

Malcolm F. White FRSE, member of EMBO

Current Position

Professor of Biochemistry, Biomedical Sciences Research Complex, School of Biology, University of St Andrews, Scotland.

- Career**
- 2014-2017 Head of School of Biology, University of St Andrews.
 - 2007-2013 Director of Research, School of Biology, University of St Andrews.
 - 2004- Professor of Biochemistry, University of St Andrews.
 - 2001-2004 Royal Society URF & Reader, School of Biology, University of St Andrews.
 - 2000-2001 Royal Society URF & Lecturer, School of Chemistry, University of St Andrews.
 - 1997-2000 Royal Society URF, Department of Biochemistry, University of Dundee.
 - 1995-1996 Cancer Research Campaign Postdoctoral Fellow, with Professor David Lilley *FRS*.
Department of Biochemistry, University of Dundee.
 - 1993-1994 Fulbright Visiting Research Fellow, with Professor Jack F. Kirsch. M.C.B. Department, University of California, Berkeley.
 - 1990-1992 Research Fellow, with Dr Linda Gilmore. Department of Biochemistry, University of Edinburgh.

Education

- 1982-86 BSc Hons Biochemistry 1st Class, University of Aberdeen.
- 1986-90 PhD Biochemistry, University of Edinburgh.

Recognition / Awards

- 2021 ERC Advanced Grant Awardee
- 2021 UK PhD Supervisor of the Year Award (FindaPhD.com)
- 2014 Royal Society Wolfson Research Merit Award
- 2010 Elected to the European Molecular Biology Organisation (EMBO)
- 2010 Deputy Chair of the Biochemical Journal
- 2008 Elected to Royal Society of Edinburgh
- 1996 Royal Society University Research Fellowship

Summary of research activity

155 journal publications, 8 book chapters. (ORCID ID 0000-0003-1543-9342)
H – index 60 (Google Scholar); 54 (Scopus)
£9.3 M (£2.4M current) in grant awards as PI

Research

I lead a group in the inter-disciplinary Biomedical Sciences Research Complex at St Andrews University. Our primary area of interest is the mechanisms bacteria use to defend themselves against viral infection, including type III CRISPR and CBASS systems that function via cyclic oligoadenylate signalling. Our research utilises techniques in biochemistry, enzymology, molecular biology, proteomics, bioinformatics, biophysics and microbiology.

Leadership Roles

2014-2017 Head of School of Biology

As HoS I was line manager for ~70 academics. The School is spread over six building and 3 interdisciplinary research centres. In 2016 the School achieved a ranking of 1st in student satisfaction (NSS) for both biochemistry and zoology. Overall league table success has included a historically high ranking of 2nd in the UK in the 2018 Guardian University Guide. We were awarded an Athena Swan Bronze award in 2014 and a Silver award in Nov 2017.

2007-2013 **Director of Research, School of Biology**

Responsible for research management and strategy, and in particular the Biology submissions to the Research Excellence Framework (REF) in 2014. I coordinated the Biology REF submission and wrote the documentation. This included the development of six impact case studies for REF2014 all rated as 4* - world leading, placing St Andrews second in the UK for impact. I took a leading role in developing, researching and writing impact case studies.

Professional Contribution

- 2019- Royal Society *Open Science* Subject Editor for Biochemistry, Molecular and Cell Biology
- 2021- Royal Society of Edinburgh member of the “Gender” nomination panel
- 2019-2021 Member of the “Cell and Molecular Biology” sectional committee of the RSE
- 2018-2021 Review Panel Member for German Research Foundation DFG Priority Programme
- 2017-2022 Editorial Board member of “The CRISPR Journal”

Current Grant Awards as PI

- BBSRC Project Grant – Dissecting Mol Biol of *cOA signalling* 01/20-12/23, £720k.
- ERC Advanced Grant – CBASS: Life, Death and cyclic nucleotides, 07/21-06/26, €1.78M.

Patents

1. UK Patent Application No. 1902256.5: Novel Enzyme for phage therapy. Filed 19/2/2019
2. Cas10-based assay for nucleic acid detection. WO2022223956A1 priority 2021-04-20.

Selected recent papers as corresponding author (* joint)

Antiviral Type III CRISPR signalling via conjugation of ATP and AdoMet Chi H, Hoikkala V, Gruschow S, Graham S, Shirran S and White MF (2023) **Nature**. In revision.

<https://doi.org/10.1101/2023.06.26.546636>

Cyclic nucleotide-induced superhelical structure activates a TIR immune effector

Hogrel G, Guild A, Rickman H, Gruschow S, Bertrand Q, Graham S, Spagnolo L and White MF (2022) **Nature** 608, 808-812.

Tetramerisation of the CRISPR ring nuclease Crn3/Csx3 facilitates cyclic oligoadenylate cleavage

Athukoralage JS, McQuarrie S, Gruschow S, Graham S, Gloster TM* and White MF* (2020) **eLife** 9:e57627.

The dynamic interplay of host and viral enzymes in type III CRISPR-mediated cyclic nucleotide signalling

Athukoralage JS, Graham S, Rouillon C, Gruschow S, Czekster CM and White MF (2020) **eLife**, 9:e55852.

Structure and mechanism of a Type III CRISPR defence DNA nuclease activated by cyclic oligoadenylate

Zhu W, Graham S, Rambo R, White MF* and Gloster TM* (2020) **Nat Commun** 11(1):500.

An anti-CRISPR viral ring nuclease subverts type III CRISPR immunity Athukoralage JS, McMahon SA,

Zhang C, Gruschow S, Graham S, Krupovic M, Whitaker RJ, Goster TM* and White MF* (2020) **Nature** 577 (7791), 572-575.

Cyclic oligoadenylate signalling mediates Mycobacterium tuberculosis CRISPR defence Gruschow S,

Athukoralage JS, Graham S, Hoogeboom T and White MF (2019) **Nucleic Acids Res** 47 (17), 9259-9270.

Ring nucleases deactivate type III CRISPR ribonucleases by degrading cyclic oligoadenylate

Athukoralage JS, Rouillon C, Graham S, Gruschow S and White MF (2018) **Nature** 562, 277-280.

Control of cyclic oligoadenylate synthesis in a type III CRISPR system Rouillon C, Athukoralage JS,

Graham S, Gruschow S and White MF (2018) **eLife** 7:e36734.

Intrinsic sequence specificity of the Cas1 integrase directs new spacer acquisition Rollie C, Schneider S,

Brinkmann AS, Bolt EL and White MF (2015) **eLife** 10.755/eLife.08716.