

## *Biography 2023*

### **Professor Conor C Murphy**

MB BCh BAO (Hons), MMedSc (Hons), PGCert (TLCP), FRCSI, FRCOphth, PhD

Irish Medical Council Registration number 20332



Professor Conor Murphy is the Chair and Professor of Ophthalmology at the RCSI University of Medicine and Health Sciences and a consultant ophthalmic surgeon at the Royal Victoria Eye and Ear Hospital in Dublin. He received his medical degree from University College Dublin in 1996 and this was followed by an MMedSc degree in Physiology (1998) and a PhD in Ocular Immunology (2005) from the same institution. He undertook his clinical training in Dublin, Bristol, Liverpool and Perth, returning to Ireland to take up his current role in 2009.

Professor Murphy specialises in disorders of the cornea and ocular surface, uveitis and corneal transplant surgery. His principle surgical interest is corneal transplantation, especially anterior lamellar keratoplasty (DALK) for keratoconus and corneal stromal disorders and endothelial keratoplasty (DMEK) for endothelial corneal diseases like Fuchs' dystrophy. He heads the Ocular Immunology Research Group at RCSI, which focuses on research into ocular surface inflammation, corneal transplantation and uveitis. He has published 90 articles in the peer-reviewed literature including in *Ocular Surface*, *Ophthalmology*, *JAMA Ophthalmology*, *Scientific Reports* and the *British Journal of Ophthalmology* and has received research funding of over €1,000,000 from the European Commission, Health Research Board, the Irish College of Ophthalmologists/Novartis Research Bursary, the Royal Victoria Eye and Ear Hospital Research Foundation and the National Eye Research Centre (UK). Professor Murphy has supervised 3 PhD degrees, 3 MD degrees and numerous research Masters degrees. In his role as the postgraduate Professor of Ophthalmology in Ireland, he is the Chief Examiner of the professional Membership and Fellowship examinations in ophthalmology of the Royal College of Surgeons in Ireland.

## Current position

Professor and Chair of Ophthalmology, RCSI University of Medicine and Health Sciences 2009 -  
Consultant Ophthalmic Surgeon, Royal Victoria Eye and Ear Hospital, Dublin 2009 -

## Education and qualifications

- 1996 MB BCh BAO (Hons), University College Dublin, Ireland
- 1998 MMedSc in Physiology (Hons), University College Dublin, Ireland
- 2000 FRCSI (Ophthalmology)
- 2001 MRCOphth (UK)
- 2005 PhD in Ocular Immunology, University College Dublin, Ireland
- 2007 FRCOphth (UK)
- 2008 Postgraduate Certificate in Teaching and Learning in Clinical Practice, University of Chester and Edge Hill University, United Kingdom
- 2008 Certificate of Completion of Training UK (CCT, awarded 8<sup>th</sup> April 2008)

## Summary of key clinical, academic and governance roles

### Current roles

Undergraduate and postgraduate Professor of Ophthalmology, RCSI 2009-  
Chief examiner of the MRCSI (Ophth) and FRCSI (Ophth) examinations 2009-  
Member of the Board of the Royal Victoria Eye and Ear Hospital Research Foundation 2009-  
Member of the Academic Council, RCSI 2009-  
Principle Investigator, Department of Pharmacy and Biomolecular Sciences, RCSI 2009-  
Irish representative of the European University Professors of Ophthalmology Council 2018-  
Academic member of Irish College of Ophthalmologists Training Advisory Committee 2009-  
Founding committee member of the Irish Regional Ophthalmic Anaesthesia Society 2009-  
Member of the European Cornea Conference, Bowman Club, American Academy of Ophthalmology, Association for Research in Vision and Ophthalmology (ARVO), and Irish College of Ophthalmologists

### Past roles

Medical Director of the Royal Victoria Eye and Ear Hospital 2013-2016  
Chairman of the Department of Ophthalmology, Royal Victoria Eye and Ear Hospital 2018-2020  
Member of the Board of Beaumont Hospital, Dublin 2017-2020  
Chairman of the Governance and Risk Committee of Beaumont Hospital 2017-2020  
Director of Education and Research of the Royal Victoria Eye and Ear Hospital 2010-2013  
Member of the Medical and Health Sciences Board, RCSI, 2015-2018  
Co-director of Year 4 of Medicine, RCSI University of Medicine and Health Sciences 2020- 22  
Co-chair of the Learning Environment Development Committee RCSI 2019- 22  
Member of the Opticians Board of Ireland 2010-2015

