UAM
UNIVERSIDAD AUTONOMA
DE MADRID

# Discursos del Acto de Investidura como Doctores Honoris Causa de los Profesores

## Fiona M. Watt

## Sir Philip Cohen

**20 de mayo de 2016 a las 10 h.**

**Salón de Actos de la Escuela Politécnica Superior**
**Campus de Cantoblanco**

# Discursos del Acto de Investidura como Doctores Honoris Causa de los Profesores

## Fiona M. Watt

## Sir Philip Cohen

# Índice

Laudatio de la Profesora

**Fiona M. Watt**

por la Profesora Doctora

Amparo Cano

*Excelentísimo y Magnífico Señor Rector,*
*Excelentísimas e Ilustrísimas Autoridades,*
*Estimados Profesores,*
*Amigos y Amigas,*
*Querida Profesora Fiona Mary Watt,*

Es para mi un gran honor participar en el nombramiento como nueva Doctora Honoris Causa de nuestra Universidad Autónoma de Madrid a la Profesora Fiona Watt.

Es asimismo una difícil tarea, glosar la trayectoria científica, académica y humana de la Dra. Watt en pocas palabras, que nos lleva a solicitar el máximo galardón académico que una universidad puede otorgar, el nombramiento como Doctor Honoris Causa.

El interés científico de la Profesora Watt se ha dedicado durante casi toda su carrera al estudio de la homeostasis de la epidermis y más concretamente a la caracterización de las células madre epidérmicas, siendo una líder indiscutible en este campo. Sus aportaciones han sido esenciales para comprender como se controla la renovación de las células madre y como se seleccionan los diferentes linajes de la epidermis por interacciones recíprocas con el microambiente celular, conocido como "nicho". La evolución más reciente de sus investigaciones en este campo conectan sus estudios básicos con la medicina regenerativa, área de enorme transcendencia en la investigación biomédica actual.

Tras realizar su tesis doctoral en la Universidad de Oxford bajo la dirección del Professor Henry Harris y del Dr. Eric Sidebottom, Fiona se trasladó al Department of Biology del Massachusetts Institute of Technology (MIT) en Cambdrige, USA, donde realizó su formación postdoctoral en el laboratorio del Dr. Howard Green entre 1979-81. Allí inició sus estudios sobre diferenciación de queratinocitos epidérmicos. Para ello desarrolló por primera vez un modelo de

cultivo y diferenciación in vitro de queratinocitos, algo que actualmente es casi trivial en muchos laboratorios, pero que en aquella época supuso un logro notable. Estos estudios establecieron las bases de lo que sería su principal interés científico durante los años siguientes, el estudio de la homeostasis de la epidermis y sus mecanismos de regulación. Así, a su regreso a Londres en 1981 Fiona obtuvo su primera posición como investigadora independiente, en el Kennedy Institute of Rheumatology donde actuó como directora del Molecular Cell Biology Laboratory entre 1981 y 1986, caracterizando en esa etapa varios marcadores de diferenciación de los queratinocitos epidérmicos. Posteriormente, se trasladó al Imperial Cancer Research Fund, actualmente CR-UK London Research Institute, siendo directora del Keratinocyte Laboratory entre 1987 y 2006. Fue en esta institución donde Fiona realizó contribuciones pioneras sobre la relevancia de las interacciones de los queratinocitos con la matriz extracelular para el mantenimiento de la homeostasis y diferenciación de la epidermis. Adicionalmente, Fiona descubrió como la diferenciación de la epidermis esta acoplada al movimiento de las células de la capa basal e identificó que la integrina beta1 (molécula esencial para las interacciones de las células con la matriz extracelular) existe en diferentes estados de activación. Demostró, asimismo, que las integrinas regulan la diferenciación de los queratinocitos epidérmicos y dilucidó los mecanismos subyacentes. De especial interés fue la identificación por primera vez de la existencia de mutaciones en integrinas en tumores.

La evolución de sus hallazgos le llevaron a finales de 1990 a iniciar el estudio de las células madre de la epidermis, habiendo sido pionera en este activo campo de investigación. Entre sus principales contribuciones iniciales en este campo fue la identificación de lo que Fiona denomino “células amplificadoras transitorias” de la epidermis, es decir aquellas células que van a adquirir la capacidad de diferenciación posterior de la epidermis. Identificó la integrina beta1 como el primer marcador que se puede utilizar para aislar las células madre viables directamente de la epidermis y para determinar su localización tisular. Actualmente, el uso de este tipo de marcadores es un procedimiento de rutina en los grupos de investigación de células madre. Posteriormente, el laboratorio de la Dra. Watt ha

identificado marcadores de células madre adicionales, así como nuevas poblaciones de células madre del folículo piloso, que han contribuido a establecer el papel esencial de este anejo de la piel mas allá de la generación del pelo. Otros estudios pioneros del grupo han demostrado que los linajes seleccionados por la progenie de las células madre no están predeterminados sino que son regulados por el micro-ambiente. Uno de las contribuciones esenciales del laboratorio de Fiona para estos estudios fue el desarrollo original de preparaciones de epidermis completa ("whole mount") y el análisis de linajes para dilucidar las relaciones espaciales entre las células madre y su progenie.

