Harry Whitwell, PhD

Director - British Society for Proteomic Research

M: 07917 607910 E: harrywhitwell@gmail.com
Skype: harrywhitwell W: www.imperial.ac.uk/people/h.whitwell

Employment

Proteomics Platform Lead for the National Phenome Centre, with Dr Matthew Lewis, Prof Julian Griffin and Prof Zoltan Takats, Systems medicine, Dept of Metabolism, Digestion and Reproduction, Imperial College London (11th June 2020 - Current)
This position is to establish proteomics capabilities within the Division of Systems Medicine through undertaking a novel programme of research and establishing collaborations both within the institution and externally. My research is to investigate the role of protein methylation in cancer with particular focus on the relationship between metabolobic changes arising from MTAP deletion (occurs in 15% of all cancer) and protein methylation.

- Develop analytical and methodological methodology for analysing protein methylation through bespoke enrichment protocols and bioinformatics software.
- Establish serum and plasma proteomics using DIA methodologies, such as SONAR-MS/MS.
- Establish label-free quantitative DIA workflows (nLC-MS^e) for general proteomics analysis and targetted peptide quantification pipelines.
- Responsible for running and maintaining analytical equipment, advising other PI's on proteomic aspects to their projects and establishing lasting collarborations.

Post Doctoral Researcher, Lab of Dr Peter DiMaggio and Prof Matthew Fuchter, Imperial College London, (May 2017 -11th June 2020)
Identifying interactions between methyltransferase and unknown substrates. Developing methods for quantitative histone analysis and for methyl-enrichment.

- LC-MS/MS of post translational modifications.
- Management, maintenance and method development for LC-MS/MS (Orbitrap).
- Histone epigenetic code.
- Data analysis by novel techniques, such as parenclitic networks for identifying changes in data proteomic data sets.
- Development of unbiased methyl-lysine enrichment via chemical modification for MS.
- Enzymatic assays and chemical probes for methyl-transferase enzymes.
- Supervision of MSc and PhD students.
- Lecturing in proteomics for MSc Genomic Medicine and teaching R programming.
- Computational method development for identifying SILAC pairs and general proteomic analysis.

Post Doctoral Researcher, Lab of Dr John F Timms, University College London, (August 2015 - May 2017)
Investigating and identifying novel serum biomarkers for ovarian cancer by label-free LC-MS/MS and array-based technologies.

- Proteomic analysis of whole serum in longitudinal patient samples.
- Acquisition of TMT-labelled and quantitative label-free data sets to identify potential new serum biomarkers with validation by ELISA.
- Generation of longitudinal models for ovarian cancer prediction using R statistical programming.
- Development of a new network analysis approach based on parenclitic networking. This can be applied to all fields of biological sciences - e.g. phosphorylation effects of global data.
- Key responsibilities also included Trouble shooting and repairing HPLC (Ultimate 3000) nanoLC-MS/MS (LTQ-Orbitrap XL, ThermoScientific).
- Lecturing on proteomics and the proteome on MSc Biomedicine.
- Investigation of PTMs e.g. protein-phosphorylation, protein-glycosylation and cysteine-nitrothiolation.

- Development of novel multiplexed, label free quantitation (MultiPAQ).
- Collaborations with Dr William Horsnel (University of Capetown), Prof. Philip Eaton (Kings College London) and Dr Jens Madsen (University College London).

Product Licence Assistant, Reckitt Benckiser, Hull - (2011-2012)
Managing European and global pharmaceutical licences for a number of key products. Communicating with offices distributed globally. Time management and organisation was critical due to differences in time zones and ensuring licence changes were compiled within strict legal time frames.

Qualifications

PhD Candidate, Lab of Dr Jens Madsen, Dr Paul Skipp and Prof Howard Clarke, University of Southampton, (2012-2016)
Thesis: "Nanoparticles, their Protein Corona and Impact on the Immune Function of Human Lung Cells".

