Sid Faithfull Brain Cancer Research Laboratory

Bringing us closer to more effective treatments for brain cancer patients and their families
All of us in the Sid Faithfull Brain Cancer Research Laboratory are thankful for your interest in supporting our research.

Your investment in our work enables us to build capacity, obtain resources and instigate trials that ultimately lead to better treatments and improved quality of life for many people.

In this research update I will introduce to you the people in our team as well as tell you about the progress of our clinical trials and ongoing resource collection. I will also provide you with information about our current projects and where we see our next steps.

Thank you again for sharing your vision with us of a better future for those diagnosed with brain cancer.

With many thanks,

Prof Bryan Day
The Sid Faithfull Brain Cancer Research Laboratory studies the most common and aggressive form of both adult brain cancer, Glioblastoma (GBM) and paediatric brain cancers, Medulloblastoma and Diffuse Intrinsic Pontine Glioma (DIPG).

The focus of our research is on understanding the molecular mechanisms which are responsible for the initiation and recurrence of brain cancers and to develop and test new and effective therapies to treat these aggressive diseases.

**Our Vision**

To continue to build an internationally competitive translational research program at QIMR Berghofer MRI in both adult and paediatric brain cancer. Our focus and commitment is to investigate the biological processes critical for the development of these aggressive refractory cancers and bring these basic findings to clinical trials.

The challenge of identifying new targeted therapies with efficacy in brain cancer is immense, especially since a combination of agents will almost certainly be required. The Sid Faithfull Brain Cancer Research Laboratory is investigating several promising projects, aimed at developing strategies to firstly, target tumour-initiating cells and secondly, to better understand GBM heterogeneity and validate combined approaches to achieve greater responses for brain cancer sufferers.

Better outcomes are urgently needed as overall survival for brain cancer sufferers has increased by months only in the last 50 years.
1. Clinical Assessment of Ifabotuzumab (anti-EphA3) in Relapsed or Refractory GBM
This clinical trial was instigated based on Professor Day’s and Professor Andrew Boyd’s discoveries of the role of EphA3 in GBM. It was a multicentre, phase I dose escalation study to evaluate the safety and efficacy of Ifabotuzumab when given weekly by two hour IV infusion to patients with relapsed or refractory GBM. The study was conducted in both Melbourne (Austin Health) Dr Hui Gan/Professor Andrew Scott and Brisbane (RBWH) Dr Po Inglis/Dr Paul Thomas. This study has since completed with encouraging results. Ifabotuzumab showed rapid, specific targeting of GBM tumour in all patients participating in this trial. Whole body bio-distribution images showed no specific normal tissue uptake of Ifabotuzumab. This is exceptionally promising as it further demonstrates the efficacy of EphA3 as a therapeutic target in GBM.

2. Isolation of Circulating Tumour Cells in Patients with Glioblastoma Using Spiral Microfluidic Technology
This clinical study was carried out in collaboration with clinicians from the Royal Brisbane Women’s Hospital as well as scientists from both the Queensland University of Technology and QIMR Berghofer. The aim of this trial was to assess the prognostic and predictive capabilities of circulating tumour cells (CTCs). It was the first of its kind to use a spiral microfluidic device for the enrichment of CTCs found from peripheral blood of newly diagnosed GBM patients. The results of this trial were published in *Frontiers in Oncology* (Bark, JM, et. al) in June 2021.
Interest in the laboratory’s panel of patient derived GBM cell lines has increased substantially in the past 12 - 18 months. Our team is now being contacted regarding QCell on a fortnightly basis from collaborators everywhere from the University College Cork to Harvard University (see full distribution list on p.6). The demand for this valuable resource is an encouraging sign of the interest and commitment to progressing discoveries in brain cancer research across the globe.

In 2021 Prof Bryan Day was appointed to the Scientific Advisory Committee for the Cooperative Trials Group for Neuro-Oncology (COGNO). This allows him to keep abreast of and advise on all large scale multi-centred neuro-oncology trials within the country.

The Sid Faithfull Brain Cancer Research Laboratory had work published in upwards of 20 journal articles between 2020 – 2021.