Sus estudios en el campo de las células madre y sus aplicaciones a la medicina regenerativa han continuado brillantemente en dos instituciones británicas creadas en la última década para este tipo de estudios. Entre 2007 y 2012 fue subdirectora del Cambridge CR-UK Institute y del Wellcome Trust Center for Stem Cell Research, ocupando además los cargos de Herchel Smith Professor of Molecular Genetics, Cambridge University, y Fellow de St John's College. En 2012 se trasladó de nuevo a Londres, para asumir la dirección del recién creado Centre for Stem Cells and Regenerative Medicine del King's College London, localizado en el Guy's Hospital campus, en pleno corazón de Londres. Además de su propio grupo, Fiona es responsable de la investigación de mas de 300 científicos que abordan el estudio de la biología de las células madre y sus aplicaciones biomédicas desde una perspectiva multidisciplinar que abarca desde la biología celular y molecular hasta la física y la biología de sistemas. Estas responsabilidades asumidas por Fiona en la última década demuestran su capacidad de liderazgo y su implicación en la política científica.

Adicionalmente a las contribuciones originales a la biología de las célula madre, Fiona ha realizado contribuciones destacadas en diversas áreas de la patología epidérmica, habiendo identificado mutaciones en genes que actúan como promotores tumorales y especifican determinados tipos de tumores epidérmicos, como los derivados de las glándulas sebáceas. Otra de las áreas patológicas en las que ha desarrollado diferentes estudios y contribuciones es en la psoriasis y patologías relacionadas, generando modelos preclínicos para psoriasis y dermatitis

atópica de enorme valor en investigación preclínica de estas patologías de una notable incidencia en la población.

Las contribuciones científicas de la Dra. Watt durante más de tres décadas se han visto reflejadas hasta la fecha en mas de 300 publicaciones, de ellas más de 200 artículos originales, 90 revisiones y capítulos de libro y numerosas contribuciones editoriales. La relevancia para la comunidad científica de estas contribuciones se refleja en su altísimo índice de citaciones (más de 22.000 hasta la fecha).

Durante su carrera ha recibido numerosos premios y distinciones, destacando entre ellos los nombramientos como Fellow de la Academy of Medical Sciences (2000) y de la Royal Society (2003), y como Honorary Foreign Member de la American Academy of Sciences and Arts (2008) y el premio al mérito científico de la Royal Society Wolfson (2011).

Ha impartido numerosos seminarios y conferencias en prestigiosos centros de investigación. Ha desarrollado, asimismo, una gran actividad en la organización de conferencias y congresos y participa como asesora o consejera de diferentes comités científicos y asesores de numerosas organizaciones e instituciones científicas, tanto del sector público como del sector farmacéutico.

La actividad científica de la Dra. Watt no se limita a los aspectos mencionados, sino que también destaca por su intensa actividad editorial. En particular, me gustaría reseñar su participación como Editor-in Chief de la revista Journal of Cell Science (una de las principales del área de Biología Celular) desde 1992 hasta 2010. Su encomiable trabajo editorial y dedicación en esta revista durante casi 20 años han sido decisivos para conseguir situarla dentro de las primeras 10 revistas del área en menos de 10 años.

El compromiso científico de Fiona se ha caracterizado, adicionalmente, por otra faceta relevante, como es su esfuerzo continuado en las políticas de igualdad y de promoción de la carrera profesional de mujeres científicas, en particular en el área de la Biología Celular. Esta actividad complementaria se ha dirigido a diferentes aspectos, desde su participación activa en los comités “ad hoc” de la ASCB (American Society for Cell Biology) a la promoción editorial, con la publicación de entrevistas a científicas destacadas en el campo realizadas entre 2004 y 2006,

y publicadas en Journal of Cell Science. Me gustaría mencionar aquí el gran honor y estímulo a mi carrera que supuso el hecho de que Fiona me seleccionara como una de las científicas que entrevistó en esta serie editorial. Muchísimas gracias, Fiona, por esta consideración entrañable. Como reconocimiento a esta faceta la Dra. Watt ha recibido dos premios destacados: American Society for Cell Biology (ASCB) Women in Cell Biology Senior Award (2008) y, recientemente, FEBS/ EMBO (Federation of European Biochemical Societies/ European Molecular Biology Organization) Women in Science Award (2016).

Añadiendo un aspecto adicional a la trayectoria profesional de Fiona, me gustaría destacar su compromiso con la divulgación científica reflejado en numerosas entrevistas en medios de difusión nacionales e internacionales, incluyendo prensa, TV y presentaciones web, además de participar activamente en políticas de captación de fondos para investigación básica. Ello la ha llevado a sumar un reconocimiento adicional a su trayectoria con la reciente concesión del premio del King's College London por la contribución mas relevante al compromiso público.

No de menor relevancia es la trayectoria académica de la Profesora Watt que mantiene una activa colaboración docente con diversas Universidades británicas e internacionales, participando en la impartición de cursos para pre-graduados, doctorandos y cursos de especialización. En su faceta académica ha desarrollado asimismo una intensa actividad en la formación de doctorandos, habiendo dirigido hasta la fecha unas 50 tesis doctorales, varias de ellas de investigadores clínicos, la mayoría de los cuales prosigue su actividad investigadora y académica. Más allá de su formación científica, Fiona desempeña una autentica labor como mentora, ayudando a sus estudiantes y doctorandos a preparar entrevistas, proyectos y a encontrar sus primeros trabajos. Por lo que respecta a su relación con la Universidad Autónoma de Madrid, me gustaría destacar de forma especial su contribución notable a la formación de varios investigadores postdoctorales, doctorandos de nuestra Universidad, que se han convertido en la actualidad en investigadores consolidados en diferentes centros de excelencia nacionales e internacionales. Entre ellos me gustaría mencionar a los Dres. Alberto Gandarillas, Salvador Aznar-Benitah y Héctor García Palmer, todos ellos realizaron su

formación pre-doctoral en el Instituto de Investigaciones Biomédicas "Alberto Sols", centro mixto de la UAM y el CSIC. Fue para mi un verdadero placer proporcionar en su día referencias de estos jóvenes científicos para su admisión en el grupo de Fiona.