## Description of research interests

### 1) Corneal transplantation research

VISICORT is a multi-disciplinary research project involving 12 partners from across the EU with expertise in corneal transplantation, cell therapy, immunology, bio-sampling, systems

biology/immune profiling and bioinformatics. The project will complete the first ever systematic immune profiling of human corneal transplant recipients. Clinical data and bio-specimens from over 900 corneal transplant recipients at 5 leading transplant centres, including the Royal Victoria Eye and Ear Hospital and RCSI, have been centrally collated and distributed to cutting-edge laboratories where multi-platform profiling and integrated bioinformatics analyses are underway. Profiling data will generate a better understanding of corneal transplant rejection and failure. This knowledge will be used to develop novel biomarker-based surveillance strategies and, coupled with SME-based expertise in cell product development, will also inform the design and initiation of an optimised clinical trial strategy of immunomodulatory stromal stem cell therapy in high-risk human corneal transplant recipients. The project is being coordinated by Prof Matt Griffin, Professor of Transplant Biology at NUI, Galway. Benefiting from a €6 million award from the European Commission, the project launched in May 2014 and will be completed in April 2021. There has been a strong commitment and contribution to this project from the Royal Victoria Eye and Ear Hospital and we look forward to being able to achieve better outcomes for our patients in the future. See [www.visicort.eu](http://www.visicort.eu)

## 2) Primary Sjögren's Syndrome Research

Primary Sjögren's Syndrome (pSS) is an autoimmune disease that destroys the specialised secretary glands that produce saliva and tears, causing dry eyes and dry mouth as well as generalized symptoms of aches, pains and lethargy. There is currently no cure for pSS and the exact cause is unknown. In this study we are expanding our understanding of this disease at a molecular level by investigating the epigenetic control of inflammation mediated by microRNA, tiny RNA genes that act as a switch for biological processes like inflammation. We are measuring microRNA in blood immune cells and ocular surface cells as well as examining tear samples for inflammatory mediators. As well as aiming to identify biomarkers of disease, this study is focussed on developing new nanoparticle based therapeutic agents that inhibit inflammation by exploiting microRNAs expressed on the surface of the eye. It forms part of the PhD thesis of Dr Emily Greenan, Clinical Tutor and PhD candidate, RCSI.

## 3) Graft versus host disease research

Graft versus host disease (GVHD) is a severe immune reaction to stem cell transplant therapies for haematological disorders, most commonly blood cell cancers. One of the most severe manifestations of GVHD is ocular surface inflammation and dry eye disease. As the main focus of Dr Greenan's PhD thesis, our work aims to improve the detection and treatment of ocular GVHD and enhance our understanding of the epigenetic control of inflammation of the surface of the eye in this condition. This project is supported by a strong collaboration with the Department of Haematology and the national haematology stem cell transplant centre at St James' Hospital.

## 4) Acute anterior uveitis research

Acute anterior uveitis (AAU) is characterised by the acute onset of inflammation in the front compartment of the eye, leading to pain, light sensitivity and blurred vision. We have defined, in an Irish Cohort, the clinical characteristics of AAU and have established a simple algorithm called the DUET algorithm for the rapid detection of spondyloarthritis in patients with AAU. We are also investigating the molecular mechanisms of this disease, in particular the role of dendritic cells and microRNA in the pathogenesis of AAU. Following the recent publication of our work on microRNA in

AAU, we are currently studying a larger cohort of patients to explore the role of microRNA in both blood immune cells and the aqueous humour of the eye in HLA B27 positive and negative patients. This work is being undertaken by Dr Esraa Hegazy, Clinical Lecturer in Ophthalmology, in collaboration with the Department of Rheumatology at St Vincent's University Hospital, Dublin and UCD.

#### 5) Fuch's corneal dystrophy and Keratoconus

This project will undertake an in-depth study of two of the most common corneal conditions, keratoconus and Fuch's Endothelial Corneal dystrophy, using a unique multi-omics approach. The aim is to profile families of proteins, lipids and metabolites, using state-of-the-art mass spectrometry techniques, and provide new insights into disease pathogenesis and progression by analysing different eye tissue samples from the same patient at different time points. Professor Murphy is a co-investigator on this project which is being undertaken at the University of Edinburgh.

