

# Cells, Genes, Mutation and Cancer

## Summary

The aim of our project entitled 'Cells, Genes, Mutation and Cancer' was to increase awareness of how lifestyle choices affect cancer risk by developing understanding surrounding the interaction between the environment, DNA damage and our genes (DNA) in the development of cancer. The project took place in Pencoed Comprehensive School and Cardiff University, School of Biosciences. It provided year 12 pupils with the opportunity for practical exploration of biological sciences, and the opportunity to develop communication skills through the dissemination of their experience to their peers. We also wished to increase the pupils' awareness and appreciation of scientific processes by involving them in typical essential research activities and topical debates and to develop their awareness of University life through informal discussions with undergraduate students.

## *Our Objectives were to;*

- Engage the students in scientific research, and stimulate them to devise experiments to address scientific problems
- Gain practical experience alongside working research scientists
- Enhance general knowledge of the roles of genes and mutations in cancer.
- Provide transferable skills: "good laboratory practice", "accurate note taking, recording and decision making", "independent and team-work communication skills".
- Enthuse the young people to consider bio-scientific research as a career.

Dr Karen Reed and Miss Maddy Young (a PhD student) visited Pencoed Comprehensive school to talk about their research, to introduce the idea of genes and gene regulation and provide an introduction to the workshop day held in the University. After the workshop, both Dr Reed and Miss Young visited the school again and chaired debates about the ethics of using animals in research and the prospect and consequence of personal genome sequencing.

Approximately 32 Year 12 visited Cardiff School of Biosciences and experienced many routine research techniques including cell staining and microscopy, PCR and gel electrophoresis and were given a tour of the research labs.

The showcase event held during a lunch time and after school provided a platform for 7 volunteers from Year 12 to demonstrate the skills and knowledge they had gained from the project. This was visited by at least 60 pupils from years 8 to 10, and feedback from those visitors demonstrated enjoyment and an increased understanding from attending this event.

In addition to the work with Pencoed Comprehensive School, Dr Reed also visited Pencoed Primary school and Croesty Primary school, to run activities with the year 6 children in both schools (approximately 90 children in total). These visits addressed the questions "what is a university?" and "what is research?", and provided hands on activities and experiments covering the topics "what are cells?" and "what do yeast cells need to grow?" Dr Reed introduced the topic of cancer and answered questions from the children relating to her research. Feedback from the teachers and children proved these visits were extremely valuable and worthwhile.

## Project Evaluation

Evaluation for the classroom and workshop activities was obtained by informal and anonymous comments on pieces of scrap paper. Overall, all activities ran smoothly and the pupils enjoyed the

activities and feel they have gained understanding from participation. Evaluation of the showcase event was obtained using a questionnaire.

**Problems**

Due to timetabling issues we were unable to work with the year 13 pupils as we had originally intended, thereby reducing the impact of the project. Timetabling issues also reduced the number of volunteers from year 12 who participated in the showcase event, and prevented them visiting the primary schools with Dr Reed. Despite advertising the showcase event to parents and local people, we were disappointed that only one person outside of the school attended this event.

**Conclusion**

The project was delivered on budget and met its aims for those participating. The teacher and students benefited greatly gaining valuable hands on experience of equipment and techniques, which would only normally be discussed in theory. This provided extra insight into biological techniques for both students and staff.

Miss Maddy young greatly assisted Dr Reed in the planning and management of this project and both have developed many skill sets including communication (both written and oral), planning and organisation, time management, lesson planning, event organisation, grant writing and evaluation. Both Dr Reed and Miss Young have really enjoyed working with the children and find their enthusiasm a real inspiration.

Visit to Cardiff University.



Dr Reed explaining how to pipette to Zak Rossaye



The PCR dance

Microscopy – Emma Mason examining cancer cells



Zak Rossaye explaining gel electrophoresis in the showcase event



Jonathan Barnett explaining how cancer arises to year 10 pupils during the showcase event