Tras esta breve semblanza de la Dra. Watt, quizás nos podamos preguntar cómo es posible compaginar todas sus actividades y conciliarlas, además, con una enriquecedora vida familiar con su marido y tres hijos, dos de ellos gemelos. En una entrevista publicada en 2009 en la revista Stem Cells[1], Fiona daba algunas claves para ello, mencionando "You only live once, so it's really important to enjoy the work you are doing. One talent I have is to avoid worrying about things I can't do anything about. I find it very easy, as soon as I get home, to just switch off science and enjoy being with the kids. You shouldn't worry about the kids when you're in the lab and you shouldn't worry about the lab when you're with the kids. Otherwise, you'll go nuts!". A mi me gustaría añadir una nota adicional, su desbordante pasión por la investigación y su enorme energía y vitalidad, rasgos que pude apreciar de inmediato en mi primer encuentro con ella, allá por el año 1994. Esta pasión se despertó en ella desde pequeña, estando desde muy pronto convencida que no podía hacer otra cosa. Parafraseando otra respuesta en dicha entrevista, Fiona mencionaba "I think that being a scientist is in a sense hardwired, and there are people who just couldn't conceive of being anything else". Sin duda, esta es la actitud profesional y vital de Fiona.

Profesora Watt, querida Fiona, es para nuestra Universidad y para mi en especial un verdadero honor que pase a formar parte de nuestra insigne lista de Doctores "Honoris Causa".

***Profesora Amparo Cano***

[1] Lako M & Daher S. Balancing Work and Life: A conversation with Fiona Watt. Stem Cells, 27(4): 762-763 (2009). doi :10.1002/stem.53

# Discurso de Investidura de la Profesora / *Speech by* Fiona Watt

Ladies and Gentlemen, let me begin by thanking the University for bestowing this great honour on me.

It is a particular pleasure to accept this award because of my deep and long standing connections with the Universidad Autonoma de Madrid. Professor Amparo Cano and I have been colleagues for many years and it is a testimony to the University's superb reputation that it hosts such world-class faculty. I have also had the pleasure and privilege of training several outstanding young scientists who obtained their degrees from the University, including Alberto Gandarillas, Salvador Aznar Benitah and Hector Palmer. They have all gone on to pursue highly successful research careers.

I was born and grew up in Edinburgh, Scotland, and enrolled as a student at the University of Cambridge, where I obtained a degree in Natural Sciences. It was during my studies in Cambridge that I became fascinated by Cell Biology. I therefore moved to Oxford for my PhD studies so that I could train with Henry Harris, who was using cell-cell hybrids to study the characteristics of tumour cells.

After Oxford I moved to the Massachusetts Institute of Technology for postdoctoral research with Howard Green, and here I began to study keratinocytes, the cells of the outer skin layer, or epidermis. My experience in Howard Green's lab not only provided me with the experimental system that I have pursued throughout my career, but also exposed me to the practical applications of research - using cultured epidermis to treat burns patients.

At the age of only 25 I returned to the UK to establish my own independent laboratory. I worked first at the Kennedy Institute for Rheumatology in London and then spent 20 years working for a Cancer Research Institute that is now part of the Francis Crick Institute in London. From 2007 to 2012 I worked in Cambridge, where I helped to establish two new research institutes, one focused on cancer and one on stem cells. In 2012 I moved back to London to create the Centre for Stem Cells and Regenerative Medicine at King's College London.

A major theme of my research has been to identify the cells that are responsible for maintaining the epidermis, namely the stem cells. These days everyone has heard of stem cells and understands their potential value for improving human health. However, when I first started working with keratinocytes the stem field was largely theoretical and many people were skeptical about its value. I began by developing an assay to allow me to count the number of stem cells in a culture of human keratinocytes and used this to identify cell surface markers of stem cells. I also identified some of the intrinsic regulatory mechanisms that control the location and position of stem cells within the epidermis. As the technology for genetically modifying mice became available I began to combine my in vitro studies of human keratinocytes with mouse models. In mice I was able to study the communication between keratinocytes and other cell types and to develop models of skin cancer and also of benign, inflammatory skin diseases such as psoriasis. However, I never lost my interest in human keratinocytes and currently I am designing new artificial cell culture environments to enable me to understand, at single cell resolution, the interplay between intrinsic and extrinsic signals in controlling stem cell fate.

Obviously I have not carried out all this research on my own. I have supervised close to 50 PhD students and trained more than that number of postdoctoral researchers. I have also worked with several superb research assistants who form the backbone of my lab. When selecting people to join the lab, I am influenced not so much by their academic credentials but by their passion for science and collegiality. My research team is international in composition and I am delighted when scientists leave my lab to establish their own labs, whether in the UK or further afield, including Spain.

What have I learned from being a scientist? I believe that science is a vocation, not a job – if you don't love it, there is no point in doing it. I believe that what you publish is more important than where you publish, and that putting too much pressure on young scientists to publish in the top journals can lead to dishonest behaviour. I believe in science as a community effort, and that the relationships we make in the lab can have a lasting, and very positive influence on our lives.

With that, I end by thanking you for your attention and for this wonderful honour.