#### 6) National Uveitis Registry

Prof Murphy recently set up a national registry of patients with uveitis. With the help of this registry, we hope to identify epidemiological trends, audit treatment outcomes and deliver effective laboratory, clinical and health service research with the overarching aim of improving outcomes for patients with uveitis.

#### 7) National Corneal Transplantation Registry

Prof Murphy and colleagues set up this registry in 2011 to help audit outcomes of corneal transplantation in Ireland and to identify health service needs in the area of complex corneal disease.

### **Higher research degrees supervised**

Dr Emily Greenan, Novel insights into the clinical and molecular basis for immune mediated ocular surface disease. PhD, RCSI 2023

Dr Katja Iselin, Outcome after reversed corneal graft rejection: A descriptive analysis on patients included in the prospective VISICORT study. MCh, RCSI 2021.

Dr Rana Khalil, De-novo glaucoma post keratoplasty: a systematic review. MCh, NUI Galway 2020.

Dr David Shahnazaryan, The Role of Viral Regulatory Protein ICP0 in Herpes Simplex Type I Keratitis, MD, RCSI 2019.

Ni Mhealoid Aine, Vision-Related and Health-Related Quality of Life in Patients with Giant Cell Arteritis, MCh by Module, RCSI 2018.

Goodchild Christine, Impact of Anterior Uveitis on patients: 5 year prognosis from the DUET study. MCh by Module, RCSI 2018.

O'Rourke Micheal, Clinical characteristics and molecular mechanisms in non-infectious anterior uveitis. PhD, UCD & NUI 2016.

Pilson Qistina, Profiling microRNA in primary Sjogren's syndrome: a quantitative and qualitative analysis of an Irish cohort. MD, RCSI & NUI 2016.

Ramasamy Pathma, Quantitative proteomic analysis and gene expression profiling microarray re-analysis of uveal melanoma. MD, RCSI & NUI 2015.

Al Arrayedh Hamed. Outcomes of corneal transplantation in Irish patients with Congenital Hereditary Endothelial Dystrophy (CHED). Masters of Medicine (Ophthalmic Science), University of Sydney 2015.

De Chaumont Ciaran. Investigating the effect of corneal Herpes Simplex Virus infection on Toll like receptor expression in human Peripheral Blood mononuclear cells. MSc RCSI & NUI 2013

## Grant awards

- 2021 Royal Victoria Eye and Ear Hospital Research Foundation. "Multiomic characterization of ocular graft versus host disease from patient tears" (Dr Emily Greenan, Clinical Research Fellow/ Clinical Tutor, RCSI; €7,500)
- 2020 Royal Victoria Eye and Ear Hospital Research Foundation. "Establishing 2D and three-dimensional models of inflammatory dry eye disease to test novel microRNA therapeutics in human conjunctival epithelial cells" (Dr Emily Greenan, Clinical Research Fellow/ Clinical Tutor, RCSI; €7,500)
- 2019 Royal Victoria Eye and Ear Hospital Research Foundation. "Multiomic profiling of ocular inflammation in dry eye disease" (Dr Emily Greenan, Clinical Research Fellow/ Clinical Tutor, RCSI; €15,000)
- 2018 Royal Victoria Eye and Ear Hospital Research Foundation. "Targeting ocular inflammation in dry eye disease with novel microRNA-based therapeutics" (Dr Emily Greenan, Clinical Research Fellow/ Clinical Tutor, RCSI; €15,000)
- 2018 AbbVie. "Development and implementation of a National Uveitis Registry". (Prof Conor Murphy, €84,000)
- 2018 Santen. "Effect of Ikeris on cytokine and microRNA profile at the ocular surface in severe keratitis due to dry eye disease" (Prof Conor Murphy; €45,000)
- 2018 Irish College of Ophthalmologists/Novartis annual research award. "Targeting ocular inflammation in dry eye disease with novel microRNA-based therapeutics" (Dr Emily Greenan, Clinical Research Fellow/ Clinical Tutor, RCSI; €35,000)
- 2017 Royal Victoria Eye and Ear Hospital Research Foundation. "Profiling miRNA expression in acute anterior uveitis" (Dr Christine Goodchild, Clinical Research Fellow, RCSI; €15,000)
- 2016 Irish College of Ophthalmologists/Novartis annual research award. "Utilising microRNA-based therapeutics for the development of novel targeted drug delivery device for patients with dry eye disease" (Dr Sinead Connolly, MCh candidate; €17,500)

