

Gregory John Towers

Professor of Molecular Virology, Division of Infection and Immunity, UCL

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Education, Qualifications and Past Posts

2006 Professor of Molecular Virology, Division of Infection and Immunity, UCL

2005-2021 Wellcome Trust Senior Biomedical Research Fellowship, renewed in 2010 and 2015, "Characterisation of innate immune DNA sensing and viral evasion strategies" held at Division of Infection and Immunity UCL.

2002 Sabbatical at Columbia University, College of Physicians and Surgeons, New York, USA lab of Prof Stephen P. Goff.

2001-2005 Wellcome Trust Research Career Development Fellowship "Investigation of the early post entry events of the retrovirus life cycle and mechanisms of retrovirus restriction" held at Division of Infection and Immunity UCL.

2000-2001 Senior Post Doctoral Research Fellow, Wohl Virion Centre, Lab Head Prof Robin Weiss, Dept of Immunology and Molecular Pathology, UCL. Investigation of the retroviral lifecycle and mechanisms of retrovirus restriction.

1998-1999 Staff Scientist, "Genethon" Gene Therapy Institute, Evry, France. Investigation of the retroviral lifecycle and mechanisms of retrovirus restriction as applied to gene therapy.

1995-1997 Postdoctoral Research Fellow, National Institute of Medical Research, lab of Dr Jonathan Stoye. Identification of the retroviral restriction gene Fv1 and investigation of anti-viral mechanism.

1991-1995 Ph.D. Control of the HIV-1 promoter by retinoic acid. Chester Beatty Labs, Institute of Cancer Research, Dept of Cellular Biology (Dr M.K. Collins) and University College London, Dept of Molecular Pathology, (Prof D.S. Latchman).

1988-1991 University of Surrey. B.Sc.(hons) Biochemistry, First Class

Current funding

Albion VC Fund "Development of Transduction Enhancer for ex-vivo stem cell gene therapy" PI with Cols D. Selwood, G. Santilli, S. Hart, UCL. £703,050 22/6/23-31/3/25

UKRI Consortium grant "The G2P2 virology consortium: keeping pace with SARS-CoV-2 variants, providing evidence to vaccine policy, and building agility for the next pandemic" Col with PI Wendy Barclay, Imperial College London, and others. 01/10/23-30/09/27, total budget £7,793,460.04, (£1,363,416.00. to UCL).

SARS-CoV-2 Antiviral Drug Discovery (AVIDD) Col with PI Nevan Krogan and UCL Col Clare Jolly and others 16/05/22-30/04/25 \$67,452,049 (\$971,466) to UCL.

Wellcome Investigator Award "Studying lentiviruses to understand mechanisms, regulation and consequences of nucleic acid sensing" PI 01/03/2021-28/02/2026 £1,809,720

Rosetrees Trust Interdisciplinary Award "Development of IFITM inhibitors as transduction enhancers to facilitate efficient human Stem Cell Gene Therapy" PI with Cols David Selwood (Chemistry) UCL; Dara Davison (Molecular Biology) UCL; and Adrian Thrasher (Gene Therapy) UCL. 01/02/2021-28/2/2025 £150,000

MRC Project Grant "Characterisation and therapeutic manipulation of Flaviviridae innate immune evasion" PI 1/6/2019-31/8/2025. £414,571

Wellcome Trust Collaborative Award "What's so special about pandemic HIV. How capsid cofactor interactions regulate DNA synthesis, innate immune detection and pandemic potential" PI with Cols D. Selwood UCL; L. James LMB Cambridge, D Jacques and T Bocking UNSW Australia 1/3/2019-28/2/2025 £2,677,937 (£1,027,334 to UCL)

Evolution Education Trust PhD studentship Gaining control over cancer: Investigating the relationship between transposable element expression, inflammation and therapeutic outcome in cancer. 1/10/23-30/09/26 £152,812.80

Sponsor of independent Fellowships

Sir Henry Wellcome Fellowship to Lucy Thorne, “Defining Pathogen-sensing in Human Skin-derived Dendritic Cells” 2015-2019, £250,000

Wellcome Trust Clinical PhD Fellowship to Dr Douglas Fink “Vpx antagonism of DNA sensing in determining cross-species transmission and epidemic potential of primate lentiviruses” 1/9/16-30/7/19. £250,000

Wellcome Trust Clinical PhD Fellowship to Dr Robert Lever “Species specificity of the lentiviral Vpr protein” 2018-2021. £250,000

MRC Clinical PhD Fellowship to Dr Chris Van Tulleken “The investigation of human polymorphisms impacting on HIV/AIDS pathogenesis” 1/9/2012-31/12/2016 (part time) £203,659

Invited Positions of Responsibility

Editorial Board Journal of Virology

Previously Editorial boards of Retrovirology and Journal of General Virology

Wellcome Trust Pathogen Biology and Disease Transmission Expert Review Group 5, Member 2014-2016, Chair 2017-2019

Wellcome Trust Research Enrichment Public Engagement evaluation committee 2018

Ad hoc Wellcome Trust senior science interview panel member 2014-19, 2024

F1000 faculty member (HIV Infection and AIDS, Basic Science)

Teaching

I am committed to research led teaching and co-lead a module on molecular virology for final year undergraduates and Masters students and deliver numerous specialist lectures. I encourage my post-docs to teach as I find that it helps their communication, clarity of thought and fluency of science presentation. My lab hosts undergraduate intercalated B.Sc. and M.Sc. students for lab projects and has an active public engagement and work experience programme <https://www.ucl.ac.uk/towers-lab/public-engagement>

Selected Publications

Reuschl et al. (2024) Evolution of enhanced innate immune suppression by SARS-CoV-2 Omicron subvariants. *Nat Microbiol* **9**:451-463.

Dickson et al. (2023) The HIV capsid mimics karyopherin engagement of FG-nucleoporins. *Nature*. doi: 10.1038/s41586-023-06969-7.

Bouhaddou et al. (2023) SARS-CoV-2 variants evolve convergent strategies to remodel the host response. *Cell*. **186**:4597-4614.e26.

Zuliani-Alvarez et al. (2022) Evasion of cGAS and TRIM5 defines pandemic HIV. *Nat Microbiol*. **7**:1762-1776

Thorne et al. (2022) Evolution of enhanced innate immune evasion by SARS-CoV-2. *Nature* **602**:487-495

Thorne et al (2021) SARS-CoV-2 sensing by RIG-I and MDA5 links epithelial infection to macrophage inflammation. *EMBO J Aug 2*;40(15):e107826.

Sumner et al. (2020) Disrupting HIV-1 capsid formation causes cGAS sensing of viral DNA. *EMBO J Oct 15*;39(20):e103958.

Colpitts et al. (2020) Hepatitis C virus exploits cyclophilin A to evade PKR. *Elife. Jun 16*;9:e52237. doi: 10.7554/eLife.52237.

Petrillo et al. (2018) Cyclosporine H Overcomes Innate Immune Restrictions to Improve Lentiviral Transduction and Gene Editing In Human Hematopoietic Stem Cells. *Cell Stem Cell*. **23**:820-832.

Jacques et al. (2016) HIV-1 uses dynamic capsid pores to import nucleotides and fuel encapsidated DNA synthesis. *Nature*. **536**:349-53.

Rasaiyaah et al. (2013) HIV-1 evades innate immune recognition through specific co-factor recruitment. *Nature*. **503**:402-5