Curriculum Vitae de la Profesora

**Fiona M. Watt**

# CURRICULUM VITAE

**Name:** Fiona Mary WATT
**Place of birth:** Edinburgh
**Nationality:** British
**Status:** Married, three children
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## Qualifications and research experience

**1973 - 1976:** Cambridge University - 1st Class Honours B.A. in Natural Sciences (M.A. 1979)

**1976 - 1979** Sir William Dunn School of PathologyUniversity of Oxford - D.PhilSupervisors: Professor Henry Harris and Dr. Eric Sidebottom

**1979 - 1981** Postdoctoral Associate in Laboratory of Dr. Howard Green, Department of Biology, M.I.T., Cambridge, Massachusetts, U.S.A.

**1981 - 1986** Head of Molecular Cell Biology Laboratory, Kennedy Institute of Rheumatology, London.

**1987 - 2006** Head of Keratinocyte Laboratory, CR-UK London Research Institute (formerly Imperial Cancer Research Fund) Principal Scientist 1992

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|---|---|
| **2007 - 2012** | Deputy Director, Cambridge CR-UK Institute; inaugural Herchel Smith Professor of Molecular Genetics, Cambridge University and Deputy Director, Wellcome Trust Centre for Stem Cell Research; Fellow of St John's College |
| **2012** - | Director, Centre for Stem Cells and Regenerative Medicine, King's College London |

## Research interests

My major research interests are in how the differentiated state of adult tissues is maintained and how this information can be harnessed for regenerative medicine. My experimental models are mammalian skin, human iPS cells and squamous cell carcinomas. Current projects in my laboratory are concerned with how stem cell self-renewal and lineage selection are controlled by reciprocal interactions with the cellular microenvironment, or niche.

## Awards and honours [Selected]

› Biological Council Medal, 1990
› William Montagna Award of the American Society for Investigative Dermatology, 1999
› Member, European Molecular Biology Organization, 1999
› President, British Society for Cell Biology, 1999-2006
› Fellow, Academy of Medical Sciences, 2000
› Tanioku Memorial Lectureship, prize of Japanese Society for Investigative Dermatology, 2001
› CE.R.I.E.S. Research Award of Chanel, 2001
› Fellow, Royal Society, 2003
› FEDERA award of the Dutch Federation of Medical Scientific Societies, 2003
› Ebling Award of the European Hair Research Society, 2006
› President, International Society for Stem Cell Research (ISSCR), 2008

› Honorary Foreign Member, American Academy of Arts and Sciences, 2008
› American Society for Cell Biology (ASCB) Women in Cell Biology Senior Award, 2008
› Member, Academia Europaea, 2009
› MRC Suffrage Science Heirloom, 2011
› Carl Zeiss Lecturer, German Society for Cell Biology, 2012
› King's College London award for public engagement, 2013
› Hunterian Society Medal, 2015
› Wellcome Trust Research Leadership Development Programme, 2015
› Doctor Honoris Causa, Universidad Autonoma de Madrid, 2016

## Consultancies and honorary appointments [Selected, since 2006]

› Specialist adviser, House of Lords Science and Technology Committee inquiry into Regenerative Medicine, 2012-2013
› Non-Executive Director, Cell Therapy Catapult Ltd, 2016-
› Member, Science Gallery London Leonardo Group, 2016-

## Committee membership [Selected, since 2006]

› Scientific Advisory Board, Canadian Stem Cell Network, 2006-
› Scientific Advisory Board, Keystone Symposia, 2006-2007
› Scientific Advisory Board, Harvard Stem Cell Institute, 2006-
› Scientific Advisory Board, Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University, 2008-
› Institute of Molecular Biotechnology of the Austrian Academy of Sciences (IMBA) Scientific Advisory Board, 2008-
› Scientific Advisory Board, Ontario-wide Stem Cell initiative and Centre for Commercialization in Regenerative Medicine, 2011-
› Jury member, New York Stem Cell Foundation-Robertson Stem Cell Investigator Awards Program, 2013 -
› Scientific Advisory Board, California Institute for Regenerative Medicine (CIRM), 2013 –

› Scientific Advisory Council, National Centre for Cell Science, Pune, India, 2013 –
› Member, UK Government Regenerative Medicine Expert Group, 2014
› Scientific Advisory Board (SAB) of the Mechanobiology Institute, Singapore (MBI), 2014-
› Scientific Advisory Committee, National Institute for Biological Standards and Control, 2014-
› DEBRA International Medical and Scientific Advisory Panel, 2015-
› Chair, Early Career Selection Committee, Wellcome Trust/DBT India Alliance, 2015 –
› Member, Wellcome Trust Collaborative Awards Committee, 2015 –
› Member, International Advisory Board, UK Centre for Mammalian Synthetic Biology Research, Edinburgh University, 2015 –
› Member, European Molecular Biology Laboratory Scientific Advisory Committee, 2016-2018
› Scientific Advisory Board, Biozentrum, University of Basel, 2016-2020
› Evaluation panel, European Research Council (ERC) advanced grants, LS3 Cellular and Developmental Biology, 2016 -
› Scientific Review Board, Howard Hughes Medical Institute, 2016-

## Scientific journals [Selected]

› Editor-in-Chief, Journal of Cell Science, 1992 - 2011
› Editorial Board, Current Opinion in Cell Biology, 1994-
› Section head, 'Faculty of 1000' online review service, 2001-
› Editorial Board, Seminars in Cell and Developmental Biology, 2005-
› Editorial Board, Cell Stem Cell, 2006-
› Deputy Editor, eLife, 2011-
› Editorial Board, Stem Cell Reports, 2012-
› Advisory Board, bioRxiv pre-print server (Cold Spring Harbor Laboratory), 2013-

# Selected publications

## Thesis

**Watt, F.M.** (1979)
Microtubule-organising centres in cells in culture and in hybrids derived from them.
D.Phil. Thesis, University of Oxford

## Research Articles

6. **Watt, F.M.** and Green, H. (1982)
Stratification and terminal differentiation of cultured epidermal cells.
Nature 295:434-436.