- Investigation of nanoparticle interactions with proteins and lipids using nanoLC-MS^{E} (Synapt G2S and QTof Ultima, Waters), LC-MS/MS (Xevo TQ, Waters).
- *cell culture, primary cell isolation, qPCR, immunohistochemistry, electron and fluorescent microscopy.*
- *protein purification* (affinity chromatography, SEC, off-gel fractionation, dialysis).
- Analysis and handling or large data sets (e.g. cell lysate proteomes) with consideration of network-interactions.

Masters (MSc) in Bioscience Technologies, University of York (2010-2011)
Theory and practical knowledge of techniques for protein production, proteomics, genomics, biophysical techniques and bioinformatics. A research placement at the Food and Environmental Research Agency (FERA) developing a novel assay for the detection and serotyping of *Salmonella* by LC-MS/MS (Q-Exactive, ThermoScientific).

BSc(Hons) 2:1 - Biology, University of York, (2007-2010)
Modules included: Cancer and the Cell Cycle, Molecular Biology, Biochemistry, Cellular Biology, Genetics and Gene Expression. Dissertation: "Control of Shoot Branching in Willow" During this project I investigated auxiliary root activation in Willow and the timing between PIN1 polarisation and vascularisation using PIN1:GFP *Arabidopsis* models and Willow buds. Techniques involved light microscopy, confocal microscopy and SEM. Dissertation completed under the supervision of Prof Ottoline Leyser.

Woodhouse Grove School, Apperley Bridge (1999-2007)
A Levels: Maths (A), Biology (A), Chemistry (B), Geography (AS-Level, A)

Grants and Awards

£10,183.42 - UKDRI Collaborative Proteomics Studies Award (2021) Nuclear Factors Associated with Microglia Activation as Modulators of Disease-associated Cell States.
£14,205 - UKDRI Collaborative Proteomics Studies Award (2021) Developing a High Throughput Protoemic Assay for Dementia Research.
£557,000 - MRC-NIHR Methodology Research Programme - Co-investigator (January 2019-2022) Construction of graph-based network longitudinal algorithms to identify screening and prognostic biomarkers and therapeutic targets (GBNLA).
£1,500 - MJ Dunn Fellowship, BSPR 2017 Competitive award judged on the merit of submitted abstracts.
£1,500 - British Society of Immunology travel grant (2015) Competitive award judged on the merit of submitted abstract.
Poster Award - F1000 Poster of the Month (2015) "Nanoparticles, their protein corona and effect on the immune function of human lung cells"
£1,500 - British Society of Immunology travel grant (2014) Competitive award judged on the merit of submitted abstract.

Evidence of Esteem

- Organising committee member and communications officer of the London Proteomics Discussion Group. In this role, I developed the seminar series website: www.londonproteomics.co.uk (2019-current)
- Elected director of the British Society for Proteome Research (2018-current)
- Lecturing on masters courses in proteomics at Imperial College and University College London (2016-current)
- Supervision and management of PhD and MRes students.
- Invited speaker to Volga Neuroscience (2018)
- Speaker at HUPO (2018)
- Society Memberships: British Society for Proteome Research, Human Proteome Organisation
- Numerous personal collaborators worldwide.
- Organisation of outreach events to support schools in Science.

Conference Presentations

University of Bologna, Department of Experimental, Diagnostic and Speciality Medicine, University of Bologna 2018
Invited to present a seminar: "Parenclitic Networks Applied to Ovarian Cancer Predictiona and Their Further Applications with Emphasis on SNP-SNP Interactions"

Volga Neuroscience 2018
Invited Speaker: "Parenclitic Networks Applied to Ovarian Cancer Prediction"

Human Proteome Organisation Annual Symposium 2017
Presentation: "Longitudinal and Network-Based Biomarker Models for the Prediction of Ovarian cancer"

Department of Women's Health Annual Conference 2016
Presentation: "Longitudinal Analysis of Serum Biomarkers for the Diagnosis of Ovarian Cancer"

London Biological Mass Spectrometry Discussion Group Meeting, March 2016
Presentation: "Nanoparticles - Interactions with Pulmonary Epithelial Lining Fluid"

FENAC Academic Workshop, March 2016
Presentation: "Nanoparticles - Interactions with Pulmonary Epithelial Lining Fluid"

British Society for Proteomic Research, July 2015
Poster: "Using mass spectrometry to characterise the interaction of airborne nanoparticles with pulmonary lipids and proteins"

5th Zing Bionanomaterials Conference, April 2015
Poster: "Nanoparticles Interacting with Protein and Lipids can Disrupt Pulmonary Surfactant" Awarded BSI Travel Grant to attend.

