

Physiology News

HoD's Foreword

I'm delighted to see that 2023 was such a productive year in our Department. It was great to restore some normality with more in person meetings and office chat.

Once more we can celebrate an impressive number of publications and grants been awarded, with the special highlight being the renewal of the funding for the SFI FutureNeuro Centre, an achievement which will bring a most welcome boost to the neuroscience research in RCSI and in Ireland as whole.

Many congratulations to all newly minted doctors and a warm welcome to everyone who joined in this year and my thanks to all staff with teaching commitments for the outstanding work with our undergraduate and postgraduate student education. In line with outreach activities, Prof Triona Ní Chonghaile's research was featured on a TG4 documentary on "Recovery from Cancer".

The Green Lab Committee has been very active implementing initiatives to reduce our impact on the environment: we took part in another freezer challenge, had tap aerators installed in the labs (representing 50% reduction in water consumption) and more importantly our initiatives are leading the way for a more sustainable research environment in RCSI and fulfilling our sustainability goals.

A big thanks to everyone in Department for their contribution to the newsletter and I hope we have a successful and impactful 2024.

Jochen

Welcome new colleagues!

February: **Elena Perez Morrissey** (RA) – Team Jochen, **Valentina Salari** (Visiting Scientist) – Team Tobias, **Kate Hanratty** (Internship) – Team Omar, **Sean Kerrane** (Internship) – Team Brona) and **Nina Flach** (Visiting Scientist) – Team Marc.

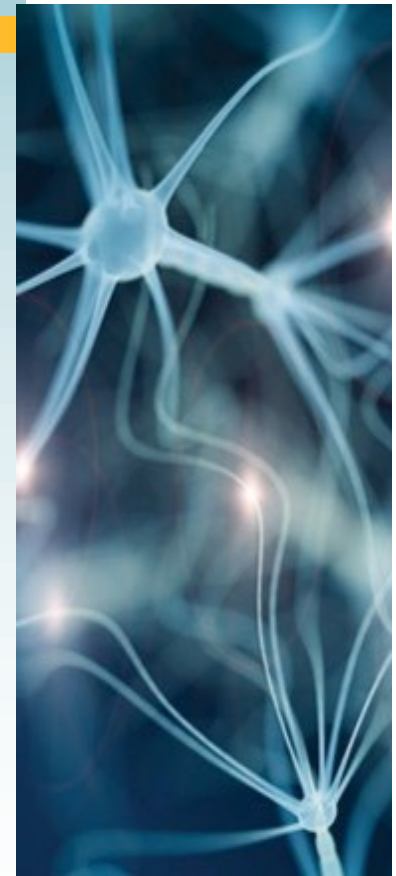
March: **Dr Ludovica Di Martino** (Postdoctoral fellow) – Team Triona and **Florian Osswald** (MSc Student) – Team Brona.

April: **Rocky O'Halloran** (International Engagement Manager) – Team Jochen.

June: **Mohannad Dabbour** (GLIORESOLVE PhD candidate) – Teams Annette & Jochen

September: **Dr Rachel Stewart** (Postdoctoral fellow) and **Barry Maguire** (MD Candidate) – Team Jochen, **Lauren McAuley** (PhD Candidate) – Team Simon, **Suzanne Murphy** (MD Candidate) – Team Annette, **Dr Ana Fernandez** (Postdoctoral fellow), **Olga de Luca** (Visiting Scientist), **Aisling Coady** (Visiting Scientist), and Yitao Wang (PhD Candidate) – Team Tobias, **Dr Cian Darcy** (Postdoctoral fellow) – Team Triona.

October: **Keelan Farnan** (PhD candidate) - Team Triona.



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New Projects, Grants & Theses



Staff Highlight

Dr Shona Pfeiffer

Dr Shona Pfeiffer is a Principal Investigator and Lecturer in the Department of Physiology & Medical Physics. She graduated with a BSc (Hons) degree in Biochemistry in 2007 from University College Dublin (UCD) and subsequently was awarded a PhD in Neuroscience in 2011. She continued her interest in translational neuroscience and novel therapies in the treatment of neurological disorders in the Centre for Systems Medicine, RCSI. Dr Pfeiffer was awarded a Postgraduate Diploma in Health Professions Education in 2016.



