

BENJAMIN ERIK NILSSON-PAYANT, Ph.D.

TWINCORE
 Centre for Experimental and Clinical Infection Research
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EDUCATION

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| Oct 2013 – Dec 2017 | University of Oxford, Oxford, UK
D.Phil. in Infection, Immunology and Translational Medicine
Wellcome Trust Doctoral Studentship
Advisor: Professor Ervin Fodor, Ph.D. |
| Oct 2010 – Jul 2013 | Imperial College London, London, UK
B.Sc. in Biology (First Class Honours) |

RESEARCH EXPERIENCE

Jan 2022 – present: TWINCORE Centre for Experimental and Clinical Infection Research

- Setting up of independent junior research group focused on understanding the replication mechanisms of hantaviruses and how viral and host factors, in particular viral (aberrant) replication products and defective viral genomes, induce and regulate a pathogenic host response to viral infection.

2018 –2021: Postdoctoral Fellow, Icahn School of Medicine at Mount Sinai / NYU Langone Health

- Advisor: Professor Benjamin R. tenOever, Ph.D.
- Research focus on (1) understanding the host response to SARS-CoV-2 infection, (2) the role of viral RNA sensing in determining viral fitness and (3) identifying small viral RNA species and characterizing their role in the viral life cycle and the host immune response.
- First author of study, describing first host transcriptome of SARS-CoV-2 infected cells and animals.
- Identified and described NF-κB as the master regulator of SARS-CoV-2 infections and its critical pro-viral role in the viral life cycle.
- Helped implement model systems to study SARS-CoV-2 in hPSC-derived organoids, resulting in several publications to date.
- Identified and tested repurposed drugs against SARS-CoV-2 *in vitro* and *in vivo*.
- Developed biochemical and sequencing tools to study small viral RNAs and their role in the innate immune response to negative-sense RNA viruses.

2013 – 2017: Graduate student (PhD), University of Oxford

- Advisor: Professor Ervin Fodor, Ph.D.
- Thesis title: Viral and host factors regulating influenza virus replication
- Research centred around understanding the role of polymerase subunit PB2 in influenza A virus host adaptation.

2013: Undergraduate Research Fellow, Imperial College London

- Supervisor: Professor George Christophides, Ph.D.
- Project: Eiger and GPRgr9 as altruistic antimalarial drug targets in *Anopheles gambiae*

2012: Research Assistant, University College London

- Supervisor: Professor Paul Kellam, Ph.D.
- SGM Harry Smith Vacation Studentship Award
- Project: Viral genes regulating the KSHV lytic cycle and pathogenesis.

FUNDING

2022 – 2025 Cluster of Excellence RESIST (Viral and host determinants of respiratory viral disease)

AWARDS AND FELLOWSHIPS

2022 Microbiology Society Travel Grant
 2019 Marie Skłodowska-Curie Actions Seal of Excellence
 2017 ASV Student and Postdoc Travel Award
 2017 Lincoln College Travel Award
 2016 Microbiology Society Travel Grant
 2016 Lincoln College Travel Award
 2015 Lincoln College Travel Award
 2013–2017 Wellcome Trust Doctoral Studentship
 2012 Harry Smith Vacation Studentship

SELECTED ORAL AND POSTER PRESENTATIONS

Jun 2022 Vector-borne and zoonotic viral infections in Equatorial Africa
 Summer School (Brazzaville, Republic of Congo)
 Jun 2022 18th Negative-Strand Virus Meeting (Braga, Portugal)
 Aug 2021 18th Smögen Summer Symposium on Virology (Virtual presentation)
 Jun 2021 15th International Nidovirus Symposium (Virtual presentation)
 Aug 2020 17th Smögen Summer Symposium on Virology (Virtual presentation)
 Jun 2020 39th Annual Meeting of the American Society for Virology 2020 (Virtual presentation)
 Dec 2019 AVS10 (Queenstown, New Zealand)
 Aug 2019 16th Smögen Summer Symposium on Virology (Smögen, Sweden)
 Jul 2017 36th Annual Meeting of the American Society for Virology 2017 (Madison, USA)
 Mar 2017 27th Annual Meeting of the Society for Virology (GfV) 2017 (Marburg, Germany)
 Aug 2016 Options IX for the Control of Influenza 2016 (Chicago, USA)
 Apr 2016 Society for General Microbiology Annual Conference 2016 (Liverpool, UK)