Royal Society Bio-Nano Interactions Conference 2014
Poster: "Nanoparticles, Their Protein Corona and Impact on the Immune Function of Lung Cells"

British Society of Immunology Congress, 2014
Poster: "Nanoparticles, Their Protein Corona and Impact on the Immune Function of Lung Cells"

FENAC Seminar Series, 2013
Presentation: Nanoparticles, Their Protein Corona and Impact on the Immune Function of Lung Cells"

Publications

Manuscripts in Print:

14. Di Blasi, R., Blyuss, O., Timms, J. F., Conole, D., Ceroni, F., and **Whitwell, H. J.** (2021) Non-Histone Protein Methylation: Biological Significance and Bioengineering Potential. ACS Chem. Biol. acschembio.0c00771.

13. Demichev, V., Tober-Lau, P., Nazarenko, T., Thibeault, C., **Whitwell, H.**, Lemke, O., Röhl, A., Freiwald, A., Szyrwiel, L., Ludwig, D., Correia-Melo, C., Helbig, E. T., Stubbemann, P., Grüning, N.-M., Blyuss, O., Vernardis, S., White, M., Messner, C. B., Joannidis, M., Sonnweber, T., Klein, S. J., Pizzini, A., Wohlfarter, Y., Sahanic, S., Hilbe, R., Schaefer, B., Wagner, S., Mittermaier, M., Machleidt, F., Garcia, C., Ruwwe-Glösenkamp, C., Lingscheid, T., Bosquillon de Jarcy, L., Stegemann, M. S., Pfeiffer, M., Jürgens, L., Denker, S., Zickler, D., Enghard, P., Zelezniak, A., Campbell, A., Hayward, C., Porteous, D. J., Marioni, R. E., Uhrig, A., Müller-Redetzky, H., Zoller, H., Löffler-Ragg, J., Keller, M. A., Tancevski, I., Timms, J. F., Zaikin, A., Hippenstiel, S., Ramharter, M., Witzenrath, M., Suttorp, N., Lilley, K., Mülleder, M., Erik Sander, L., group, S., Ralser, M., and Kurth, F. (2020) A time-resolved proteomic and diagnostic map characterizes COVID-19 disease progression and predicts outcome. medRxiv 2020.11.09.20228015.

12. Watson A, Sørensen GL, Holmskov U, **Whitwell HJ**, Madsen J, Clark H. Generation of novel trimeric fragments of human SP-A and SP-D after recombinant soluble expression in E. coli. Immunobiology [Internet]. 2020 May 27 [cited 2020 May 28];151953. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0171298520301546

11. **Whitwell HJ**, Bacalini MG, Blyuss O, Chen S, Garagnani P, Gordleeva SY, et al. The human body as a super network: digital methods to analyse propagation of ageing. Front Aging Neurosci. 2020 May 25;12:136.

10. **Whitwell, HJ**, Worthington, J., Blyuss, O., Gentry-Maharaj, A., Ryan, A., Gunu, R., Kalsi, J., Menon, U., Jacobs, I., Zaikin, A., Timms, J.F. Improved early detection of ovarian cancer using longitudinal multimarker models. 2020. Br. J. Cancer 1–10. https://doi.org/10.1038/s41416-019-0718-9

9. **Whitwell HJ**, DiMaggio Jr P, HiLight-PTM: An Online Application to Aid Matching Peptide Pairs with Isotopically Labelled PTMs. Bioinformatics. 2019 ISSN: 1367-4803 https://doi.org/10.1093/bioinformatics/btz654

8. **Whitwell HJ**, Blyuss O, Menon U, Timms JF, Zaikin A. Parenclitic networks for predicting ovarian cancer. Oncotarget [Internet]. 2018; 9: 22717–26. doi: 10.18632/oncotarget.25216.