Dr Pfeiffer has a particular interest in the molecular mechanisms underlying neuronal injury, neurodegenerative disease and diabetes mellitus, for investigating disease progression and the development of diagnostic, prognostic and novel therapeutic agents for disease modification and neuro-protection in both pre-clinical and clinical settings.

She is also the Deputy Director of the RCSI Research Summer School (RSS) supporting and promoting undergraduate research experience.

Fertility Treatment Policy

RCSI has a HR policy dedicated to support staff undergoing fertility treatments.

You can find the [full policy here](#).

New Doctors! Congratulations



2023 Vivas:

Aileen Harnett, Archita Biswas, Justine Mathoux, Karen Conboy, Kieron White, Lyndsey Flanagan.

In May, Anna Blümel, Elisabeth Jirström, Jorin Bejleri and Kieron White received their diplomas—Congrats to all of you!



Grants and Awards

Congrats to **Prof Henshall** and the **FN team** for the renewal of the funding (a whooping €18M!) for the **FutureNeuro Centre** for another 6 years. His group also secured €600K in funding from Roche. **Dr Simon Furney** was awarded €300K for the project “NoCoSMICC: Non-Coding Somatic Mutations in Colorectal Cancer” under the SFI Frontiers for the Future Programme in May. **Prof**

Brona Murphy was awarded €300K from Enterprise Ireland and **Dr Niamh Connolly** and **Prof Jochen Prehn** were awarded €500K from the JPND programme (HRB).



Dr Niamh Connolly also won

most **Highly cited RCSI Senior Authored paper with Industry collaboration** at Research Day in March while (now Dr) **Lyndsey Flannagan**

took home the award for **Post-graduate in Year 2+ Poster Presentation**. During the IACR in February, **Andrew Roe**



(Team Triona) won the **Best PhD Proffered**

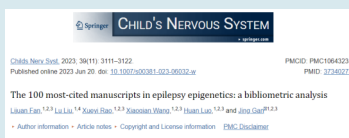
Talk and in October, **Florian Osswald** (Team Brona) was awarded the inaugural Ronnie Fehily Medal for his lay description of his Master's Research. Last, but not least, **Carmen Stepek** won two funding awards: the *Helmholtz Information and Data Science Academy (HIDA) Visiting researcher grant* (€8,168) and the *Shirley Kearney AWC Basel University Study Degree Award* (US\$4,000) and **Javier Villegas Salmeron** won a €300 travel grant to attend the CNIC PHDay. Outstanding work everyone!

Shout-out to...

...Prof Henshall and his team for featuring in first place of the 100 most-cited manuscripts in the fields of Epilepsy and

Epigenetics out of a total of 632 scientists worldwide. [Link here](#).

... and to now **Prof Triona Ní Chonghaile** who got promoted to **Associate Professor** in April.



Meetings and Outreach Events

We started the year with our traditional **Transition Year** programme organised by **Dr Helena Bonner**.



On April 27th we had our first in person departmental meeting since COVID. It was great to see everyone in person again!



We also resumed our seminar series the *Physiology Mini-rounds*, featuring **Prof Brona Murphy**, **Dr Katja Rybakova**, **Dr Simon Furney** and **Dr Nicola Cosgrove** in



March and in



October, **Dr Ian Miller**, **Prof Kevin McGuigan** and **Bhairavi Sawant**.

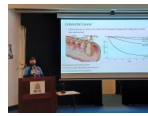
In June, our researchers were involved with

Prof Kevin McGuigan goes viral!

Prof Kevin McGuigan went viral last May with a picture posted on Twitter (now X) which reached more than 10 million views in 24 h!

You can read the whole story [here](#).

the RCSI Research Summer School, which



included lectures and laboratory hands-on workshops.



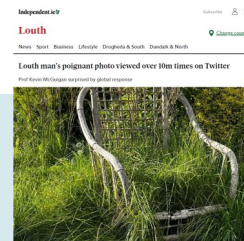
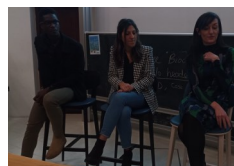
November marked *Science Week* and **Dr Helena Bonner** visited the Midlands to bring a bit of our research to 150 pupils in Laois!



Our 2023 networking day was an *extended* version of our annual get together. We met on December 14th for a full day of activities including an overview of *Future Neuro* centre phase 2 delivered by **Prof David Henshall**, a very useful summary of our current core facilities provided by **Dr Heiko Dussmann** and a positive note on Sustainability (more on page 4) by **Dr Niamh Connolly**.



