Conference: British Society for Proteome Research (BSPR) 2022, St Anne's College Oxford (3-6 th July) Theme: Next Generation Proteomics Sessions: Native/Structural Proteomics, Systems Biology/Networks, Towards P5 medicine, Chemical Biology, Bioinformatics, Imaging and Spatial Proteomics, One Health Research, Next Generation Technology Keynote Speakers: Sir Peter Radcliffe, Perdi Barran, Evangelina Petasalki, Manuel Mayr, Sabine Flitsch, Christopher Tape, Matthew Collins, Anne-Claude Gingras, Mike Gilette, Melanie Bailey, Claire Eyers, Alfredo Castello Why did I attend BSPR 2022 Conference? I attended BSPR2022 because I am very interested in next generation proteomics, especially in how spatial and therefore the underlying structural information can enrich the depth of information able to be obtained. I am also interested in how proteomic data can be linked to other omic data such as transcriptomics providing greater insight into the mechanisms underlying disease and how treatments can be tailored to patients using a personalised approach. It was also a valuable experience to share one of my current projects as a poster, discuss different proteomic advances with other and gain insight into the cutting-edge research being carried out. Conference Highlights I enjoyed so many talks, learnt so much and heard about lots of interesting applications of proteomics it was hard to narrow down my highlights of the BSPR2022 conference, but below are a few standouts.

1. Matthew Collins – The Challenges and Opportunities of studying ancient proteins A fascinating talk by the inventor of the ZooMS (quick) method wrongly described as referring to as zoo archaeology on Wikipedia, describing how he applies MALDI-TOF MS to archaeology. A technique "so easy kids can do it"! Using MALDI-TOF MS in my drug discovery research, whilst I'd read about its ability to type meat, animals and remains e.g. skeletal remains found, I had not before connected this to medieval manuscripts - written on animal skins, but with the information of when and where they were published, so a far more value source of archaeological information. The ability

of the technique to solve questions which have confounded zoologists or other types of archaeologists for hundreds of years such as are Thunderbirds more related to chicken's or other bird species? However, preserving artefacts from the past is important and it was astonishing to hear the wealth of data provided from protective cleaning waste e.g. eraser rubbings/bone chips or electrostatics technics used to pull molecules off the surface of artefacts without damaging them.

2. How important are neutrophils in human health and disease? Throughout the conference, other than proteomics, the importance of neutrophils and the instrumental role they play in inflammation was highlighted, as neutrophils were a key part of every oral presentation in the 'Towards P5 medicine' session from cardiovascular to cystic fibrosis to periodontal disease. Furthermore, later in the conference, Alejandro J Brenes, Dundee University discussed the effect of COVID-19 on proteomic neutrophil signature – showing that in early infection those patients who are more severely ill and have delayed recovery do not have robust interferon signals and a lot more changes in the proteome resulting from impaired killing and survival of neutrophils. Interestingly, when isolating neutrophils the population contains ~3% eosinophils and PRG 2 & 3 proteins are highly expressed in eosinophils but not neutrophils and change with disease severity making these good biomarkers.

3. Solvent precipitation SP3 (SP4) enhances proteomics sample preparation without magnetic beads (Poster) Harvey Johnston, Babraham Institute presented an improved method for performing proteomics sample preparation at a much reduced cost which he has termed 'SP4'. SP4 uses 4x volumes of 80% acetonitrile captured with centrifugation instead of magnetic beads but glass beads did improve the SP4 handling. SP4 matched or outperformed SP3 and was comparable with S-TRAP for inputs 1-5000 µg. Moreover, it was much more compatible with detergents and salts, producing a

deeper proteome coverage, offering a faster and much cheaper method which we are looking forward to trying in our own lab.

4. Networking Event run by Young Proteomics Investigators Club (YPIC) YPIC offered a rare opportunity to chat with some inspirational proteomics professionals over lunch, discussing our research and gaining insights both into future steps we could take in both our research and careers. One piece of advice that has really stuck with me was from Professor Claire Eyers, paraphrased – follow research that interests you, and allow it to shape your career.

5. Sir Peter Radcliffe – Signalling oxygen levels by protein hydroxylation Hearing from Sir Peter Radcliffe was the perfect close to the conference, discussing his research into hypoxia – the reason why your mothers/ partners/ friends plants die when you overwater them is due to hypoxia, and the gene responsible also works in human cells! It was interesting and inspirational to hear from someone who made a Nobel Prize-winning breakthrough. He challenged us to tackle unfashionable problems, answerable in your hands and emphasised that scientifically one of the hardest things to learn is when to call negative results and to understand their importance in the big picture of the research being carried out. Conclusions Overall, attending BSPR provided me with an invaluable opportunity for both my research and career development. I was very grateful to be able to discuss my work with others, gain insight into their different methods and how they applied them in their own research. Moreover, amongst so much exciting research, it was amazing to be awarded the best poster prize at the conference.