**New Collaboratives & Alliances**

Prof Bryan Day became part of the Directorship for The Australian Brain Cancer Research Alliance (ABCARA) in 2021 alongside Prof Hui Gan and Prof Terrance Johns. ABCARA aims to foster strong and ongoing national collaborations across basic, translational and clinical brain cancer research.

Prof Bryan Day along with seminal clinicians, scientists and imaging specialists in the brain cancer space are in the process of forming what will be known as Brain Cancer Queensland (BCQ). BCQ will act as a formal framework for a lot of the existing collaborations within this group with the hopes of attracting funding for future innovative projects and clinical trials.
Resources and Technology Update

Glioblastoma Organoid (GBO) Culture

Most of the current primary brain cancer cell lines in the Sid Faithfull Brain Cancer Research Laboratory are cultured in two dimensions on the surface of a cell culture flask. Two dimensional (2D) in-vitro models have their limitations and are best suited in studies of cell-intrinsic properties.

In comparison, three-dimensional (3D) brain organoids – tiny replica organs derived from human stem cells and created in a lab dish “brains in a dish”, mirror in-vivo tumour biology and drug response more faithfully. Organoid tumour models also allow us to better study the tumour microenvironment and highlight the complexity of in-vivo animal models. They are therefore an important tool in the field of cancer research.

To study how cancer cells manipulate the healthy brain tissue into a tumour favourable state, we have generated cerebral organoids from induced pluripotent stem cells and implanted glioblastoma cells to observe tumour growth and response to therapy. So far, we have learned that the brain organoid neuronal tissue facilitates tumour growth by suppling growth stimulating factors to the tumour cells. We are currently investigating how these brain-organoid-glioblastoma-hybrids are responding to standard therapy and how we can utilize organoids to test novel therapies in vitro.

Following the idea of precision medicine, we also established a Glioblastoma Organoid (GBO) culture protocol that allows growing patient derived glioblastoma organoids in a lab dish. GBOs retain the architecture and heterogeneity of the patient’s tumour.

Combining the organoid culture technique with single-cell RNA sequencing, a technique that allows the study of gene expression from individual cancer cells, we seek to identify the genes associated with therapy resistance (e.g. DNA repair pathway gene expression) and also analyse potentially targetable oncogenes present in resistant cell populations within the tumour.

Based on our findings, we will initiate a number of multi-arm drug targeting studies to assess viable therapies that can also be used with current standards of care. If positive findings are generated, future therapies or novel gene targets will be explored using orthotropic animal models.

Patient-derived GBM organoids

Resources and Technology Update

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Based on our findings, we will initiate a number of multi-arm drug targeting studies to assess viable therapies that can also be used with current standards of care. If positive findings are generated, future therapies or novel gene targets will be explored using orthotropic animal models.
The QIMR Berghofer Tissue and Culture Tumour bank is now in its 12th year of operation. Prof Day and his team have been collaborating closely with the neurosurgeons at the Royal Brisbane and Women’s hospital to maintain this tumour bank. To-date, we have collected a total of 357 brain tumour samples from consenting patients.

With 140 primary cell lines now established, 12 cell lines have been extensively characterised by our team. This panel of patient-derived GBM cell lines are urgently needed and are highly sought after in pre-clinical cancer research.

These models are freely available to the scientific community through the lab’s QCell resource. In the past 12 months, this resource has had over 25 different national and international laboratories requesting access to this panel of cell lines.

Additionally, over 40 publications have cited the use of our QCell resource in subsequent research.
The Sid Faithfull Brain Cancer Research Laboratory has progressed its research in both Medulloblastoma and Diffuse Intrinsic Pontine Glioma (DIPG) with the establishment of a Paediatric Brain Cancer Tumour Bank in 2019. To-date, 27 Medulloblastoma and 4 DIPG samples have been collected from the Queensland Children’s Tumour Bank. In addition to this, we have collaborated with Stanford University to obtain a further 7 DIPG cell lines. We have also obtained 6 Medulloblastoma patient derived xenograft models from the Fred Hutchinson Cancer Research Centre in Seattle.

From these samples the laboratory has generated two Medulloblastoma organoid models. This is an incredible achievement for the Sid Faithfull Brain Cancer Laboratory. These resources are the first of their kind in paediatric brain cancer research.

