NUSOVUS

Today's Research ~ Tomorrow's Health

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TENOVUS SCOTLAND
SUPPORTING MEDICAL RESEARCH
SCOTTISH REG CHARITY NO SCO09675

A leading medical research charity providing vital funds for early stage medical research in Scotland

For nearly two years, the Covid-19 pandemic has been the focus of much scientific and medical research, with astonishing progress being made. Other medical research has, however, continued, albeit hindered by many of the prevailing restrictions on access to facilities. This edition of Nusovus focuses on non-Covid research and the ongoing work of Tenovus Scotland in supporting research across all disease areas.

A new model of the human gut to enhance research in nutrition, food safety and gut health

With research funding from Tenovus Scotland, Dr Silvia Gratz, Senior Research Fellow at the Rowett Institute, University of Aberdeen and her clinical collaborator Dr Mairi McLean, Senior Clinical Lecturer at the University of Dundee, carried out a project aiming to assess whether dietary mycotoxins are environmental risk factors for inflammatory bowel disease (IBD) through their potential toxicity towards the gut. Mycotoxins are toxic secondary metabolites produced by fungi and are common contaminants of cereal-based foods. Low-level chronic exposure is highly prevalent in consumers.

The project assessed the impact of mycotoxin exposure on the function of the human gut *in vitro* using cultured cells from tissue donors. Research found that mycotoxins impaired intestinal barrier function and intestinal repair, both of which are likely to increase the risk for IBD. This finding will inform further research into the effect of food contaminants on gut function.
In this project the team created a new and highly relevant model system of the human gut to enhance their ability to study processes linked to gut function, without the need of laboratory animals. Funding from Tenovus Scotland allowed them to develop the model and lay the foundation for successful further grants from the University of Aberdeen Research Enhancement Scheme and an ongoing PhD studentship from the National Centre for the Replacement, Refinement & Reduction of Animals in Research (NC3Rs). This project both created a training opportunity and had further impact on reducing our reliance on experimental animals in scientific research.

Dr Gratz commented: "The Tenovus funding has enabled me as a researcher to establish a new collaboration with NHS clinicians and the Grampian Biorepository who provide an invaluable resource for our research. It has also facilitated developing a model system which we will use in future studies of human gut function in response to diet and gut microbiota - an integral part of the research agenda within the Rowett Gut Health theme."

Dr Silvia Gratz

Great oaks

Tenovus Scotland offers congratulations to **Professor Andrew Morris**, Vice-Principal of the University of Edinburgh, on his receiving the Royal Medal of the Royal Society of Edinburgh (RSE), its highest accolade, for his exceptional work on health data science, both in Scotland and internationally. Prof Morris received his second ever research grant (of £7,500) from Tenovus Tayside in 1994, and two years later received further Tenovus funding of £99K to establish the Diabetes Audit and Research in Tayside Scotland (DARTS) study, the wider roll-out of which has placed Scotland at the forefront of diabetes epidemiological research. Prof Morris built his research portfolio at the Universities of Glasgow, Dundee and Edinburgh and his efforts have led to the creation of Health Data Research UK, for which he serves as inaugural Director.

Congratulations are also due to **Professor Roland Wolf** from the University of Dundee who has been awarded the RSE Sir James Black Medal for his outstanding work in drug and chemical safety. Prof Wolf's research group has also received Tenovus funding in the past.

Great oaks from little (Tenovus) acorns!

Tenovus Scotland Tayside & NE Fife Honorary President

In 2020 Professor Peter Howie became Honorary President of Tenovus Scotland Tayside & NE Fife, an appointment which recognised his long and very valuable association with the charity.

Professor Peter Howie

A Glasgow medical graduate, Peter specialised in Obstetrics & Gynaecology and trained under Professor Ian Donald at the Queen Mother's Hospital. He later moved to Glasgow Royal Infirmary and Glasgow Royal Maternity Hospital to work with Professor (later Sir) Malcolm Macnaughton. After Lecturer and Senior Lecturer posts in Professor Macnaughton's department, Peter moved to Edinburgh as Clinical Scientist in the MRC Unit of Reproductive Biology where he researched the biological control of lactation and methods of promoting and supporting breast feeding.

Later, as Professor of Obstetrics & Gynaecology in Dundee, he joined the Tayside Committee of Tenovus and contributed enormously to its work over the subsequent 30 years. He was Chairman from 1999 until he stepped down in 2013. For much of that time, he was Dean of the Dundee Medical School and, as the strength of research rose under his leadership, so did the success of Tenovus in raising funds and promoting that research in an ideal symbiotic relationship. All of this owes hugely to Peter's energy and commitment and those around him whom he inspired to support these essential endeavours.