- 2015 Royal Victoria Eye and Ear Hospital Research Foundation. "Utilising microRNA-based therapeutics for the development of novel targeted drug delivery device for patients with dry eye disease" (Dr Sinead Connolly, MCh candidate; €15,000)
- 2014 Private donor. "Targeting inflammation in Sjögren's syndrome—novel microRNAs as potential therapeutics". (€27,000)
- 2014 Health Research Board/ Medical Research Charities Group "Restoring immune balance in patients with primary Sjögren's syndrome by modulating microRNA expression" (€40,000)
- 2014 RCSI Seed funding call "Modulating microRNA expression as a means to restore immune function in patients with primary Sjogrens Syndrome" (€30,000)
- 2013 ICO/Pfizer Research Fellowship "Acute anterior uveitis in an Irish Cohort: clinical characteristics and molecular mechanisms" (Dr Micheal O'Rourke, €35,000)
- 2013 EU FP7 grant Award. Partner in VISICORT: Adverse Immune Signatures and their Prevention in Corneal Transplantation (Prof Conor Murphy €400,000; total consortium: €6 million)
- 2012 Health Research Board/ Medical Research Charities Group: "Profiling Toll-like receptor responses in patients with primary Sjögren's syndrome" (€50,000)
- 2011 Royal Victoria Eye and Ear Hospital Research Foundation: "Acute anterior uveitis in an Irish Cohort: clinical characteristics and molecular mechanisms" (Dr Micheal O'Rourke, €30,000)
- 2011 Irish College of Ophthalmologists/Pfizer Research Fellowship: "Targeting toll-like receptor pathways in the treatment of HSV-1 keratitis" (€35,000)
- 2010 RVEEH Research Foundation: "Evasion of the innate immune response by HSV-1 in the cornea: molecular mechanisms mediating interferon downregulation and virus survival" (€20,000)

## Peer reviewed publications

### BOOKS

Mark Batterbury & Conor Murphy. Ophthalmology: An Illustrated Colour Text (4<sup>th</sup> Ed. 2018). Elsevier, Edinburgh.

### BOOK CHAPTERS

Quill B, **Murphy CC**. A pharmacokinetic review of antibiotics used in the treatment and prophylaxis of endophthalmitis. Book chapter in: Endophthalmitis. Nova Publishers 2015.

O'Rourke M, Haroon M, **Murphy CC**, FitzGerald O. Anterior Uveitis in Spondyloarthropathy: The ophthalmologist's role in earlier recognition. Book chapter in Ankylosing spondylitis; symptoms, treatment and complications. Nova Publishers. 2013, ISBN: 978-1-62618-362-9

