD student demonstrator who led each of the groups through the station. Some of the stations had protocols for the pupils to read through and carry out themselves, such as the DNA extractions and the sticky cells experiments. Other stations, such as the onion and cheek cell microscopy, were run as a demonstration using samples prepared by the pupils with guidance from the demonstrators. The pupils were also helped by their own teachers and parent helpers, who also really enjoyed themselves immensely.

Three of the stations were completed in the morning with us only running over time by 10 minutes. The pupils then went away from the lab to have lunch (in the Cruickshank Botanic



Garden). Following their lunch they returned to the lab to complete their remaining two stations and gain their final two stamps for their CELLsplorers Passports.

The day ended with a prize ceremony for the best individual pupil or group of pupils from each station. This final session also gave an opportunity for the children and adults to complete feedback forms. The prizes were designed and made by our very talented Teaching Technicians who stitched, stuffed and embroidered five different cell types (a fat cell, nerve cell, muscle cell, *E. coli* cell and a red blood cell) – if you look closely in the group photograph on the back page of this report you might catch a glimpse of some of these cells.

Feedback from the event was incredibly positive with the pupils having lots of really nice things to say about their day. When asked what they liked they said things like below...



When asked what they might want to improve they suggested things like this...



Overall, the comments and feedback were excellent and there was a definite trend towards pupils really enjoying and learning a lot from both the DNA extraction and sticky cells stations. When speaking with the pupils after the event these stations were enjoyed the most as they gave an opportunity for them to do real science experiments using genuine lab equipment.

## **Plans for the future**

Having now run the event in full I feel it could benefit from being pared back slightly to include less stations. This would allow pupils to go in to more depth as well as allowing for time to freely discuss what they are doing. Based on their feedback it is the highly experimental stations that proved the most successful, so it is envisaged that this will be the focus of any future events.

This event was always designed to be run more than once. Initial conversations with the teachers suggest the event could be extended to other year groups within the school and be run on an annual basis.

Finally, all of the equipment and consumables purchased for this event will be able to be used again and again for many years to come, so lots of primary school children will benefit from the opportunity to visit the University and become CELLsplorers!

### Acknowledgements

I would like to acknowledge the hard work and effort from the College of Life Sciences and Medicine Teaching Technicians (Alison Davidson, Cath Clarke, Kelly Reid, Hazel Fyfe, Julie Taylor, Kevin Bruce and Bruce Gordon), especially Kelly for troubleshooting some unruly sticky cells and Alison and Cath for making some amazing cell prizes! I would also like to thank Wai-Lum Sung for his wonderful artwork and graphic design skills and also the PhD students who acted as demonstrators on the day (Teodora Georgescu, Stephanie Drysdale, Fernando Fernandez, Nicola Morrice and Alexandra Andriu). Finally, I would like to acknowledge the support given by the Biochemical Society, without which none of this would have been possible – thank you!













