



2016
NEXT GEN
PROGRAM



Lotterywest
BioDiscovery
Centre



HARRY PERKINS INSTITUTE
OF MEDICAL RESEARCH

THE LOTTERYWEST BIODISCOVERY LAB NEXT GEN PROGRAM

for schools.

WHAT IS IT?

The Lotterywest BioDiscovery Centre NEXT GEN Program's aims to inspire, engage and educate the next generation in science and medical research using the innovative technologies and techniques. A purpose built PC2 education laboratory allows students to work with the latest research grade equipment while guided by research scientists.

The programs are themed using the current medical research focus of the Perkins Institute and are lined to the Australian Curriculum and WACE courses. The unique experiences are purposely built around a number of science, technology, engineering and maths (STEM) career pathways.

We cater for secondary students accommodating different stages of learning and ability with a broad reaching focus to include regional and disadvantaged schools in UWA's ASPIRE program.

The NEXT GEN program is designed to address across curricular focus if required including ethics, design and technology and career pathway development.

The day will feature:

- The latest scientific tools and equipment as used by Perkins medical research scientists
- Documenting discoveries on a Perkins iPad
- Discussions with Perkins scientists.



THE PERKINS EX-CELL-ENT ADVENTURE

**YEAR
8**

ACTIVITY
DURATION
4.5 HOURS

PRICE PER
STUDENT
\$45

Discover CELLS BEHAVING BADLY! Discover CELLS BEHAVING BRILLIANTLY!

The students day at Perkins includes two engaging sessions both hosted by research scientists to help them discover how our cells are used in the quest for a healthier body. Human cancer cells provide the theme for "Cells Behaving Badly" where students will work in a PC2 certified laboratory to learn how to handle, explore and image cells with research grade equipment. Stem cells provide the theme for "Cells Behaving Brilliantly" and involves students tackling the Perkins Amazing Race. This is a fun competitive exploration of the BioDiscovery Centre where they tackle tasks aimed at uncovering the secrets of stem cell research at Perkins. A highlight includes each team being challenged to get the best score in the giant floor game "Start as a Stem Cell".

Curriculum Links

Australian Curriculum Year 8 SSU 149, SHE 134, 135, 136, 226, 227, SIS 144, 148.



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DIAGNOSING DIABETES

YEAR
9

ACTIVITY
DURATION
4.5 HOURS

PRICE PER
STUDENT
\$45

A great STEM investigation - testing and analysing patient samples!

Your students will step into the shoes of a pathologist to diagnose diabetes. They will use technology (including use of glucose meters, an **ELIZA** protocol and **spectrophotometry**) to determine glucose and insulin levels in patient samples. Our Biodiscovery scientists will guide students through the use of **digital technology** to record, **graph** and **analyse** their patient samples to arrive at the best treatment plan.

Curriculum Links

Australian Curriculum Year 9

SSU175,SHE 158,160, SIS 166,165,169,170,171,172



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THE 21ST CENTURY GENETICS TOOLKIT

PREREQUISITE KNOWLEDGE:

STUDYING OR COMPLETED GENETICS TOPIC

YEAR

10

ACTIVITY
DURATION

4.5 HOURS

PRICE PER
STUDENT

\$45

DISCOVER the technical and cellular toolkit that cancer research scientists use!

DISCOVER how the latest genetic knowledge is helping us move closer to better, more personalized treatments for disease.

The students' day at the Perkins includes two engaging sessions hosted by research scientists to help them discover what tools are used to discover clues to better understanding cancer, diabetes, cardiovascular and neuromuscular diseases.

Students will step into the world of a medical research scientist with a fun and informative laboratory experience. They will be guided by our great young team of BioDiscovery scientists and will learn to use technical tools like a MICROPIPETTE, MINI-CENTRIFUGE and a BioSAFETY CABINET. They will also use CELLULAR tools like the HeLa Cell Line to stain and observe. Digital learning is featured with streamed images from our microscope that students annotate and will then have access too when they return to school.

Curriculum Links

Australian Curriculum Year 10 SSU 184, SHE 191, 192, 194, 195, 230, SIS 198, 204, 205, 206, 208.