**PEER REVIEWED JOURNAL PUBLICATIONS**

- Greenan, E., Pilson, Q., Gabhann-Dromgoole, J. N., & Murphy, C. (2022). Quality of life questionnaires validate a remote approach to ophthalmic management of primary Sjögren's syndrome. doi:[10.1038/s41598-022-23676-x](https://doi.org/10.1038/s41598-022-23676-x)
- Iselin, K. C., Kaufmann, C., Malata, D., Bachmann, L. M., Power, W. J., Quill, B., & Murphy, C. C. (2022). Telemedicine Service for Keratoconus Monitoring: Patient Satisfaction and Prospects for Further Expansion. *Telemedicine and e-Health*, 28(11), 1690-1697. doi:[10.1089/tmj.2021.0619](https://doi.org/10.1089/tmj.2021.0619)
- Hjortdal, J., Griffin, M. D., Cadoux, M., Armitage, W. J., Bylesjo, M., Gabhann, P. M., . . . Degauque, N. (2022). Peripheral blood immune cell profiling of acute corneal transplant rejection. *American Journal of Transplantation*, 22(10), 2337-2347. doi:[10.1111/ajt.17119](https://doi.org/10.1111/ajt.17119)
- Harford, D. A., Greenan, E., Knowles, S. J., Fitzgerald, S., & Murphy, C. C. (2022). The burden of methicillin-resistant *Staphylococcus aureus* in the delivery of eye care. *Eye (Basingstoke)*, 36(7), 1368-1372. doi:[10.1038/s41433-021-01643-6](https://doi.org/10.1038/s41433-021-01643-6)
- Stephenson, K. A. J., Power, B., Malata, D., Quill, B., Murphy, C. C., & Power, W. J. (2022). Management of Keratoconus in Down Syndrome and Other Intellectual Disability. *Cornea*, 41(4), 456-461. doi:[10.1097/ICO.0000000000002793](https://doi.org/10.1097/ICO.0000000000002793)
- Pleyer, U., Al-Mutairi, S., Murphy, C. C., Hamam, R., Hammad, S., Nagy, O., . . . Androudi, S. (2022). Impact of adalimumab in patients with active non-infectious intermediate, posterior, and panuveitis in real-life clinical practice: HOPE study. *British Journal of Ophthalmology*. doi:[10.1136/bjo-2021-320770](https://doi.org/10.1136/bjo-2021-320770)
- Greenan, E., Gallagher, S., Khalil, R., Murphy, C., & Gabhann-Dromgoole, J. N. (2021). Advancing our understanding of corneal herpes simplex virus-1 immune evasion mechanisms and future therapeutics. doi:[10.3390/v13091856](https://doi.org/10.3390/v13091856)
- Gazzard, G., Kolko, M., Iester, M., Crabb, D. P., Emesz, M., Hirn, C., . . . Théa, L. (2021). A scoping review of quality of life questionnaires in glaucoma patients. *Journal of Glaucoma*, 30(8), 732-743. doi:[10.1097/IJG.0000000000001889](https://doi.org/10.1097/IJG.0000000000001889)
- Greenan, E., Murphy, C., & Gabhann-Dromgoole, J. N. (2021). Optimising the method for isolating ocular surface microRNA using impression cytology. doi:[10.1016/j.jtos.2021.07.010](https://doi.org/10.1016/j.jtos.2021.07.010)
- Iselin, K. C., Greenan, E., Hynes, C., Shaw, S., Fulcher, T., Power, W. J., . . . Murphy, C. C. (2021). Changing trends in corneal transplantation: a national review of current practices in the Republic of Ireland. *Irish Journal of Medical Science*, 190(2), 825-834. doi:[10.1007/s11845-020-02340-1](https://doi.org/10.1007/s11845-020-02340-1)
- Batten, I., Robinson, M. W., White, A., Walsh, C., Fazekas, B., Wyse, J., . . . Bourke, N. M. (2021). Investigation of type I interferon responses in ANCA-associated vasculitis. doi:[10.1038/s41598-021-87760-4](https://doi.org/10.1038/s41598-021-87760-4)
- Muid, J., Stephenson, K. A. J., Hegazy, E., & Murphy, C. C. (2021). Behçet's disease presenting as bilateral occlusive retinal vasculitis in a young woman. *BMJ Case Reports*, 14(3). doi:[10.1136/bcr-2021-241794](https://doi.org/10.1136/bcr-2021-241794)