24. **Watt, F.M.**, Jordan, P.W. and O'Neill, C.H. (1988)
Cell shape controls terminal differentiation of human epidermal keratinocytes.
Proc. Natl. Acad. Sci. USA 85:5576-5580

29. Adams, J.C. and **Watt, F.M.** (1989)
Fibronectin inhibits the terminal differentiation of human keratinocytes.
Nature 340:307-309.

35. Adams, J.C. and **Watt, F.M.** (1990)
Changes in keratinocyte adhesion during terminal differentiation: reduction in fibronectin binding precedes $\alpha_5\beta_1$ integrin loss from the cell surface.
Cell 63:425-435.

53. Jones, P.H. and **Watt, F.M.** (1993)
Separation of human epidermal stem cells from transit amplifying cells on the basis of differences in integrin function and expression.
Cell 73:713-724.

58. Hodivala, K.J. & **Watt, F.M.** (1994)
Evidence that cadherins play a role in the downregulation of integrin expression that occurs during keratinocyte terminal differentiation.
J. Cell Biol. 124:589-600.

61. Jones, P.H., Harper, S. and **Watt, F.M.** (1995)
Stem cell patterning and fate in human epidermis.
Cell 80:83-93.

69. Carroll, J.M., Romero, M.R. and **Watt, F.M.** (1995)
Suprabasal integrin expression in the epidermis of transgenic mice results in developmental defects and a phenotype resembling psoriasis.
Cell 83:957-968.

95. Zhu, A.J. and **Watt, F.M.** (1999)
b-catenin signalling modulates proliferative potential of human epidermal keratinocytes independently of intercellular adhesion.
Development 126:2285-2298.

96. Jensen, U.B., Lowell, S. and **Watt, F.M.** (1999)
The spatial relationship between stem cells and their progeny in the basal layer of human epidermis: a new view based on whole mount labelling and lineage analysis.
Development 126:2409-2418.

97. Zhu, A.J., Haase, I. and **Watt, F.M.** (1999)
Signalling via b1 integrins and mitogen-activated protein kinase determines human epidermal stem cell fate in vitro.
Proc. Natl. Acad. Sci. USA 96:6728-6733.

101. Lowell, S., Jones, P., Le Roux, I., Dunne, J. and **Watt, F.M.** (2000)
Stimulation of human epidermal differentiation by Delta-Notch signalling at the boundaries of stem-cell clusters.
Curr. Biol. 10:491-500.

124. Evans, R.D., Perkins, V.C., Henry, A. , Stephens, P.E., Robinson, M.K. and **Watt, F.M.** (2003)
A tumor-associated β1 integrin mutation that abrogates epithelial differentiation control
J. Cell Biol. 160:589-596.

129. Braun, K.M., Niemann, C., Jensen, U.B., Sundberg, J.P., Silva-Vargas, V. and **Watt, F.M.** (2003)
JManipulation of stem cell proliferation and lineage commitment: visualisation of label-retaining cells in wholemounts of mouse epidermis
Development 130:5241-5255.

137. Janes, S.M. and **Watt, F.M.** (2004)
Switch from αvβ5 to αvβ6 integrin expression protects squamous cell carcinomas from anoikis.
J. Cell Biol. 166:419-431.

138. Groot, K.R., Sevilla, L.M., Nishi, K., DiColandrea, T. and **Watt, F.M.** (2004)
Kazrin, a novel periplakin-interacting protein associated with desmosomes and the keratinocyte plasma membrane.
J. Cell Biol. 166:653-659.

141. Silva-Vargas, V., Lo Celso, C., Giangreco, A., Ofstad, T., Prowse, D.M., Braun, K.M. and **Watt, F.M.** (2005)
β-catenin and Hedgehog signal strength can specify number and location of hair follicles in adult epidermis without recruitment of bulge stem cells.
Developmental Cell 9:121-131.

142. Benitah, S.A., Frye, M., Glogauer, M. and **Watt, F.M.** (2005)
Stem cell depletion through epidermal deletion of Rac1.
Science 309:933-935.

147. Takeda, H., Lyle, S., Lazar, A.J.F., Zouboulis, C.C., Smyth, I. and **Watt, F.M.** (2006)
Human sebaceous tumours harbour inactivating mutations in LEF1.
Nature Med. 12:395-397.

148. Frye, M. and **Watt, F.M.** (2006)
The RNA methyltransferase Misu (NSun2) mediates Myc-induced proliferation and is upregulated in tumours.
Curr. Biol. 16:971-981.

150. Jensen, K. B. and **Watt, F.M.** (2006)
Single-cell expression profiling of human epidermal stem and transit-amplifying cells: Lrig1 is a regulator of stem cell quiescence.
Proc. Natl. Acad. Sci. USA 103:11958-11963.

155. Niemann, C., Owens, D.M., Schettina, P. and **Watt, F.M.** (2007)
Dual role of inactivating Lef1 mutations in epidermis: tumour promotion and specification of tumour type.
Cancer Research 67:2916-2921.

159. Sevilla, L.M., Nachat, R., Groot, K.R., Klement, J.F., Uitto, J., Djian, P., Määttä, A. and **Watt, F.M.** (2007)
Mice deficient in involucrin, envoplakin and periplakin have a defective epidermal barrier.
J. Cell Biol. 179:1599-1612.