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EPIGENETICS, ASTHMA AND THE FOXP3 GENE

**YEAR
11**

**ACTIVITY
DURATION
4.5 HOURS**

**PRICE PER
STUDENT
\$45**

DISCOVER how restriction enzymes function in gene expression

DISCOVER epigenetics and how its knowledge is leading to better understanding of disease management

Students will start the day with two fun dry lab activities that explore the concepts of DNA methylation and restriction enzyme involvement in gene expression. Then they will participate in hands on laboratory session in our PC2 lab, using two standard laboratory techniques: restriction enzyme digestion, and gel electrophoresis to investigate epigenetic modification (DNA methylation) of a gene associated with asthma.

Curriculum Links

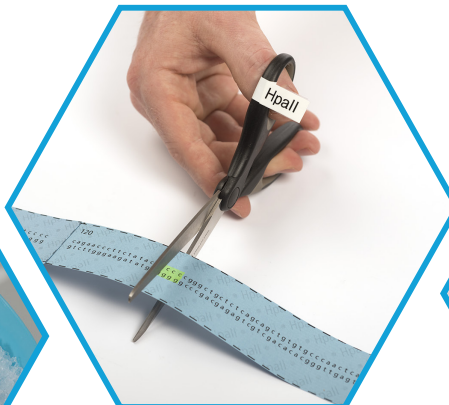
**ATAR Human Biology Year 11
Unit 2 – Reproduction and inheritance**

SU:

Epigenetics is the study of phenotypic expression of genes, which depends on the factors controlling transcription and translation during protein synthesis, the products of other genes, and the environment

SHE:

Discoveries made through the use of modern biotechnological techniques have increased understanding of DNA and gene expression.



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SPECTACULAR STEM CELLS – FUTURE REGENERATIVE MEDICINE

**YEAR
11**

ACTIVITY
DURATION
4.5 HOURS

PRICE PER
STUDENT
\$45

DISCOVER how stem cells are providing exciting opportunities to better manage disease.

Discover how procedures used by Liver and Blood Cancer research scientists that has provided a better understanding of how cells “go bad”

The student’s day at the Harry Perkins Institute of Medical Research includes two engaging sessions hosted by research scientists to help them better understand how our knowledge of stem cells is increasing our chances of better health outcomes in the future.

Session 1: Students will be guided by a researcher through the laboratory technique to thaw, prepare and stain stem cells used for investigating liver cancer.

Session 2: The Perkins Blood Cancer Laboratory provides the theme for students tackling the Perkins Amazing Race. This is a fun, competitive exploration of the BioDiscovery Centre where they engage with tasks aimed at uncovering the secrets of stem cell research at the Perkins. A highlight includes each team being challenged to get the best score in the giant floor game “Start as a Stem Cell”.

Curriculum Links

Human Biology Year 11

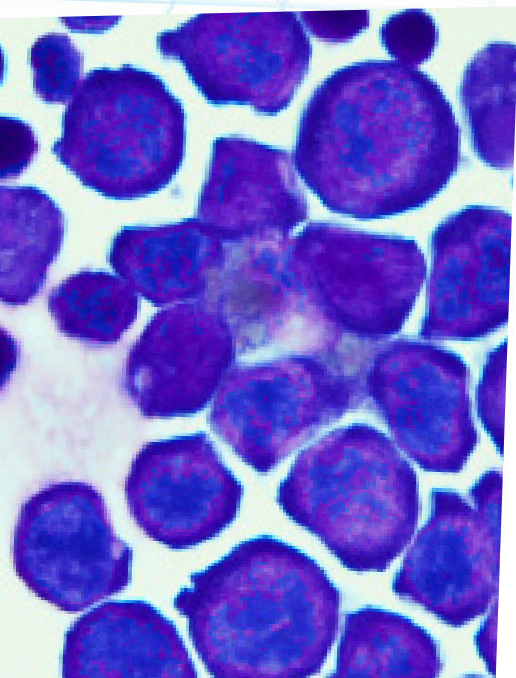
Unit 2 Reproduction and Inheritance

SU statements:

- Stem cells have the ability to divide by mitosis and differentiate into many different tissues, depending on the level of cell potency.

SI statements:

- Conduct investigations, safely, competently and methodically for the collection of valid and reliable data.



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SEARCHING FOR MUTATIONS WITH POLYMERASE CHAIN REACTION

YEAR
12
HBS/BS

ACTIVITY
DURATION
4.5 HOURS

PRICE PER
STUDENT
\$45

DISCOVER how to amplify a human gene with PCR that enables sufficient DNA to be sequenced.