We closed the day with a chat with three of our department's alumni, **Dr Frank Lincoln**, **Dr Alessandra Di Grande**, and **Dr Catriona Dowling**, who shared their professional experiences to date.



Volunteering

Team Triona got on the bike last April to support the Irish Cancer Society. Well done!



Prof Triona Ní Chonghaile also featured on TG4 documentary "Biseach ón Ailse" (Recovery from Cancer). You can watch the episode (as Gaeilge!) [here](#).



Academic Promotions

All information on the Academic Promotions can be found at the [Staff Portal](#).



60 seconds with...

Alice O'Farrel, Programme Manager

A typical day?

Reviewing budgets, doing grant amendments, organising events BUT mainly my life involves trying to get people to reply to Emails or send me things I need for re-reporting! :)

What's your life motto?

I don't have a life motto...do I need one?

How do you relax?

I've got into Yoga the past couple of years. I love ballet. I love watching cooking shows.

Favourite destination (s)?

South East Asia. I also really like Las Vegas.

If you could step into the shoes of one person for a day, who would it be and why?

A food critic – to try as many different restaurants as possible. Or any Royal Ballet Dancer. These things would not work at the same time!!

Physiology Aurorans



As part of our Department's commitment to foster Gender Equality in Higher Education, another two staff members joined the 2023-2024 cohort of the Aurora programme: **Dr Isabela Aparicio** and **Dr Petra Bencurova**. Aurora is Advance HE's leadership development initiative for women. It is run as a unique partnership bringing together leadership experts, higher education providers and research institutes to take positive action to

address the under-representation of women in leadership positions in the sector. Previous Aurorans in our department include: **Dr Eva Jimenez** (current at TCD), **Dr Niamh Connolly**, **Dr Orlaith Brennan**, **Patsy Connolly** (now at the SPBS).

If you are interested in learning more about Aurora, [follow this link!](#)

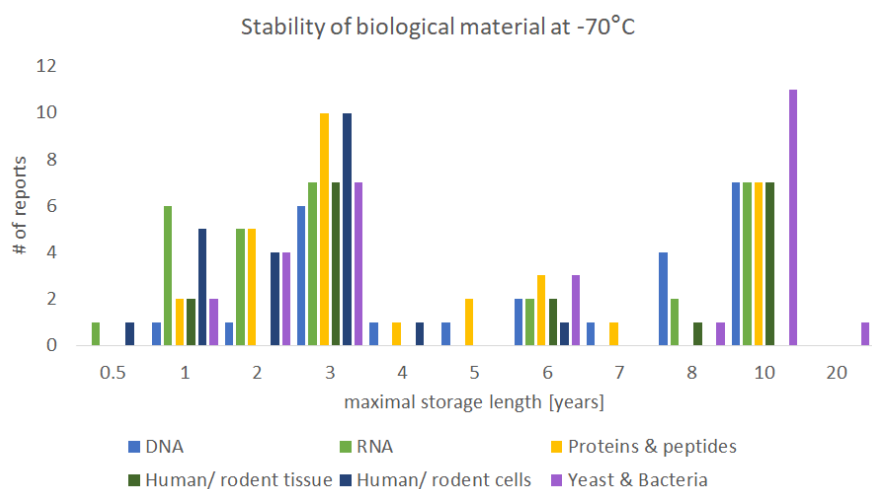
Green Lab Committee

The Physiology & FN labs took part in the 2022-2023 Freezer challenges saving a whopping **30,600Wh per day**, equivalent to reducing our CO₂ emissions by **3,700 Kg over this period**, reflecting in an economy of **€3,318 per year**. Many thanks to everyone who helped clean up their freezers and keep up the good work!



Dr Petra Bencurova also carried out a literature review to ascertain the current knowledge on sample stability at different temperatures (-70°C and -80°C) in ultra-low temperature freezers. While no study directly compared both temperatures, the rich empirical evidence suggests that most biological samples (RNA, protein, human/rodent tissue, tissue lysates, yeast & bacteria) are stable for up to 10 years at -70°C (The preferred temperature for DNA storage is -20°C). Therefore, **-70°C is a recommended setting for ULT freezers containing the majority of biological samples.**

If you have questions about this, contact the Green Lab Team.