161. Torres, J. and **Watt, F.M.** (2008)
Nanog maintains pluripotency of mouse ES cells by inhibiting NFkB and cooperating with Stat3.
Nature Cell Biology 10:194-201.

165. Lo Celso, C., Berta, M.A., Braun, K.M., Frye, M., Lyle, S., Zouboulis, C.C. and **Watt, F.M.** (2008)
Characterisation of bipotential progenitors derived from human sebaceous gland: contrasting roles of c-Myc and b-catenin.
Stem Cells 26:1241-1252.

166. Sevilla, L.M., Rana, A.A., **Watt, F.M.** and Smith, J.C. (2008)
KazrinA is required for axial elongation and epidermal integrity in Xenopus tropicalis.
Dev. Dyn. 237:1718-1725.

171. Ferreira, M., Fujiwara, H., Morita, K. and **Watt, F.M.** (2009)
An activating b1 integrin mutation increases conversion of benign to malignant skin tumors.
Cancer Research 69:1334-1342.

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# Laudatio del Profesor **Sir Philip Cohen** por el Profesor Doctor Rafael Garesse

*Excelentísimo y Magnífico Señor Rector,*
*Excelentísimas e Ilustrísimas Autoridades,*
*Queridos Profesores,*
*Amigos y Amigas,*
*Querido Profesor Philip Cohen,*

Es un gran honor para mí dirigirme a ustedes en esta ceremonia para otorgarle el grado de Doctor Honoris Causa al Profesor Sir Philip Cohen. Es asimismo una difícil tarea resumir en pocas palabras los méritos del Dr. Cohen, ya que se trata de un bioquímico con una trayectoria científica, académica y humana excepcional en un área que ha revolucionado en el último siglo nuestra manera de comprender el funcionamiento de los seres vivos. Es finalmente para mí una gran responsabilidad, ya que hablo en nombre del área de bioquímica y biología molecular y de nuestra querida Universidad Autónoma de Madrid.

El Dr. Cohen ha desempeñado un papel crucial en la bioquímica, y particularmente en el campo de la señalización intracelular. Su interés científico ha permitido desarrollar una línea de investigación pionera, que ha descubierto nuevos mecanismos implicados en la regulación de la actividad de las diferentes células del organismo. Gracias a su trabajo conocemos mejor cómo las células responden a las numerosas señales que le llegan del exterior, un diálogo molecular fascinante y esencial para mantener la homeostasis del organismo. Bajo el punto de vista de la transferencia, los descubrimientos surgidos de su laboratorio han sido utilizados para el desarrollo de nuevos fármacos que ayudan a combatir diferentes enfermedades prevalentes y muy particularmente el cáncer. *From the bench to the bedside*, del laboratorio al paciente, en un nítido ejemplo de lo que hoy constituye uno de los grandes objetivos de la investigación en ciencias de la salud y que se conoce con el nombre de investigación traslacional.

Durante los últimos 40 años Sir Philip ha sido la fuerza motora del crecimiento de la investigación en el área de ciencias de la vida en la Universidad de Dundee, Escocia, en donde ha trabajado con su mujer Trizia, también científica, y en donde han crecido sus dos hijos Susanne y Simón. Durante este tiempo el Profesor Cohen ha visto crecer su departamento de unas 40 personas, a más de 1000 en la actualidad pertenecientes a 60 nacionalidades diferentes. Ha sido directamente e indirectamente responsable del desarrollo de una agrupación de empresas dedicadas a las ciencias de la vida y a la biotecnología en Dundee, que emplea a 4000 personas y que representa el 16% de la economía de esta ciudad escocesa con unos 200.000 habitantes, que se encuentra a orillas del rio Tay.

La aproximación de Sir Philip a la ciencia estuvo profundamente influenciada por los dos años que paso en la Universidad de Washington en Seattle, trabajando en el laboratorio de Edmond Fischer. Fischer junto con Ed Krebs, serían galardonados años más tarde, en 1992, con el Premio Nobel de Medicina por descubrir unas modificaciones reversibles en las proteínas. Se trata de la adición o eliminación de un pequeño grupo fosfato, una modificación química que cambia ligeramente su estructura tridimensional, su forma, pero que influencia notablemente su actividad. Desde entonces, el Dr. Cohen ha expandido los horizontes de este campo de investigación de forma notable, de tal modo que su trabajo ha permitido demostrar que esta modificación de las proteínas, es un mecanismo de control que regula casi todas las funciones de las células vivas. La realizan un grupo de enzimas llamadas kinasas y fosfatasas y su importancia es tan grande, que la incorporación defectuosa de grupos fosfatos a determinadas proteínas es una de las causas de las principales enfermedades crónicas como el cáncer, la diabetes, o varias enfermedades con base inflamatoria.

Aunque su trabajo se engloba dentro de lo que conocemos como investigación básica, sir Philip intuyó la enorme aplicabilidad de sus descubrimientos a la mejora de la salud, y desarrolló un área de investigación nueva con gran implicación biotecnológica mediante el desarrollo de moléculas, de drogas, que inhiben a las proteínas responsables de la incorporación de estos fosfatos. De este modo, las drogas pueden dirigirse específicamente a dianas moleculares que se encuentran

alteradas en procesos patológicos. Philip creó en Dundee la división de terapia de transducción de señales (Division of Signal Transduction Theraphy) en donde numerosas compañías farmacéuticas han podido evaluar sus fármacos y desarrollar moléculas más efectivas para el tratamiento de enfermedades. Este centro, el más grande en Europa, es a nivel mundial un modelo de investigación traslacional, en donde instituciones con distintos objetivos comparten intereses comunes. Gracias a su visión se han desarrollado ya algunos fármacos que actualmente se están utilizando en clínica para el tratamiento del melanoma.