TEACHING AND MENTORSHIP*Student Mentorship:*

- Abraham Ayanwale (Graduate Student, Hannover Medical School/TWINCORE, 2022 – present)
- Fabian Röpkner (Master Student, Hannover Medical School, 2022)
- Christina Higgins (Graduate Student, Icahn School of Medicine at Mount Sinai, 2020-2021)
- Kristina Atanasoff (Rotation advisor, Icahn School of Medicine at Mount Sinai, 2020)
- Raveen Rathnasinghe (Rotation advisor, Icahn School of Medicine at Mount Sinai, 2018)
- Alastair Louey (Graduate Student, University of Oxford, 2015 – 2017)
- Wun-Chung Szeto (Visiting Graduate Student, University of Oxford, 2015)

Teaching:

- Laboratory methods course (Hannover Medical School Graduate School, 2022)
- Training instructor for departmental BSL-3 facility (Icahn School of Medicine at Mount Sinai, 2020-2021)
- Teaching assistant (University of Oxford, 2014 – 2017)

PROFESSIONAL SERVICE

Ad-hoc reviewer: PLOS Pathogens, eLife, Scientific Reports, Archives in Microbiology, Heliyon, Microorganisms
 Professional Memberships: American Society for Virology, American Society for Microbiology, Swedish Society for Virology, German Society for Virology, Microbiology Society

PUBLICATIONS

(* Joint first author; # corresponding author)

Yaron TM, Brook HE, Levy TM, Johnson JL, Jordan TX, Cohen BM, Kerelsky A, Lin TY, Liberatore KM, Bulaon DK, Van Nest SJ, Koundouros N, Kasterhuber ER, Mercadante MN, Shobana-Ganesh K, He L, Schwartz RE, Chen S, Weinstein H, Elemento O, Piskounova E, **Nilsson-Payant BE**, Lee G, Trimarco JD, Burke KN, Hamele CE, Chaparian RR, Harding AT, Tata A, Zhu X, Tata PR, Smith CM, Possemato AP, Tkachev SL, Hornbeck PV, Beausoleil SA, Anand SK, Aguet F, Getz G, Davidson AD, Heesom K, Kavanagh-Williamson M, Matthews DA, tenOever BR, Cantley LC, Blenis J, Heaton NS (2022) Host protein kinases required for SARS-CoV-2 nucleocapsid phosphorylation and viral replication. *Science Signaling*, 15(757):eabm08. <https://doi.org/10.1126/scisignal.abm08>.

Bram Y, Duan X, **Nilsson-Payant BE***, Chandar V, Wu H, Shore D, Fajardo A, Sinha S, Hassan N, Weinstein H, tenOever BR, Chen S, Schwartz RE (2022) A Dual-Reporter System for Real-Time Monitoring of SARS-CoV-2 Main Protease Activity in Live Cells Enables Identification of an Allosteric Inhibition Path. *ACS Bio & Med Chem Au*, in press. <https://doi.org/10.1021/acsbiochemau.2c00034>.

Han Y, Tan L, Zhou T, Yang L, Carrau L, Lacko LA, Saeed M, Zhu J, Zhao Z, **Nilsson-Payant BE**, Neto FTL, Cahir C, Giani AM, Chai JC, Li Y, Dong Z, Moroziewicz D, The NYSCF Global Stem Cell Array Team, Paull D, Zhang T, Koo S, Tan C, Danziger R, Ba Q, Feng L, Chen Z, Zhong A, Wise GJ, Xian JZ, Wang H, Schwartz RE, tenOever BR, Noggle SA, Rice CM, Qi Q, Evans T, Chen S (2022) A human iPSC-array-based GWAS identifies a virus susceptibility locus in the NDUFA4 gene and functional variants. *Cell Stem Cell*, 29:1475-1490. <https://doi.org/10.1016/j.stem.2022.09.008>.

Laurent P, Yang C, Rendeiro AF, **Nilsson-Payant BE**, Carrau L, Chandar V, Bram Y, tenOever BR, Elemento O, Ivashkic LB, Schwartz RE, Barrat FJ (2022) Sensing of SARS-CoV-2 by pDCs and their subsequent production of IFN-I contribute to macrophage-induced cytokine storm during COVID-19. *Science Immunology*, 7(75):eadd4906. <https://doi.org/10.1126/sciimmunol.add4906>.

Kastenhuber ER, Mercadante M, **Nilsson-Payant BE**, Johnson JL, Jaimes JA, Mueksch F, Weisblum Y, Bram Y, Chandar V, Whittaker GR, tenOever BR, Schwartz RE, Cantley L (2022) Coagulation factors directly cleave SARS-CoV-2 spike and enhance viral entry. *eLife*, 11:e77444. <https://doi.org/10.7554/eLife.77444>.

