Grade 12

DNA isolation and gel electrophoresis

Students will understand the genetic basis of disease and how scientists use DNA and gene modification to learn about disease at the cell level.

Activity: Students will isolate plasmid DNA from trans-genic lab bacteria and perform an enzymatic digest and gel electrophoresis to isolate the jellyfish gene for green fluorescent protein (GFP).

Time required
Full day (4h)

Grade 12 students learn the structure and function of DNA in protein synthesis. Investigating changes in protein synthesis resulting from disease is an important way basic medical scientists understand the mechanisms of disease and determine drug targets or treatment options. Gene modification and potential treatments involving genome editing could be the future of medicine for today's students. Students will get hands-on experience in basic techniques working with DNA.

Specific learning outcomes addressed: B12-1-03; B12-2-06; B12-2-09; B12-2-10; B12-2-07

Time Required	Student Experience
30 min	Introduction to the Research Centre and research interests. Students are introduced to concept of transgenic organisms and the capacity for genes to be read by any organism.
5 min	Break for washrooms
15 min	See live cells and microorganisms under a phase contrast microscope
1.5 hr	DNA isolation from trans-genic lab bacteria
30 min	Lunch
1 hr	Restriction enzyme digest to isolate gene for green fluorescent protein; gel electrophoresis to visualize DNA and discuss the potential ability to treat diseases like cystic fibrosis resulting from point mutations with new genome editing technologies like CRISPR-Cas9 are discussed, including legal and ethical factors contributing to use of this technology.

times are approximate, and can be scaled to whatever time you have available!
If half-days are possible we can run either DNA extraction **or gel electrophoresis**