Además, el desarrollo de drogas que inhiben la actividad de proteínas que incorporan fosfato ha sido y es actualmente una herramienta insustituible para la investigación básica de los mecanismos que regulan la actividad de nuestras células. Se utilizan para el estudio de mecanismos implicados en las más variadas funciones biológicas, que se llevan a cabo en laboratorios de investigación de todo el mundo. En una línea de trabajo similar, durante los últimos años el profesor Cohen se ha interesado por otro mecanismo de modificación química de las proteínas celulares llamado ubiquitinación. Coherente con su espíritu emprendedor ha creado un centro, también en Dundee, que estudia cambios en las propiedades de las proteínas por la incorporación de moléculas de ubiquitina, siendo también uno de los centros pioneros de estudio en este campo a nivel mundial.

La carrera científica de Sir Philip ha estado acompañada desde el principio de la concesión de premios y honores y citarlos todos aquí sería interminable. Es uno de los 18 profesores de investigación de la Royal Society, director de la unidad de fosforilación de proteínas del Medical Research Council, director del Instituto Escoces de señalización celular, y es también presidente de honor de la Sociedad de Bioquímica de Gran Bretaña. Entre los últimos premios y honores que ha recibido cabe destacar el premio Roft Luzt del Instituto Karolinska de Suecia o la medalla Millenium Medical Research Council de Gran Bretaña. También ha sido galardonado con la medalla Real de la Royal Society y ha sido elegido miembro extranjero de la Academia Nacional de Ciencia de Estados Unidos y de la Academia Nacional de Ciencias de Australia.

Desde el punto de vista académico Sir Philip Cohen ha sido director de más de 45 Tesis Doctorales y ha supervisado directamente a más de 65 estudiantes postdoctorales. Muchos de sus estudiantes actualmente desempeñan cargos de responsabilidad en las universidades y centros de investigación y desarrollo más importantes del mundo. Por otro lado ha sido editor de numerosas revistas científicas de difusión internacional y miembro de medio centenar de Comités Científicos en todo el mundo. Ha sido invitado a más de 300 conferencias plenarias en congresos nacionales e internacionales, ha publicado más de 500 artículos de trabajos originales y revisiones. Entre los años 1996 y 2007 fue el biólogo celular más citado del mundo, con 20.170 citas. Su índice H es de 140, es decir tiene 140 trabajos que ha sido citado más de 140 veces.

Sir Philip ha tenido una relación especial con la comunidad científica española, es miembro de honor de Sociedad Española de Bioquímica y Biología Molecular y en septiembre de 2015 firmó con otros científicos de prestigio internacional una carta en apoyo a la investigación y la ciencia española. Además tiene una estrecha vinculación con la Universidad Autónoma de Madrid habiendo visitado varias veces nuestro Campus, sus Facultades de Medicina y Ciencias, el Centro de Biología Molecular "Severo Ochoa", el Instituto de Investigaciones Biomédicas "Alberto Sols" y el Centro Nacional de Biotecnología. Entre sus estudiantes y colaboradores se encuentran numerosos científicos que trabajan en la UAM, entre ellos, Jorge Martín, Ana Cuenda, Marta López y Susana Alemany, profesora honoraria del departamento de bioquímica y una de las postdoctorales y colaboradoras más queridas del profesor Cohen.

Pero por encima de todo Philip es una persona excepcional, sin duda un innovador y un pionero de la investigación traslacional, ahora uno de los ejes centrales de H2020 y todos los Planes Nacionales de Investigación. Quizás una de las personas que mejor le ha definido es Tony Pawson, al decir que «*los logros de Philip son tan excepcionales que simplemente no sé por dónde empezar. Para mí, él personifica lo que significa ser un científico, es creativo, tenaz, magnánimo y está siempre terriblemente bien informado. Los elefantes, por alguna razón, representan el paradigma de la memoria, pero creo que deberían ser reemplazados por*

*Philip Cohen. Tal vez es su ilimitado entusiasmo y su energía para con la ciencia, por no hablar de su afición por el golf y la observación de aves y su entusiasmo por mejorar la vida en la ciudad de Dundee, lo que deja una huella que impresiona».*

Es esta pasión y lealtad con la Ciencia, su amor por la Universidad, su implicación con el bienestar de las personas y su incansable dedicación para mejorar la prosperidad de las futuras generaciones lo que nos lleva a estar hoy aquí reunidos. Profesor Cohen, querido sir Philip, es para nuestra Universidad un verdadero honor que pase a formar parte de nuestra insigne lista de Doctores "Honoris Causa".

***Profesor Rafael Garesse***

# Discurso de Investidura del Profesor / *Speech by* Sir Philip Cohen

Let me start by thanking the University for awarding me for this honorary doctorate, which is a great honour that I will cherish. Over the past 30 years many Spanish scientists have come to my laboratory at the University of Dundee, Scotland for postdoctoral research training where they have made very important contributions to the scientific discoveries that my research team has made. Nearly all have retumed to Spain to set up their own research groups in Universities and Research Institutes, including the Universidad Autónoma de Madrid. The doctorate that your University has given me today cements the strong relationship that I have had with Spanish scientists over many years.