Alumni Interview: Ross Gallagher



When did you work in Physiology? September 2010 – May 2015. I joined RCSI pretty much fresh out of college, joining as a research assistant under Dr Caoimhin Concannon, in Prof Jochen Prehn's group. After a little over 1 year, I switched to Department Lab Manager, holding the reigns while Ina Woods was on maternity leave. From there I worked as Senior Technician, until leaving in 2015 when I moved to Co. Cork to start my adventure in the Pharmaceutical Industry.

What are your best memories from your time in Physiology (either professional or social)? I know it is a cliché, but my best memories are the warmth of the people in RCSI and fun working environment. The Physiology department was a melting pot of people from all sorts of cultures and backgrounds. It was a vibrant and joyous place to be.

There were so many laughs along the way, whether it be the weekly pizza and pints nights in the Swan or the myriad of social events hosted by RCSI (Christmas balls / research events). I was also involved with organising a Physiology version of "Come dine with me" and fondly remember a huge snowball fight in front of St. Stephen's Green after a particularly heavy snowfall that closed most of Dublin.

Sporting achievements - We achieved great things!!!! Each year we represented RCSI in the local tag rugby tournament - most of us not having a clue how to play. We may not have won many games, but it was great craic spending time together along the way. It felt like a family.

I very much enjoyed working in research and helping others as lab manager and senior technician. I loved contributing with my small part in helping push academic research forward for patients.

Where are you now (career path since leaving physiology)?

While working in RCSI I was grateful to complete the MSc in Industrial Pharmaceutical Science. This qualification (along with relevant experience) allows for registration with the Health Products Regulatory Authority of Ireland, to act as a Qualified Person for the manufacture of medicines in the EU. A Qualified Person takes personal responsibility for the Quality, Safety and Efficacy of each specific batch of medicines. I now work as a Consultant Qualified Person and enjoy the role immensely, as with helping to provide critical medicines for patients around the world.

What did you take from your time in Physiology which has helped you in your career going forward?

Working in research and as laboratory manager have helped form part of a solid base with respect to understanding how medicines are discovered and how laboratory techniques are performed. A big part of working in research is using critical thinking skills and problem solving. I gladly draw on this experience in my current role as Qualified Person.

Any career advice for students/Post docs who are considering a move away from academia?

Do your research!!! The grass is not always greener. Weigh up the pros and cons of academia versus other roles. Firstly, determine what experience and qualifications are needed to work at your desired role and then put a plan in place as to how to go about achieving these milestones over a defined period of time. Then fully commit.

Interesting personal fact: I am married, have 2 children under 3, a cat named Tron and live in an old converted Schoolhouse and Forge, built before the famine in beautiful East Cork by the sea.



Looking for training?



You can find all training opportunities at the Staff Portal [on this link!](#)

Physiology Awards 2023!



Great vibe at the Iveagh Garden Hotel for our annual departmental Xmas gathering.



Congratulations to all the awardees: **Dr Mona Heiland** won the *Most Impactful Publication Award 2023*; **Dr Niamh Connolly** was awarded the *Teaching/Mentoring Champion*; **Dr Éanna Ryan** got a prize for the *Most Engaging Progress Report*; and congrats to **Dr Amaya Sanz Rodriguez** for being the *Team Player of the Year 2023*! Well done everyone and thanks to the organizers.

Publication and funding output, analysed by gender

Athena SWAN Physiology & Medical Physics Data Workstream (Niamh Connolly [lead], Kieron White)