Pair-matched GBM Tumours

With a focus on tumour heterogeneity, we aim to characterise our unique set of 3 pair-matched primary and recurrent GBM tumours that are now available in our adult brain cancer tumour bank. This will be achieved through the use of single cell RNA-sequencing.

This new technology allows us to look at the gene expression in individual tumour cells. Single cell RNA-sequencing allows us to better understand the tumour portion responsible for its aggressive character and subsequent recurrence.

Findings from these experiments will then be put to the test in the GBM organoid models. This allows us to test the effect of anti-tumour drugs in a relatively quick and cost-effective way. The drug candidates that will be discovered in this process are then able to undergo testing using our well-established patient-derived intracranial xenograft mouse model (PDX).

Children’s Brain Cancer Centre

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Professor Bryan W Day

Group Leader

BASc (Consumer Science), BSc Hons, PhD (Medical Science)

Professor Bryan W Day obtained his PhD from the University of Queensland in 2008. He heads the Sid Faithfull Brain Cancer Research Laboratory at the QIMR Berghofer Medical Research Institute and is the current Sid Faithfull Fellow.

Bryan and his team focus on the most common and aggressive form of adult brain cancer, Glioblastoma (GBM). His research interests also extend to paediatric brain cancer, with a number of active projects currently being carried out in both Medulloblastoma and Diffuse Intrinsic Pontine Glioma (DIPG).

Bryan is a past Director for the Australian Society of Medical Research (ASMR) and is passionate about maintaining the ongoing success and sustainability of medical research in Australia.

Among Bryan’s achievements have been the development of a brain tumour bank at QIMR Berghofer and the characterisation of the receptor EphA3 as a therapeutic target in brain cancer. This research has led to clinical testing of a novel EphA3 therapeutic antibody for aggressive treatment refractory brain cancers.

Bryan is the Deputy Chair of the Scientific Advisory Committee for the Cooperative Trials Group for Neuro-Oncology (COGNO). He also plays a vital role in the Directorship for the Children’s Brain Cancer Initiative (formerly CCABCR).

Professor Day’s main research focus is on understanding brain cancer cell biology and identifying novel therapeutic agents to treat these aggressive diseases in order to develop more effective treatments for patients and improve their quality of life.
Dr Rochelle D’Souza
Research Officer

BSc (Microbiology/Zoology/Chemistry), MSc (Biotechnology), PhD (Biochemistry)

Having lost her grandmother to diabetes in her formative years; Rochelle was determined to bring about a meaningful change to both the treatment of this disease and the quality of life for patients during the course of treatment. With this goal in mind she completed her basic training (a Bachelor’s and Master’s) in Biological Science in India. Rochelle then moved to the Max Planck Institute for Biochemistry in Munich. Here she completed her doctoral studies under the tutelage of Prof. Matthias Mann at who is among the top proteomics (the study of proteins) experts of the world.

Having completed her PhD in 2013, she then moved to Australia where she was briefly based in Sydney prior to joining the Sid Faithfull Brain Cancer Research Laboratory. She was drawn to join this team due to its ground breaking work in translational brain cancer research.

Despite decades of intensive research to better understand the underlying biology of brain cancer, there has been no real meaningful change in the overall survival of patients in the last 30 years. This fact resonates with Rochelle’s personal motto and is the reason she comes to the lab everyday with the hope of bringing a change in GBM treatment.

The team in the Sid Faithfull Brain Cancer Research Laboratory have set up a brain tumour and cell culture bank that has close to 350 tumour specimens to-date and generated 100 primary lines. This resource is crucial to the success of Rochelle’s current projects where she is studying abnormal cancer cell signaling and analysing changes in protein and cell behaviour.

She was the lead author on a Sid Faithfull Brain Cancer Research initiative employing proteomics to analyse the proteins in a subset of primary cell lines (Q-Cell) which will guide biological and preclinical investigations to better treat GBM.

One of the new advancements in therapeutic approaches leverages the discovery that the protein EphA3 belonging to the Eph-ephrin family, of which is elevated in GBM and other cancers. Since EphA3 is found on the surface of cells and is known to transmit molecular signals into the cell, the protein as well as its signaling route is an attractive target.