Face to Face

with Professor Ken Paterson, diabetologist and National Chair of Tenovus Scotland

What is your background?
I trained at the University of Glasgow and was a Consultant Physician with special interest in diabetes mellitus at Glasgow Royal Infirmary for 25 years. I served as Honorary Secretary of the Royal College of Physicians & Surgeons of Glasgow and on the Board of the European Association for the Study of Diabetes. I later developed interests in the assessment of new medicines and chaired the Scottish Medicines Consortium for three years.

How did you get involved with Tenovus Scotland?
When I stepped down from full-time clinical work, I was invited to join the Tenovus Strathclyde committee. Knowing of the excellent work of Tenovus I was very happy to do so. I then became Chair of the Strathclyde Committee and was invited to become Vice-Chair of Tenovus Scotland. The next step was taking up the role of Chair of Tenovus Scotland, which I did in 2019. I seem still not to have learnt how to say 'No'!

What were the origins of the charity and why the name 'Tenovus'?
Tenovus was founded in 1967 in Glasgow by Sir Charles Illingworth, who had recently stepped down as Regius Professor of Surgery at Glasgow University after 25 years in post. Its purpose was to fund medical research and equipment and it originally had ten trustees, hence the name 'Ten-of-us', a name 'stolen', with permission, from a similar charity in Wales. Tenovus then spread across Scotland and now has more than ten trustees, but the name has stuck and the aims remain unchanged.

What makes Tenovus Scotland different from other Scottish medical research charities?
Tenovus Scotland has two features which set it apart from other medical research charities. First, it funds research across all specialties and clinical areas, providing funds for common disease areas such as cardiovascular disease and cancer, as well as for 'neglected' areas like therapeutics and infectious/tropical diseases. Most other charities focus on single diseases, but Tenovus funds the best science it finds whatever the disease field in question. To assess the quality of the science there is a rigorous two-step review process, review at local level within each region being followed by review at national level. Only the very best projects are then supported, ensuring the optimal use of available research funds.

Second, Tenovus has a focus on novel science and on early-career researchers, aiming to help get new science off the ground and help researchers take the first, often difficult, steps in their research careers. At these early stages, even our relatively small pilot study grants can make a big difference, often, as our Annual Survey regularly shows, unlocking considerable other funding to allow the pilot studies to develop into definitive research programmes.

Why have PhD scholarships been funded in recent years in addition to pilot grants?
We have been fortunate to have funds available which have allowed Tenovus Scotland to support a small number of PhD scholars across Scotland. The PhD scholarships provide not only funding for research but also a small stipend for the PhD student, usually providing funding for three years to allow more detailed research to be undertaken. The academic institutions receiving the scholarships each have training programmes in place to provide the students with not only facilities to undertake their own project but a wider training in scientific method, study design and data analysis, skills which are transferable to research activities in many other fields. Young scientists with such flexible skills are highly sought after and have proven their worth in the recent response to the Covid-19 pandemic.

The Princess Royal Tenovus Scotland Medical Research Scholarships

HRH The Princess Royal with Ms Angela Ianniciello, first Tenovus Strathclyde recipient of a Princess Royal Tenovus Scotland Medical Research Scholarship

The heart in cancer treatment

Calum McMullen was a 2017 recipient of a Princess Royal Tenovus Scotland Medical Research Scholarship. Here he writes about the research he carried out and the overall experience.

Thanks to my receipt of this award, I was able to complete my PhD studies at the University of Strathclyde where I investigated how some types of anti-cancer drugs can compromise both the structure and functioning of the heart as a detrimental side effect. My research has allowed us to gain a better understanding of how these changes occur by identifying a protein (CaMKII) that is altered in heart cells following anti-cancer drug treatment. My experimental work has provided evidence to suggest that this protein could be a possible therapeutic target for future studies.

Completing a PhD in itself is very difficult, but doing so in the midst of a global pandemic has been another challenge altogether. Overnight my research just stopped, and I was forced out of the lab with no indication of a return date. In the grand scheme of things, this disruption pales into insignificance with what was going on in the world but, for me, the lockdown couldn't have happened at a worse time. I had recently accepted a postdoctoral research position and was completing my final experiments before writing my thesis. The sudden lockdown was detrimental to my progress, but the loss of momentum was even more so. Thanks to the generous and unwavering support from Tenovus Scotland, however, I was able to complete my experimental work when the restrictions were lifted and submit my PhD thesis for examination.

BUCKINGHAM PALACE

I have been Patron of Tenovus Scotland since 2003, and I am pleased to highlight in this edition of the newsletter the success of The Princess Royal Tenovus Scotland Medical Research Scholarships. Since their creation in 2014 seven have been awarded, accounting for a cumulative 20+ years of major medical research, with funding from Tenovus of about £650,000. These awards have been widely distributed across Scotland, with funding received for them from Scottish legacies and trusts. I hope that Scotland's leading businesses will partner Tenovus Scotland to expand these Scholarship awards in the future.