Han Y, Zhu J, Yang L, **Nilsson-Payant BE***, Hurtado R, Lacko LA, Sun X, Gade AR, Higgins CA, Sisso WJ, Dong X, Wang M, Chen Z, Ho DD, Pitt GS, Schwartz RE, tenOever BR, Evans T, Chen S (2022) SARS-CoV-2 infection induces ferroptosis of sinoatrial node pacemaker cells. *Circulation Research*, 130(7):963-977. <https://doi.org/10.1161/CIRCRESAHA.121.320518>.

Nilsson-Payant BE#, tenOever BR, te Velthuis AJ. (2022) The host factor ANP32A is required for influenza A virus vRNA and cRNA synthesis. *Journal of Virology*, 96: e02092-21. <https://doi.org/10.1128/jvi.02092-21>.

Nilsson-Payant BE*, Uhl S, Grimont A, Doane AS, Cohen P, Patel RS, Higgins CA, Acklin JA, Bram Y, Chandar V, Blanco-Melo D, Panis M, Lim JK, Elemento O, Schwartz RE, Rosenberg BR, Chandwani R, tenOever BR (2021) The NF- κ B transcriptional footprint is essential for SARS-CoV-2 replication. *Journal of Virology*, 95:e01257-21. <https://doi.org/10.1128/JVI.01257-21>.

Yang L, **Nilsson-Payant BE***, Han Y, Jaffré F, Zhu J, Wang P, Zhang T, Redmond D, Houghton S, Møller R, Hoagland DA, Carrau L, Horiuchi S, Goff M, Lim JK, Bram Y, Richardson C, Chandar V, Borcuk A, Huan Y, Xiang J, Ho DD, Schwartz RE, tenOever BR, Evans T, Chen S. (2021) Cardiomyocytes recruit monocytes upon SARS-CoV-2 infected by secreting CCL2. *Stem Cell Reports*, 16(9):2274-2288. <https://doi.org/10.1016/j.stemcr.2021.07.012>.

Gopal V, **Nilsson-Payant BE**, French H, Siegers JY, Yung W, Hardwick M, te Velthuis AJW. (2021) Zinc-embedded polyamide fabrics inactivate SARS-CoV-2 and influenza A virus. *ACS Applied Materials & Interfaces*, 13(26): 30317–30325. <https://doi.org/10.1101/2020.11.02.365833>.

Si L, Bai H, Rodas M, Cao W, Oh CY, Jiang A, Møller R, Hoagland DA, Oishi K, Horiuchi S, Uhl S, Blanco-Melo D, Albrecht RA, Liu WC, Jordan TX, **Nilsson-Payant BE**, Logue J, Haupt R, McGrath M, Weston S, Nurani A, Kim SM, Zhu DY, Benam KH, Goyal G, Gilpin SE, Prantil-Braun R, Powers RK, Carlson K, Frieman M, tenOever BR, Ingber DE. (2021) Human Organ Chip-enabled Pipeline to rapidly repurpose Therapeutics during Viral Pandemics. *Nature Biomedical Engineering*, 5:815–829. <https://doi.org/10.1038/s41551-021-00718-9>.

Yang L, Han Y, Jaffré F, **Nilsson-Payant BE***, Bram Y, Wang P, Zhu J, Zhang T, Redmond D, Houghton S, Uhl S, Borczuk A, Huang Y, Richardson C, Chandar V, Acklin JA, Lim JK, Xiang J, Ho DD, tenOever BR, Schwartz RE, Evans T, Chen S. (2021) An hPSC-Derived Immuno-Cardiomyocyte Co-culture Platform to Screen for Drugs that Block Macrophage-Mediated Hyper-inflammation in COVID-19 Hearts. *Circulation Research*, 129(1):33–46. <https://doi.org/10.1161/CIRCRESAHA.121.319060>.

Nilsson-Payant BE*, Blanco-Melo D, Uhl S, Escudero-Pérez B, Olschewski S, Thibault P, Panis M, Rosenthal M, Muñoz-Fontela C, Lee B, tenOever BR. (2021) Reduced Nucleoprotein availability impairs negative-sense RNA virus replication and promotes host recognition. *Journal of Virology*, 95:e02274–20. <https://doi.org/10.1128/JVI.02274-20>.