Rochelle and the team have generated compelling data showing discrete expression between the EphA3 and its binding partner, ephrin A5. EphA3 is present on the more proliferative stem cell-like GBM tissue, while ephrin A5 is present on the more differentiated slower proliferating tumour fraction. They hypothesise that ephrin A5 could drive GBM cell differentiation, leading to a less aggressive tumour cell phenotype.

Immunohistochemistry (IHC) analysis shows that EphA3 and ephrin A5 are collectively present on >75% of the total GBM tumour. We have generated well-characterised monoclonal antibodies (mAbs) against both these proteins and propose to use these simultaneously to effectively target this devastating disease. Through work on this project, Rochelle hopes to improve quality of life in patients. By targeting two proteins specifically expressed on the tumour and not normal brain, we aim to reduce toxicity while effectively killing most of the tumour.
Dr Carolin Offenhäuser
Research Officer

MSc (Biochemistry), PhD (Cell Biology)

Dr Carolin Offenhäuser is a postdoctoral researcher in the Sid Faithfull Brain Cancer Research Laboratory. She joined QIMR Berghofer in 2012, after obtaining her MSc in biochemistry from the University of Tübingen (Germany) in 2007 and her PhD in cell biology from the University of Queensland in 2012. During her first postdoctoral position under the mentorship of Prof Andrew Boyd, a renowned scientist in the field of Eph receptor biology and cancer, Carolin developed a keen interest in exploring Eph receptor tyrosine kinases as targets for cancer therapies.

In 2017 Carolin joined the Sid Faithfull Brain Cancer Research Laboratory under Professor Bryan Day to take up the opportunity to work in one of the leading brain cancer research laboratories in Australia. She was drawn to this opportunity because she believes that the lab’s vision and use of cutting edge technology, availability of primary cell lines and tumour tissues through its own brain tumour bank, and availability of in-house antibodies for preclinical studies are enabling highly translational research projects. Carolin believes this will allow her to make meaningful contributions to brain cancer research that will shift how we treat brain cancer and improve patient outcomes.

In adult glioblastoma, the EphA3 receptor is found on GBM stem cells where it is involved in propagating tumours and promoting their invasive nature. Tumour invasion makes complete surgical resection impossible and contributes to tumour recurrence. Carolin and the team have recently shown that targeting of EphA3 with antibody-drug conjugates (ADCs) can significantly reduce tumour burden and improves outcome in preclinical GBM models. This work was published at the end of 2018 in the journal Cancers.

Carolin is now part of a new initiative in the Sid Faithfull Brain Cancer Research Laboratory, which is spearheading research into developing novel therapeutic strategies for paediatric brain cancer under the umbrella of the Children’s Brain Cancer Initiative. As part of this initiative, Carolin is characterising EphA3 as a potential tumour-specific therapeutic target in paediatric Medulloblastoma and Diffuse Intrinsic Pontine Glioma (DIPG) and explores the use of antibody-drug conjugates alone and in combination with standard-of-care radiation and chemotherapy.

The hope of this research is that we can develop antibody-based tumour-specific therapies to improve survival and de-escalate current therapies, in particular radiation, to reduce long-term therapy-related side effects in children.
Dr Lachlan Harris
Research Officer
BSc Hons, PhD (Neuroscience)

Lachlan is a developmental biologist and neuroscientist by training and recently returned to Australia from the UK’s pre-eminent research facility, The Francis Crick Institute, to work on glioblastoma with Prof. Bryan Day. Glioblastoma (GBM) is the most common malignant primary brain tumour in adults and has a median survival of less than 15-months after diagnosis. Standard treatment involves surgical resection, post-operative radiation and temozolomide (TMZ) chemotherapy. Unfortunately, significant populations of resistant glioma stem cells remain after treatment, these cells regrow the tumour, and patients ultimately succumb to the illness.

Glioma stem cells are resistant to therapy because they are quiescent (slow-cycling), whereas chemotherapy is targeted at fast-cycling tumour cells. Effective strategies that combine quiescence inhibition with chemotherapy, therefore hold the potential to eradicate glioma stem cells and prevent patient relapse.

Lachlan recently performed single-cell RNA sequencing (scRNA-seq) of neural stem cells in healthy brain tissue and identified targetable quiescent pathways, data which were recently published in Cell Stem Cell. Lachlan and Prof. Day now plan to leverage this knowledge to treat GBM.