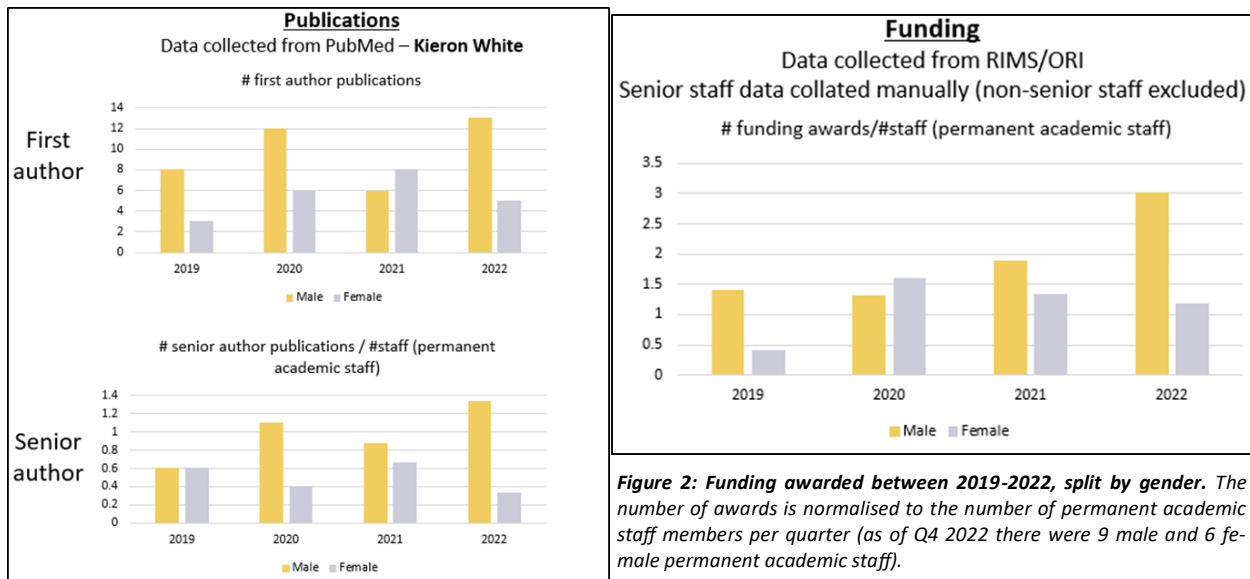


Figure 1: Publication output by gender, 2019-2022. (Top) Number of first author publications. (Bottom) Number of senior author publications, normalised by senior staff numbers.

Figure 2: Funding awarded between 2019-2022, split by gender. The number of awards is normalised to the number of permanent academic staff members per quarter (as of Q4 2022 there were 9 male and 6 female permanent academic staff).

EDI Networks

RCSI has six staff equality networks. These are driven by staff interests and supported by the EDI Unit. The EDI Networks are championed by Senior Management Team sponsors and driven by staff themselves with rotating staff chairs each year. Staff networks include:

- ◇ Age Friendly Network;
- ◇ Intercultural Network;
- ◇ Men's Shed;
- ◇ Parents and Carers Network;
- ◇ Pride Network;
- ◇ Women's Network.

More information can be found [here](#).



Athena SWAN Comms Team

Isabela Aparicio

Helena Bonner

Liam Shiels

Meghma Mitra

Got an update? Comment?

Criticism?

Get in touch with us:

Athenacommsphysiol@rcsi.ie

Or through our

[Suggestion Box](#)



We would love to hear from anyone in the Department interested in trying their hand in Communications!

Also, the Athena SWAN SAT is looking for new members, in particular PhD candidates to join our very active and dynamic team! Contact Isabela, Orlaith or Christopher if you're interested.