7. Cuenco J, Wehnert N, Blyuss O, Kazarian A, **Whitwell HJ**, Menon U, Dawnay A, Manns MP, Pereira SP, Timms JF, Cuenco J, Wehnert N, Blyuss O, et al. Identification of a serum biomarker panel for the differential diagnosis of cholangiocarcinoma and primary sclerosing cholangitis. Oncotarget [Internet]. Impact Journals; 2018; 9: 17430–42. doi: 10.18632/oncotarget.24732.

6. Wolhuter K, **Whitwell HJ**, Switzer CH, Burgoyne JR, Timms JF, Eaton P. Evidence against Stable Protein S-Nitrosylation as a Widespread Mechanism of Post-translational Regulation. Mol Cell. 2018; 69: 438–450.e5. doi: 10.1016/j.molcel.2017.12.019.

5. Krishnan S, **Whitwell HJ**, Cuenco J, Gentry-Maharaj A, Menon U, Pereira S, Gaspari M, Timms J. Evidence of Altered Glycosylation of Serum Proteins Prior to Pancreatic Cancer Diagnosis. Int J Mol Sci [Internet]. Multidisciplinary Digital Publishing Institute; 2017; 18: 2670. doi: 10.3390/ijms18122670.

4. Thawer S, Auret J, Schnoeller C, Chetty A, Smith K, Darby M, Roberts L, Mackay R, **Whitwell HJ**, Timms JF, Madsen J, Selkirk ME, Brombacher F, et al. Surfactant Protein-D Is Essential for Immunity to Helminth Infection. PLoS Pathog [Internet]. Public Library of Science; 2016; 12: e1005461. doi: 10.1371/journal.ppat.1005461.

3. **Whitwell HJ**, Mackay R, Elgy C, Morgan C, Griffiths M, Clark H, Skipp P, Madsen J. Nanoparticles in the lung and their protein corona: the few proteins that count. Nanotoxicology [Internet]. Informa UK Limited, trading as Taylor 8 Francis Group; 2016; 10: 1385–94. doi: 10.1080/17435390.2016.1218080.

2. Kendall M, Hodges NJ, **Whitwell HJ**, Tyrrell J, Cangul H. Nanoparticle growth and surface chemistry changes in cell-conditioned culture medium. Philos Trans R Soc Lond B Biol Sci [Internet]. 2015; 370. doi: 10.1098/rstb.2014.0100.

1. McKenzie Z, Kendall M, Mackay R, **Whitwell HJ**, Elgy C, Ding P, Mahajan S, Morgan C, Griffiths M, Clark H, Madsen J. Surfactant protein A (SP-A) inhibits agglomeration and macrophage uptake of toxic amine modified nanoparticles. Nanotoxicology [Internet]. 2015; 5390: 1–11. doi: 10.3109/17435390.2014.992487.

Manuscripts in Preparation:

- **Whitwell HJ**, Townsend P, Kirjakulov A, McKay R, Kostner G, Mackay R, Clarke H, Skipp P, Madsen J; Cationic Nanoparticles Disrupt Pulmonary Surfactant by Depleting Anionic Surfactant Phospholipids. SUBMITTED to Environmental Science: Nano (Jan 2021)
- **Whitwell HJ**, DiMaggio P, Fuchter M. Stable isotope labelling with engineered co-factors as a means to track enzyme-specific protein methylation. Intending to submit to Nature Chem Bio. 2020.

Other:

- **Whitwell HJ**, Skipp P, Warner J, Griffiths M, Morgan C, Clark H, Madsen J. Nanoparticles, their protein corona and effect on the immune function of human lung cells. F1000Research [Internet]. 2014 [cited 2016 May 5]; 5. doi: 10.7490/f1000research.1097319.1.
- **Whitwell, HJ** and Watson, A. BSI Wessex Immunology Group Meeting. *Immunology News*, P16-17 (May 2013)