Lachlan’s idea is to determine whether small molecule inhibitors against quiescence pathways can sensitize glioma stem cells to the current frontline chemotherapy drug TMZ, thereby improving survival by preventing or delaying relapse. Quiescence inhibition during chemotherapy is an effective treatment in pre-clinical models of blood cancer. However, no molecules targeted to brain cancers had been identified, until now. This project combines Lachlan’s expertise in the regulation of quiescence and scRNA-seq with the team’s expertise in culturing GBM organoids and Phase 1 GBM clinical trial translation.

Ultimately, these experiments will determine whether Quiescence Inhibition combined with chemotherapy (QI combination therapy) is able to eliminate treatment resistance and improve survival in GBM.
Dr Michelle Li  
Research Officer

BSc Hons (Pharmaceutical Science), MSc (Cancer Therapeutics), PhD (Medical Science)

Michelle Li completed her PhD studies in the Sid Faithfull Brain Cancer Research Laboratory where she explored novel therapeutic strategies for the treatment of paediatric brain cancer. Prior to joining this passionate group, Michelle worked in an affiliated hospital of Peking University (Beijing, China) as a tumour biology Research Assistant for 5 years.

This lab was located close to the radiotherapy department in the hospital. Young patients, especially children, came to the department with their parents for post-surgery radiation therapy. Big surgical scars and radiation skin markings were very visible on their heads. Watching the children and their parents deal with brain cancer prompted Michelle to rethink her career path.

Michelle’s hope is that someday her research can help these young patients to survive cancer. During her PhD, she worked to establish and characterise primary lines derived from medulloblastoma and DIPG patients. Michelle used these cells to investigate the Eph-ephrin signalling system and other potential therapeutic targets.

Medulloblastoma is the most common malignant brain tumour in children. Current treatments improve patient survival but lead to severe side effects due to high-dose chemotherapy and craniospinal irradiation given at a young age.

Another fatal malignant brain tumour occurring in young children is DIPG. Children typically do not survive more than two years from diagnosis, even with surgery, radiation and chemotherapy treatment.

Michelle has a keen interest in establishing a reproducible protocol for culturing of primary paediatric medulloblastoma and DIPG tumours as building blocks to study Eph receptors as therapeutic targets.

Additionally she would like to establish and characterise a patient-derived xenograft medulloblastoma and DIPG model for preclinical drug evaluation.

These *in vitro* and *in vivo* studies will provide us with a better understanding of how Eph-ephrin signalling pathways are involved in medulloblastoma and DIPG development and progression, so that we can design personalised target therapies to minimise toxicity and improve quality of life in these patients.
Dr Ulrich Baumgartner
Research Officer

BSc (Bioanalytic and Cell Biology), MSc (Cell & Molecular Biology), PhD (Biochemistry)

Dr Ulrich Baumgartner is a Molecular and Cellular Biologist with eight years of experience in the field of oncology. His postgraduate and postdoctoral work has had a strong focus on non-coding RNA (microRNAs) and tyrosine kinase signalling in non-small cell lung cancer (NSCLC) and GBM.

Prior to his academic career, Ulrich worked for 10 years at F. Hoffmann La Roche as a research associate in organic chemistry and instrumental analytics. Here he obtained rigorous training in a broad spectrum of laboratory techniques.

Ulrich completed a Bachelor’s degree in Bioanalytic and Cell Biology at the University of Applied Sciences Northwester Switzerland and a Master’s degree at the University of Bern. During this time he investigated the role of small non-coding RNAs in resistance mechanisms in NSCLC and GBM.

After completing his PhD, Ulrich took on the role of compliance expert for biological drug products at Novartis in Stein, Switzerland. Here he received additional training in project management and a deep insight into the drug development process.

Supervising two students in the SFBC lab, Ulrich takes on the mission to develop the next generation of scientists. In student supervision and training, he seeks to build self-confidence, independence and self-management in the candidates.

Ulrich aims to investigate tumour heterogeneity and resistance mechanisms in primary and recurrent GBM. To this end, Ulrich has successfully implemented glioblastoma organoid (GBO) models and single cell RNA-sequencing to study the process leading to resistance and recurrence.