Han Y, Duan X, Yang L, **Nilsson-Payant BE***, Wang P, Duan F, Tang X, Yaron TM, Zhang T, Uhl S, Bram Y, Richardson C, Zhu J, Zhao Z, Redmond D, Houghton S, Nguyen DT, Xu D, Wang X, Jessurun J, Borczuk A, Huan Y, Johnson JL, Liu Y, Xiang J, Wang H, Cantley LC, tenOever BR, Ho DD, Pan FC, Evans T, Chen HJ, Schwartz RE, Chen S. (2021) Identification of SARS-CoV-2 Inhibitors using Lung and Colonic Organoids. *Nature*, 589(7841):270–275. <https://doi.org/10.1038/s41586-020-2901-9>.

Bouhaddou M, Memon D, Meyer B, White KM, Rezelj VV, Marrero MC, Polacco BJ, Melnyk JE, Ulferts S, Kaake RM, Batra J, Richards AL, Stevenson E, Gordon DE, Rojc A, Obernier K, Fabius JM, Soucheray M, Miorin L, Moreno E, Koh C, Tran QD, Hardy A, Robinot E, Vallet T, **Nilsson-Payant BE**, Hernandez-Armenta C, Dunham A, Weigang S, Knerr J, Modak M, Quintero D, Zhou Y, Dugourd A, Valdeolivas A, Patil T, Li Q, Hüttenhain R, Cakir M, Muralidharan M, Kim M, Jang G, Tutuncuoglu B, Hiatt J, Guo JZ, Xu J, Bouhaddou S, Mathy CJP, Gaulton A, Manners EJ, Félix E, Shi Y, Goff M, Lim JK, McBride T, O’Neal MC, Cai Y, Chang JCJ, Broadhurst DJ, Klippsten S, De wit E, Leach AR, Kortemme T, Shoichet B, Ott M, Saez-Rodriguez J, tenOever BR, Dyche Mullins R, Fischer ER, Kochs G, Grosse R, García-Sastre A, Vignuzzi M, Johnson JR, Shokat KM, Swaney DL, Beltrao P, Krogan NJ. (2020) The Global Phosphorylation Landscape of SARS-CoV-2 Infection. *Cell*, 182(3):685–712.e19. <https://doi.org/10.1016/j.cell.2020.06.034>.

Yang L, Han Y, **Nilsson-Payant BE***, Gupta V, Wang P, Duan X, Tang X, Zhu J, Zhao Z, Jaffré F, Zhang T, Kim TW, Harschnitz O, Redmond D, Houghton S, Liu C, Naji A, Ciceri G, Guttikonda S, Bram Y, Nguyen DT, Cioffi M, Chandar V, Hoagland DA, Huang Y, Xiang J, Wang H, Lyden D, Borczuk A, Chen HJ, Studer L, Pan FC, Ho DD, tenOever BR, Evans T, Schwartz RE, Chen S. (2020) A Human Pluripotent Stem Cell-based Platform to Study SARS-CoV-2 Tropism and Model Virus Infection in Human Cells and Organoids. *Cell Stem Cell*, 27(1):125–136.e7. <https://doi.org/10.1016/j.stem.2020.06.015>.

Blanco-Melo D, **Nilsson-Payant BE***, Liu WC, Uhl S, Hoagland D, Møller R, Jordan TX, Oishi K, Panis M, Sachs D, Wang TT, Schwartz RE, Lim JK, Albrecht RA, tenOever BR. (2020) Imbalanced host response to SARS-CoV-2 drives development of COVID-19. *Cell*, 181(5):1036–1045.e9. <https://doi.org/10.1016/j.cell.2020.04.026>.

Nilsson-Payant BE, Sharps J, Hengrung N, Fodor E. (2018) The surface-exposed PA⁵¹⁻⁷²-loop of the influenza A virus polymerase is required for viral genome replication. *Journal of Virology*, 92:e00687–18. <https://doi.org/10.1128/JVI.00687-18>.

Hsia HP, Yang YH, Szeto WC, **Nilsson BE**, Lo CY, Ng AK, Fodor E, Shaw PC. (2018) Amino acid substitutions affecting aspartic acid 605 and valine 606 decrease the interaction strength between the influenza virus RNA polymerase PB2 '627' domain and the viral nucleoprotein. *PLOS ONE*, 13(1): e0191226. <https://doi.org/10.1371/journal.pone.0191226>.

Nilsson BE, te Velthuis AJW, Fodor E. (2017) Role of the PB2 627-domain in influenza A virus polymerase function. *Journal of Virology*, 91:e02467- 16. <https://doi.org/10.1128/JVI.02467-16>.