The scholarships offer three-year funding for research, leading to the award of the degree of Doctor of Philosophy (PhD). Prior to their introduction in 2014, Tenovus Scotland funding had been solely directed to supporting pilot projects for initial research, often resulting in larger and longer-term projects funded by national UK research charities and other funding bodies. These pilot projects still remain the principal method of supporting our research.

In the last year it has become clear how essential medical research has been to enable prompt action to save lives and counter global diseases. I hope that the work of Tenovus Scotland and these Scholarships may continue to contribute to this effort. I look forward to being able to meet our researchers at future Tenovus Symposia.

Anne

Calum (on left) with members of his lab at the last in-person conference

I cannot thank Tenovus Scotland enough for all they have done for me. As a first-generation university student, I can truly say their continued support has changed my life. The opportunities they have afforded me have provided a solid foundation for a future career in academia. My experience over the past four years has proved to me that I am committed to such a career and I'm excited to begin my postdoctoral research position and see what the future holds (once I've completed my *viva*, of course!).

Improving understanding of ovarian carcinosarcoma

Robb Hollis, who works at the Nicola Murray Centre for Ovarian Cancer Research, CRUK Edinburgh Centre, University of Edinburgh, received a Tenovus Scotland grant in 2020 for a pilot project aiming to improve understanding of an under-researched form of ovarian cancer. Here he explains a little about the research.

Ovarian carcinosarcoma (OCS) is an uncommon, highly aggressive cancer which has received relatively little research attention to date, hindering progress toward improving patient survival. Unlike other types of ovarian cancer, OCS has two distinct cancer cell populations: new treatment options must take account of the differences and similarities between these two populations.

Robb Hollis

We have identified a large series of OCS patients treated in Edinburgh, building a unique tumour sample resource of this uncommon cancer type. We have used this to identify clinical features associated with the highest- and lowest-risk patients to improve our understanding of factors that contribute to treatment success and failure. This information points us towards patients who most urgently require new treatments.

For 12 cases, we compared the two cell populations, including looking at the DNA sequence of genes in cancer cells, and measuring how each gene is being used. We also looked at how well each patient's own immune system was fighting the cancer. These analyses revealed specific differences between the two populations: some of which involve molecules that we know regulate the transformation of cells from one type to another, giving us a glimpse of how the two cancer cell populations may have formed. We also identified shared biological events – which represent biology that we may be able to target with new treatment approaches.

The Tenovus grant has been a fantastic opportunity to gain new insights into OCS and pave the way for the next generation of OCS research. As an early-career researcher, this has been invaluable; we can use this as a platform to attract further funding for advancing our understanding of OCS. We have already received additional support *via* the Nicola Murray Foundation and hope that this will eventually enable us to identify new treatment options to improve the survival of women with OCS.

Sir Roddy MacSween Prize and Medal

The Sir Roddy MacSween Prize and Medal, in memory of a former National Chair of Tenovus Scotland, is awarded annually to the best-performing undergraduate student in pathology at the University of Glasgow. The 2020 winner was William Martin and the 2021 winner Sarah Clarke.

William, from Northern Ireland, undertook his pre-clinical studies at St Andrews University before moving to Glasgow for his clinical studies – he is considering a career in orthopaedic surgery. Sarah, from South Queensferry, also did her pre-clinical studies in St Andrews and is presently thinking of pursuing a career in paediatrics.

Many congratulations to them both.

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Northern fundraising

For some years now, the Tenovus Scotland scholars in Grampian, Highlands & Islands have come together to raise funds by staging sponsored walks, runs and bake sales(!). The first Loch Morlich run was organised by PhD student Matteo Santoro who ensured that participants sported t-shirts specially printed with the Tenovus name and logo. The younger ones ran the course while others preferred to stroll around the loch, surveying the beautiful scenery in the sunshine. These ventures provide fond memories for those who appreciate the support of the Tenovus Scotland family and welcome opportunities to "give back" to the charity and raise its public profile locally.

Students with Prof Cherry Wainwright (Robert Gordon University and Vice-Chair of Tenovus Grampian, Highlands & Islands) and her dog at the 2nd Loch Morlich run.

Such activities have not been possible over the past two summers, but other ways to engage with the public have been found. As well as supporting national social media initiatives, the group has produced short video clips of present and recent award holders explaining, in simple terms, the nature of their research. These will be available soon in several formats to advance and publicise the aims of Tenovus Scotland and will also be posted on their website and social media.

We, in the north, look forward to resuming our outdoor (and tasty!) fundraising activities next year, along with our popular lawyers' evenings, when we can remind local solicitors of our work in ground-breaking medical research.