Ulrich’s idea is to improve patient management through precision medicine. Improving molecular diagnostics and identifying patient specific drug targets before the tumour recurs. Ultimately, he aims to support and help patients suffering from this devastating malignancy.
Fiona Smith
Research Assistant

BSAppSc (Medical Technology), GradDip (Biotechnology)

Fiona Smith joined the Sid Faithfull Brain Cancer Research Laboratory in 2017 after many years working as a Research Assistant. She began her association with medical research straight from high school at the Walter and Elisa Hall Institute for Medical Research in Melbourne where she was employed as a laboratory technician.

Fiona loved science at school but deferred university to get some real world experience. While she was working she commenced a degree in applied Science (Medical Technology) which she completed over the next six years while working full time. It was at the Walter and Elisa Hall Institute that Fiona began working with Professor Andrew Boyd, a renowned leader in Eph receptor biology and cancer.

Moving to Brisbane to continue working with Andrew in the Leukaemia Foundation Laboratory at QIMR Berghofer, her main focus was studying Eph receptors and the role they played in Leukaemia and other cancers. This was also the laboratory that Professor Bryan Day started his scientific training (honours and PhD) and where he first researched EphA3 as a potential therapeutic target for Glioblastoma.

When Andrew retired at the end of 2016 Fiona took the opportunity to transfer to the Sid Faithfull Brain Cancer Research Laboratory. Fiona’s hope is that her laboratory skills and knowledge of Eph receptors can now be utilised to learn more about brain cancer and ultimately help in the challenge of finding better treatments for patients. Fiona enjoys coming to work each day and working with a fantastic group of scientists committed to cancer research.

Fiona loves working in this team, especially knowing that work done in this laboratory will potentially translate to better outcomes for patients suffering with brain cancer.
Courtney Jurd joined the Sid Faithfull Brain Cancer Research Laboratory in June 2018. She is a Bachelor of Business graduate with a professional background in Business Administration and Human Resource Management. Prior to joining the Sid Faithfull Brain Cancer Research Laboratory, Courtney worked in a number of paediatric and adult hospitals across Queensland, Australia. She thoroughly enjoyed contributing her administration skillset within the healthcare sector, an area she is truly passionate about.

This passion combined with the belief that evidence-based research is integral for patients wishing to attain optimal health, led her to join Professor Bryan Day’s team.

Courtney’s focus as a member of this group is to provide the best administrative support possible so that Professor Bryan Day and the wider team can concentrate first and foremost on the vital research being conducted.

During her time with the laboratory, she has had the opportunity to be part of a number of different projects. Courtney coordinates the Brisbane Brain Cancer Journal Club. This is a multi-disciplinary meeting held at QIMR Berghofer each month with the aim of discussing new research and enhancing collaboration within the brain cancer community.

Courtney is responsible for the maintenance of the QIMR Berghofer Tissue and Culture Tumour Bank and assists with sample pick-up. She also liaises with collaborating laboratories wishing to utilise the much sought-after Q-Cell resource.

She utilises her digital media skills to maintain the laboratory’s website as well as any electronic or in-print promotional materials. Courtney also had the opportunity to be part of the authorship team on the Acta Neuropathologica publication accepted in December 2019.

Courtney enjoys working with this highly skilled and motivated group in this highly fulfilling support role.
Anja Kordowski
PhD Student

BSc (Biological Science), MSc (Cell Biology and Molecular Neurobiology)

Anja is a second year PhD student in the Sid Faithfull Brain Cancer Research Laboratory enrolled at the University of Queensland.

After obtaining a degree as a registered nurse in Germany and working in this job for six years, she completed a Bachelor’s degree in Biological Science at Ruhr-University Bochum and a Master’s degree at the European Cancer Stem Cell Research Institute at Cardiff University in the UK.

For both of her theses, Anja focused primarily on GBM research and was determined to find a PhD project in this very field. When she started looking for positions, she did not expect to find the ideal project 16,000km away, but this together with the chance to work in a lab with exceptionally good resources, made it easy for her to decide to move to Australia.

Prof Bryan Day gave Anja the opportunity to establish and work on projects that concentrate on a rare, but lethal paediatric brain cancer – Diffuse Intrinsic Pontine Glioma (DIPG).