DISCOVER why WA research is leading the way in the search for better treatment of melanoma.

The students' day at the Perkins includes engaging sessions hosted by research scientists to help them better understand how mutations can be identified by PCR, electrophoresis and sequencing.

Students will engage in a laboratory session that explores how to amplify the potentially mutated V600 BRAF gene of three Melanoma patients. The identification of such a mutation can lead to improved treatment options. The lab offers students the opportunity to set up a PCR reaction to amplify the gene of interest, followed by electrophoresis to visualize the outcome. They will visit an onsite service company – the AGRF – the next step in the process to sequence the gene.

Curriculum Links

Human Biology Year 12 | Unit 4 Human Variation and Evolution

SSU statements:

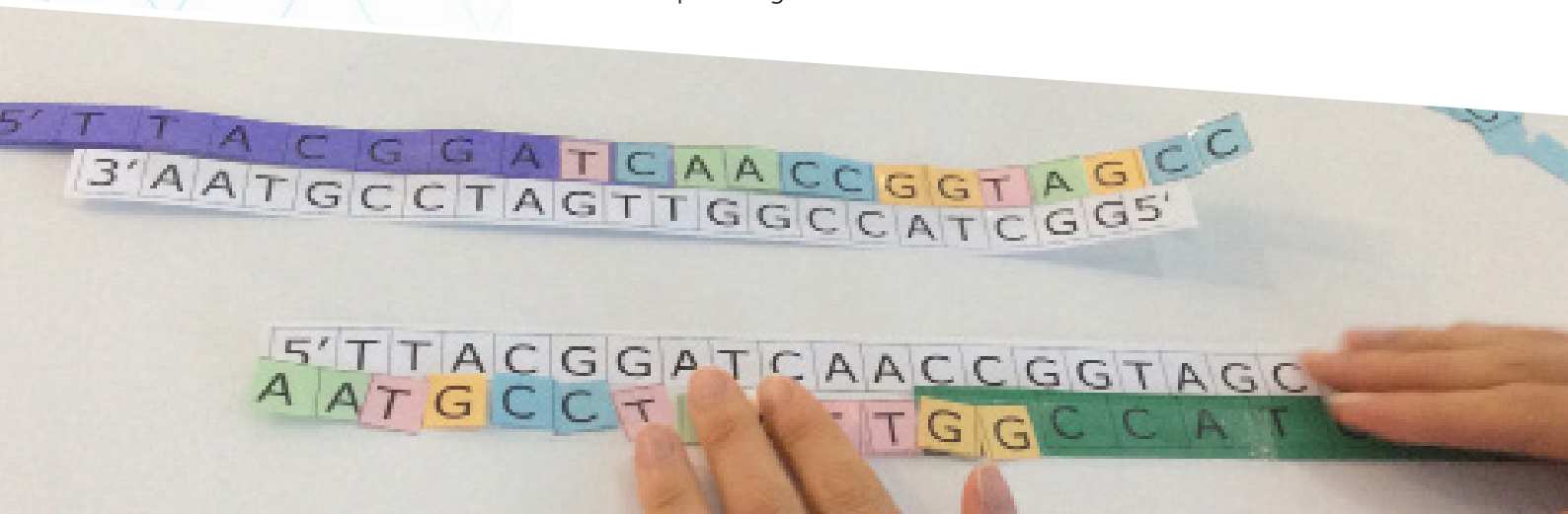
Mutations in genes and chromosomes can result from errors in DNA replication, cell division or from damage caused by mutagens

SHE statements:

Developments in biotechnology have increased access to genetic information of species, populations and individuals, existing now or in the past, the interpretation and use of which may be open to ethical considerations.

SIS statements:

Conduct investigations, including the use of virtual or real biotechnology techniques of PCR, gel electrophoresis for DNA sequencing.



A young woman with dark hair and glasses, wearing a white lab coat, is smiling warmly at the camera. She is in a laboratory setting, with various pieces of equipment and glassware visible in the background. The image is overlaid with a white rectangular frame with a red border.