Recent Publications

- Bianchi C, *et al.* (2023) P2X7 receptor inhibition ameliorates ubiquitin-proteasome system dysfunction associated with Alzheimer's disease. *Alzheimers Res Ther* 15(1): 105.
- Biswas A, *et al.* (2023) Comparative analysis of deeply phenotyped GBM cohorts of 'short-term' and 'long-term' survivors. *J Neurooncol* doi: 10.1007/s11060-023-04341-3.
- Brindley E, *et al.* (2023) Brain cell-specific origin of circulating microRNA biomarkers in experimental temporal lobe epilepsy. *Front Mol Neurosci.* 2023 Sep 22;16:1230942.
- Caulfield C, *et al.* (2023) BF2-Azadipyrromethene Fluorophores for Intraoperative Vital Structure Identification. *Molecules* 28(5): 2167.
- Chenna S, *et al.* (2022) Mechanisms and mathematical modeling of ROS production by the mitochondrial electron transport chain. *Am J Physiol Cell Physiol* 323(1): C69-C83.
- Cosgrove N, *et al.* Predictive modelling of response to neoadjuvant therapy in HER2+ breast cancer. *NPJ Breast Cancer.* 2023 Sep 27;9(1):72.
- de Diego-García L, *et al.* CPEB4-CLOCK crosstalk during temporal lobe epilepsy. *Epilepsia.* 2023 Oct;64(10):2827-2840.
- Duggan WP, *et al.* (2023) Increased *Fusobacterium* tumoural abundance affects immunogenicity in mucinous colorectal cancer and may be associated with improved clinical outcome. *J Mol Med (Berl)* 101(7): 829-841.
- Engel T (2023) The P2X7 Receptor as a Mechanistic Biomarker for Epilepsy. *Int J Mol Sci* 24(6): 5410.
- Fashina IA, McCoy CE & Furney SJ (2023) *In silico* prioritisation of microRNA-associated common variants in multiple sclerosis. *Hum Genomics* 17(1):31.
- Fitzgerald MC, *et al.* The identification of BCL-XL and MCL-1 as key anti-apoptotic proteins in medulloblastoma that mediate distinct roles in chemotherapy resistance. *Cell Death Dis.* 2023 Oct 28;14(10):705.
- Heiland M, *et al.* MicroRNA-335-5p suppresses voltage-gated sodium channel expression and may be a target for seizure control. *Proc Natl Acad Sci USA* 2023 Jul 25;120(30):e2216658120.
- Jørgensen ACS, Hill CS, Sturrock M, Tang W, Karamched SR, Gorup D, Lythgoe MF, Parrinello S, Marguerat S & Shahrezaei V (2023) Data-driven spatio-temporal modelling of glioblastoma. *R Soc Open Sci* 10(3): 221444.
- Kesavan J, *et al.* Functional expression of the ATP-gated P2X7 receptor in human iPSC-derived astrocytes. *Purinergic Signal.* 2023 Jul 15.
- Leister H, *et al.* Immunoproteasome deficiency results in age-dependent development of epilepsy. *Brain Commun.* 2024 Jan 29;6(1):fcae017. doi: 10.1093/braincomms/fcae017.
- Llorente-Folch I, *et al.* Ketone body β -hydroxybutyrate (BHB) preserves mitochondrial bioenergetics. *Sci Rep.* 2023 Nov 11;13(1):19664.
- Matveeva A, *et al.* Integrated analysis of transcriptomic and proteomic alterations in mouse models of ALS/FTD identify early metabolic adaptations with similarities to mitochondrial dysfunction disorders. *Amyotroph Lateral Scler Frontotemporal Degener.* 2023 Oct 1:1-15.
- Morgan J, *et al.* (2023) Increased uptake of the P2X7 receptor radiotracer 18F-JNJ-64413739 in the brain and peripheral organs according to the severity of status epilepticus in male mice. *Epilepsia* 64(2):511-523.
- Nair SS, *et al.* (2023) Life cycle assessment comparison of point-of-use water treatment technologies: solar water disinfection (SODIS), boiling water, and chlorination. *J Environ Chem Eng.* 11(3):110015.
- O'Dowd K, *et al.* (2023) Polypropylene based transparent jerry cans for solar disinfection (SODIS): An investigation into its effectiveness, water sample toxicity and suitability. *J Environ Chem Eng* 11: 109787.
- Sawant B, *et al.* (2023) Good optical transparency is not an essential requirement for effective solar water disinfection (SODIS) containers. *J Environ Chem Eng* 11 (3): 110314.
- Smith J, *et al.* (2023) The P2X7 receptor contributes to seizures and inflammation-driven long-lasting brain hyperexcitability following hypoxia in neonatal mice. *Br J Pharmacol.* 180(13):1710-1729.
- Smith J, *et al.* (2023) Differently expression of the metabotropic P2Y receptor family after hypoxia-induced seizures in neonates and seizure suppression via P2Y1 receptor agonism. *Purinergic Signal* doi: 10.1007/s11302-023-09923-4.
- Wang Y, Engel T, Teng X. Post-translational regulation of the mTORC1 pathway: A switch that regulates metabolism-related gene expression. *Biochim Biophys Acta Gene Regul Mech.* 2024 Mar;1867(1):195005.
- White K, *et al.* (2023) Identification, validation and biological characterisation of novel glioblastoma tumour microenvironment subtypes: implications for precision immunotherapy. *Ann Oncol* 34(3): 300-314.
- Wong ZW & Engel T (2023) More than a drug target: Purinergic signalling as a source for diagnostic tools in epilepsy. *Neuropharmacology* 222: 109303.
- Zhang H, *et al.* (2023) Histone Deacetylase 6 Inhibition Exploits Selective Metabolic Vulnerabilities in LKB1 Mutant, KRAS Driven NSCLC. *J Thorac Oncol* 18(7): 882-895.