She is very excited to investigate this untreatable disease and is highly motivated to better understand the mechanisms driving this rare cancer. During her PhD, Anja plans to study Eph receptors as therapeutic targets, as well as intratumoral heterogeneity and the tumour microenvironment.

With her background as a nurse, Anja keeps sight of the big picture and hopes that she will contribute something meaningful with her research into the treatment of DIPG. Ultimately, she aims to support and help young patients suffering from this devastating malignancy.
Kylah Bradbrook
PhD Student

Kylah Bradbrook graduated from the University of Queensland with a Bachelor of Biomedical Science after completing her honours year within the Queensland Brain Institute in 2018. After graduation, she worked full time as a practical demonstrator within the School of Biomedical Science at the University of Queensland.

Her passion for helping others combined with her avid interest in neuroscience and molecular biology, led her to join the Sid Faithfull Brain Cancer Research Laboratory as a volunteer researcher in January 2020. She was motivated to volunteer with this laboratory as she had a desire to help research brain cancer due to the poor survival and quality of life experienced by these patients.

Kylah is now a PhD candidate, with her work focused on recurrent GBM. Firstly, she is establishing samples of pair-matched primary and recurrent GBM surgeries sourced through the laboratories GBM tumour bank.

From this, she aims to identify potential therapeutic targets such as Eph receptors that can control the diversity of these tumours, potentially translating to novel treatments and reduce therapy resistance.
Dr Thomas Crawshaw
MPhil Student

BSc (Biomedical Science), MBBS

Dr Tom Crawshaw is an early career medical doctor with a strong interest in neuro-oncology and neuro-surgery undertaking a Master of Philosophy at the Sid Faithful Translational Brain Cancer Research Laboratory at QIMR.

Through his research project, he hopes to leverage the phenomenon of telomere maintenance dependency for the targeted treatment of glioblastoma.

After completing a Bachelor of Science in biomedical science at the University of Auckland in 2012, Tom moved to Brisbane to undertake medical training at the University of Queensland, graduating in 2016.

His previous work experience includes terms as a resident medical officer at Princess Alexandra Hospital (PAH) between and as a principal house officer in general surgery and intensive care at Queen Elizabeth II Hospital (QEII).

Through clinical rotations in neurosurgery at PAH, he gained an appreciation for the great unmet need of patients with primary brain cancers, for whom effective treatment options are typically limited.

He hopes that his research will be of benefit to such patients, and that the research experience gained through his work at QIMR will allow him to facilitate productive collaborations with researchers in future as a clinician working in the field of neuro-oncology.
Niclas Skarne
PhD Student

BSc (Hons) Biochemistry, MRes Biosciences (Biochemistry)

Niclas lost several family members at a young age to cancer. Ever since, he was determined to bring about change to patients suffering from cancer in the future. With his research, he aims to improve current treatments and the quality of life of patients suffering from one of the most feared diseases, GBM, an aggressive brain cancer which has a near uniformly fatal prognosis.

Prior to joining the Sid Faithful Brain Cancer Research Laboratory, Niclas received his Bachelor’s degree in biochemistry from the University of Edinburgh in Scotland, and graduated top of the year with a Master of Research from University College London.

During his 12-month research project at UCL, his research focused on dissecting the roles of an oncogenic receptor in GBM. Although his master’s project resulted in interesting results, he had limited access to essential resources to support his research.

Niclas was determined to move to Australia join Prof. Bryan Day’s group, waiting over 15 months to gain a travel exemption to be able to travel during the Covid-19 pandemic. This was due to his strong desire of joining a world-leading research group in the field of adult and pediatric brain cancer, with access to exceptional resources such as the in-house brain tumour and cell culture bank.

His main research focus lies in dissecting the crosstalk between the tumour-initiating glioma stem cells (GSCs), and the more differentiated glioma cells (DGCs). GSCs and DGCs show dynamic and bidirectional interactions which are critical in promoting tumour aggressiveness and recurrence.