STEM

PROGRAMS

FOR HIGH ACHIEVING STUDENTS



PERKINS PROFS ACADEMY 2016

To offer a STEM (science, technology, mathematics, engineering) education program to capable high school students by immersing them into a real life application of a typical STEM career pathway - medical research.

Program description

This program will run for 10 weeks and is offered each term in 2016. Students will attend the Harry Perkins Institute of Medical Research once a week or a 2 hour session either after school or during a co-curricular time slot to be decided.

This course will allow students a unique opportunity to work alongside real medical research scientists and be challenged to question, explore, think, collaborate and discover solutions to some of our most complex health issues facing West Australians including diseases like cancer & diabetes.

Outcomes

Students will have:

- Understood the essential synergy that exists between science, mathematics, technology and engineering in providing solutions to some of our major 21st century health issues.
- Acquired technical skills that will assist them to solve scientific questions
- Gained experience in collaborative investigation work
- Gained confidence in interacting with research scientists who will be in a role of mentors and facilitators of learning
- Explored a range of real life scenarios requiring them to think critically and develop strategies that could solve problems

Special focus

The following topics will be incorporated into the program throughout the course

Laboratory based molecular and tissue culture techniques as used by researchers at the Perkins.

Clinical trials and therapeutic drug development

Countless cool career options in medical research

Big business! - starting a 21st century biotech company

But should we? Ethical discussions around medical research



COST

\$300

PER STUDENT
/TERM

MAX NUMBER
18 STUDENTS

MIN NUMBER
12 STUDENTS

SUITABLE
YEAR 10 - 12
HIGH ACHIEVING



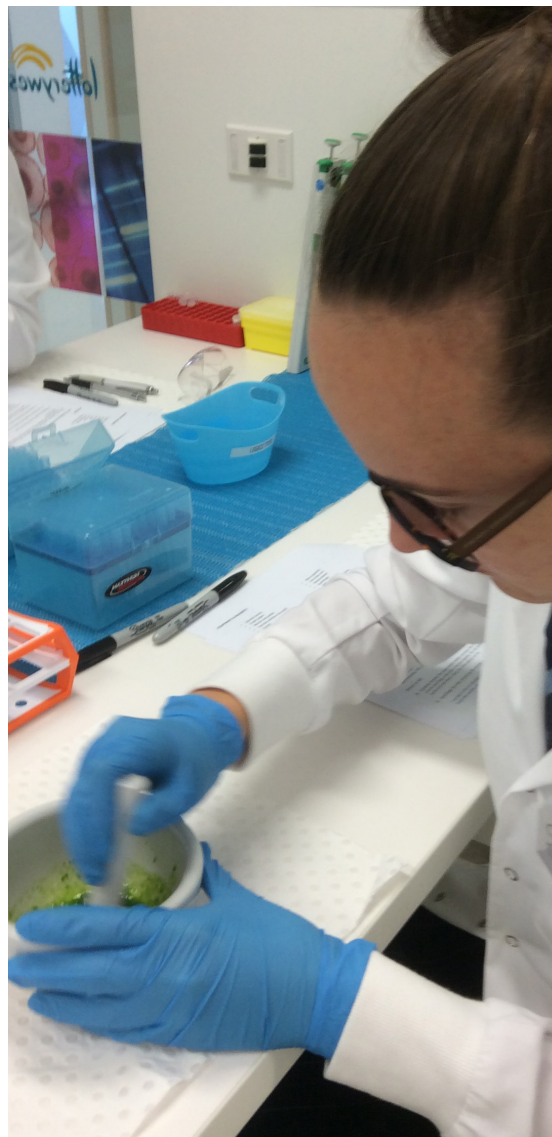
PERKINS BIOTECH BOOTCAMP - STEM IN ACTION!

Bring your high flying science & maths students for a one or two day of immersion into biotechnology and medical research !

This laboratory based intensive one or two course day will challenge and engage your high achieving lower school students.

Included will be:

- ◆ Extraction, homogenisation and analysis of chlorophyll using centrifugation and spectrophotometry
- ◆ Mathematical analysis using the Beer Lambert law
- ◆ Exploration of the most significant cancer cell lines - HeLa - stain observe and discussion of the ethical story behind this extraordinary research tool.
- ◆ Tours of Level 7 Medical Research Laboratories and UWA Centre for Microscopy, Analysis and Characterisation





FOR BOOKINGS AND FURTHER INFORMATION

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