- Harford, D. A., Green Sanderson, K., Stephenson, K. A. J., & Murphy, C. C. (2021). Monocular syphilitic uveitis. *BMJ Case Reports*, 14(2). doi:[10.1136/bcr-2020-241403](https://doi.org/10.1136/bcr-2020-241403)
- Goodchild, C., O'Rourke, M., Haroon, M., FitzGerald, O., & Murphy, C. C. (2021). 5-year longitudinal study of clinical and patient-reported outcomes in acute anterior uveitis. *Eye (Basingstoke)*, 35(2), 651-658. doi:[10.1038/s41433-020-0937-6](https://doi.org/10.1038/s41433-020-0937-6)
- Power, B., Donnelly, A., Murphy, C., Fulcher, T., & Power, W. (2021). Presentation of Infectious Keratitis to ED during COVID-19 Lockdown. *Journal of Ophthalmology*, 2021. doi:[10.1155/2021/5514055](https://doi.org/10.1155/2021/5514055)
- Almas, T., Stephenson, K. A. J., Ehtesham, M., & Murphy, C. C. (2020). Beware the quiet eye: Primary vitreoretinal lymphoma masquerading as posterior uveitis. *BMJ Case Reports*, 13(12). doi:[10.1136/bcr-2020-240802](https://doi.org/10.1136/bcr-2020-240802)
- Shahnazaryan, D., Khalil, R., Wynne, C., Jefferies, C. A., Gabhann-Dromgoole, J. N., & Murphy, C. (2020). Herpes simplex virus 1 targets IRF7 via ICP0 to limit type I IFN induction. doi:[10.1038/s41598-020-77725-4](https://doi.org/10.1038/s41598-020-77725-4)
- Erickson, S., Sullivan, A. G., Barabino, S., Begovic, E., Benitez-del-Castillo, J. M., Bonini, S., . . . Sullivan, D. A. (2020). TFOS European Ambassador meeting: Unmet needs and future scientific and clinical solutions for ocular surface diseases. *Ocular Surface*, 18(4), 936-962. doi:[10.1016/j.jtos.2020.05.006](https://doi.org/10.1016/j.jtos.2020.05.006)
- Ramasamy, P., Larkin, A. M., Linge, A., Tiernan, D., McAree, F., Horgan, N., . . . Meleady, P. (2020). PRDX3 is associated with metastasis and poor survival in uveal melanoma. *Journal of Clinical Pathology*, 73(7), 408-412. doi:[10.1136/jclinpath-2019-206173](https://doi.org/10.1136/jclinpath-2019-206173)
- Pilson, Q., Smith, S., Jefferies, C. A., Gabhann-Dromgoole, J. N., & Murphy, C. (2020). miR-744-5p contributes to ocular inflammation in patients with primary Sjogrens Syndrome. doi:[10.1038/s41598-020-64422-5](https://doi.org/10.1038/s41598-020-64422-5)
- McSwiney, T., Power, B., Murphy, C. C., Brosnahan, D., & Power, W. (2020). Reply. *Cornea*, 39(2), e5. doi:[10.1097/ICO.0000000000002188](https://doi.org/10.1097/ICO.0000000000002188)
- Mhéalóid, A. N., Conway, R., O'Neill, L., Clyne, B., Molloy, E., & Murphy, C. (2020). Vision-related and health-related quality of life in patients with giant cell arteritis.. doi:[10.1177/1120672120901693](https://doi.org/10.1177/1120672120901693)
- Greenan, E., Vandenberghe, E., & Murphy, C. C. (2019). Refractory recurrent ocular graft versus host disease. *BMJ Case Reports*, 12(12). doi:[10.1136/bcr-2019-232579](https://doi.org/10.1136/bcr-2019-232579)
- Armitage, W. J., Goodchild, C., Griffin, M. D., Gunn, D. J., Hjortdal, J., Lohan, P., . . . Vabres, B. (2019). High-risk Corneal Transplantation: Recent Developments and Future Possibilities. *Transplantation*, 103(12), 2468-2478. doi:[10.1097/TP.0000000000002938](https://doi.org/10.1097/TP.0000000000002938)
- Mcsweeney, T. J., Knowles, S. J., & Murphy, C. C. (2019). Clinical and microbiological characteristics of Moraxella keratitis. *British Journal of Ophthalmology*, 103(12), 1704-1709. doi:[10.1136/bjophthalmol-2018-313557](https://doi.org/10.1136/bjophthalmol-2018-313557)
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- McSwiney, T. J., Power, B., Murphy, C. C., Brosnahan, D., & Power, W. (2019). Safety and Efficacy of Supratarsal Triamcinolone for Treatment of Vernal Keratoconjunctivitis in Ireland. *Cornea*, 38(8), 955-958. doi:[10.1097/ICO.0000000000001963](https://doi.org/10.1097/ICO.0000000000001963)
- Fennelly, E., Greenan, E., & Murphy, C. C. (2019). Corneal melt secondary to eosinophilic granulomatosis with polyangiitis. *BMJ Case Reports*, 12(6). doi:[10.1136/bcr-2019-229859](https://doi.org/10.1136/bcr-2019-229859)
- Conway, R., O'Neill, L., McCarthy, G. M., Murphy, C. C., Veale, D. J., Fearon, U., . . . Molloy, E. S. (2019). Performance characteristics and predictors of temporal artery ultrasound for the diagnosis of giant cell arteritis in routine clinical practice in a prospective cohort. *Clinical and experimental rheumatology*, 37(2), 72-78.
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- O'Neill, L., McCormick, J., Gao, W., Veale, D. J., McCarthy, G. M., Murphy, C. C., . . . Molloy, E. S. (2019). Interleukin-6 does not upregulate pro-inflammatory cytokine expression in an ex vivo model of giant cell arteritis. *Rheumatology Advances in Practice*, 3(1). doi:[10.1093/rap/rkz011](https://doi.org/10.1093/rap/rkz011)
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