During his PhD, Niclas will be looking into the signalling loops and interactions which are critical in maintaining GSCs. He believes that disrupting these potent, synergistic GSC-DGC interactions may be key to developing more effective therapies for GBM.
Meihua Luo
PhD Student
BSc (Pharmaceutical Sciences)

Meihua Luo received her Bachelor in Science (Pharmaceutical Sciences) at Sun Yat-Sen University (SYSU) in 2015. After graduation, she worked full time as regulatory specialist in Shenzhen Techdow Pharmaceutical Co. Ltd. Enthusiastic about improving the public health, Meihua started her research journey as a full-time PhD student at Monash Institute of Pharmaceutical Science (MIPS) at Monash University in 2017.

Currently, Meihua is undertaking a 6-month Visiting Student placement within Sid Faithfull Brain Cancer Laboratory at QIMR Berghofer Medical Research Institute.

During her PhD, Meihua focusses on developing the effective nanomedicines for glioblastoma (GBM) treatment. She has successfully developed a brain-targeted nanomedicine which sufficiently improved the antitumour activity of drugs towards GBM cells with the outstanding metastasis inhibitory effect.

This GBM-targeted nanomedicine could potentially address the challenges faced in the clinic such as the drug resistance, invasiveness of brain cancer and the blood-brain barrier (BBB).

To further improve GBM therapeutics, Meihua is also working on a gene therapy-based nanomedicine, which efficiently suppressed the expression of the genes related to tumour metastasis and kill cancer cells together with the anti-cancer drugs.

Excitingly, she would like to extend this study into animal models, evaluating the performance of these nanomedicines, including their biodistribution, BBB penetration ability, and efficacy on tumour growth. This brings her to the collaboration work at QIMR.

Meihua aims to develop a nanomedicine combining the advantages of gene therapy and nanotechnology, which could alter the genes inside the patients’ cells to treat or stop disease.

Achieving this, personalising the treatment to individuals based on the genome information could undoubtfully bring a bright future for GBM patients who could not find an efficient therapy from the conventional treatments.
Emeritus Professor Andrew Boyd

Professor Andrew Boyd is the long term mentor of Professor Day; they have worked together on brain cancer since 2004 at QIMR Berghofer. Professor Boyd’s research focus is the biology of cancer, particularly the elucidation of potential targets for cancer therapy and Eph receptor biology.

Together the achievements of Professor Boyd and Professor Day and their respective groups have led to the development of a successful and diverse international competitive brain cancer research program at QIMR Berghofer.
Sid Faithfull Brain Cancer Research Laboratory
Clinical Associates

We could not carry out this vital work without the help of the Clinical Associates currently practicing in the cancer space.

The Sid Faithfull Brain Cancer Research Laboratory works collaboratively with a number of neurosurgeons and oncologists from the Royal Brisbane Women’s Hospital.

These doctors have been crucial in the facilitation of tumour tissue donations for our tumour bank, lend their expertise to initiate new clinical trials and have been co-authors on a number of our research manuscripts.

Their involvement provides a direct link to patients suffering from brain cancer. This allows us to have a more meaningful impact on outcomes for these individuals and their families.

We are very grateful for their involvement and the time they have dedicated to advancing our research.
2020/2021 Alumni

Dr Seçkin Akgül

BSc (Molecular Biology and Genetics), MSc (Cellular and Molecular Biology), PhD (Cellular and Molecular Biology)

Seçkin spent a number of years with the Sid Faithfull Brain Cancer Research Laboratory with a focus on better understanding the phenomenon called ‘intratumoural heterogeneity’, which is one of the major factors behind the varying treatment responses observed in brain cancer patients.

Seçkin and his colleagues designed novel models in the laboratory to create a comprehensive spectrum of human brain cancer. This has helped to determine which unique tumour elements are resistant to current therapies and will allow the personalisation of therapeutic interventions in future.

Dr Akgül left the laboratory in late 2020 to undertake medical training at Griffith University on a full-time basis. His contribution to the laboratory’s research was invaluable and there is no doubt that his scientific expertise will be an asset to his medical practice.
Social Shots 2020/2021

QIMR Brain Cancer Journal Club - April 2021
Michelle's Thesis Submission
Mt. Coot-Tha Lab Hike 2020

Ulrich's Birthday 2021
Lab Lunch Picnic 2021: Student vs. Student
QIMR Christmas Party 2020
Thank you again for your interest in our research.

Your generosity will enable us to continue making significant advances in brain cancer research.

Better treatments and patient outcomes are closer than they have ever been.