Nearly 50 years ago, I started to study a biological control mechanism in living cells, in which phosphate is attached to and removed from proteins, in a process called "reversible phosphorylation". The phosphate is attached to proteins by a class of enzymes known as protein kinases, hereafter termed "kinases", and detached by other enzymes called protein phosphatase ("phosphatases"). The attachment or removal of phosphate changes the shape of a protein and can alter its properties in a variety of ways. It is a simple, flexible and rapidly reversible process that is used to regulate the speed and duration of the myriad of chemical reactions that take place every second in the cells of our body.

At the time that I began my research very little was known about this topic. Only two "kinases' and one "phosphatase" had been identified and reversible phosphorylation was thought to be a specialised control mechanism confined to

the regulation of carbohydrate metabolism. Over the next 25 years my research team managed to work out how insulin promotes the conversion of glucose in the blood to its storage form called glycogen in muscle and in the liver, and we also identified and characterized many previously undiscovered "phosphatases" and "kinases". Most importantly, the work of my laboratory at that of a number of others, revealed that protein phosphorylation does not just regulate carbohydrate metabolism but is a general mechanism for controlling almost all aspects of cell life.

We now know that the human genome encodes over 500 "kinases" and nearly 150 "phosphatases", so that about one in every 30 proteins we make are "kinases' or "phosphatases". We also know that virtually all cellular proteins contain phosphate and that abnormalities in phosphorylation underlie many human diseases. However, the idea that "kinases" and "phosphatases" might be targeted to develop new drugs to treat disease was considered to be an impossible dream, explaining why no pharmaceutical company took any interest in my research for over 25 years. The first sign that these enzymes might make attractive drug targets came in 1990 with unexpected discovery of how cyclosporin works. This drug, which has permitted the widespread use of organ transplantation by preventing tissue rejection, switches off a "phosphatase" discovered and characterized in my laboratory in 1981 before cyclosporine was approved for clinical use

In 1994 I became involved for the first time in two important collaborations with pharmaceutical companies, which led to the characterization of two of the first four potent and specific "kinase" inhibitors to be developed. These studies showed that it was possible to make compounds that could enter living cells and switch off a one particular kinase relatively selectively. These exciting findings led me to set up the Division of Signa! Transduction Therapy (DSTT) in 1998, which continues to this day. lt is Europe's largest and longest running collaboration between academic research teams and the pharmaceutical industry. It is widely regarded as a general model for how Academia and lndustry can work together productively, for which it received a Queen's Anniversary Prize for Higher Education in 2005. The DSTT helps pharmaceutical companies to launch and accelerate the early stages of programmes, which are aimed at developing drugs

that switch off the biological functions of kinases to treat disease. Over the past 18 years we have helped to launch dozens of new drug discovery programmes and many compounds have been developed that are now undergoing clinical trials for the treatment of cancer, as well as chronic inflammatory diseases like rheumatoid arthritis. For example, we helped to launch the programme that led to the approval of Dabrafenib, a drug developed by GlaxoSmithKiine (GSK) that was approved for the treatment of skin cancer in 2013. Trametinib, another drug developed by GSK to treat skin cancer switches off "MEK", a kinase discovered in my laboratory by Nestor Gomez a visiting postdoctoral scientist from Spain.

Since the first drug that targets a kinase was approved in 2001, over 30 other "kinase" drugs have been approved for clinical use. Over 150 other compounds that switch off one or more kinases are currently undergoing clinical trials and about 25 of these are in Phase III the most advanced stage of clinical trials. We can therefore expect the number of approved "kinase" drugs to almost double over the next 5 to 10 years. The sales of "kinase" therapies reached Euro 30 billion per annum in 2011 and are expect to reach Euro 50 billon by the end of 2016.

Nearly all "kinase" drugs developed so far are used for the treatment of cancers, but in late 2012 Tofacitinib, a new "kinase" therapy was approved for the treatment of rheumatoid arthritis. This was a landmark event, because Tofacitinib was first new drug to arthritis that can be taken orally as a pill for over 50 years. I believe that "kinase' therapies have huge potential for the treatment of inflammatory and autoimmune diseases, such as arthritis, colitis, fibrosis, lupus, psoriasis and sepsis. So, nine years ago, I decided to switch my field of research to the study how kinases control the production of inflammatory mediators by the innate immune system. Inflammation plays a vital in defence against infection by bacteria and viruses, but can cause serious damage to the body and Iead to chronic inflammatory and autoimmune diseases if it is not switched off rapidly when the infection has been cleared. Recently, my research team has validated severa! "kinases" as drug targets for the treatment of these conditions and we are now working with our pharmaceutical partners to launch new drug discovery programmes aimed at develop improved therapies.

The study of innate immunity introduced me unexpectedly to another type of protein modification, called reversible ubiquitylation, which also regulates many cellular processes. Excited by this topic, I managed eight years ago to persuade the Scottish Government to provide money to set up the world's first Ubiquitylation Unit dedicated to the study of this complex process. This has enabled the School of Life Sciences at Dundee to develop great research strengths in ubiquitylation, which has become an emerging area of drug discovery, similar to where "kinase" drug discovery was 20 years ago. In the DSTT we are now helping pharmaceutical companies to initiate novel programmes aimed at developing drugs that target components of the ubiquitin system. However, only time will tell how big an area of drug discovery ubiquitylation will become.

When I arrived in Dundee in 1971, the biochemistry Department that I joined had only six faculty members and a handful of Ph.D. students and technicians. Over the past 45 years it has been remarkable to have seen its development into what is now the School of Life Sciences with nearly 1000 researchers from over 65 countries. It is now ranked as Europe's top University in the Biological Sciences, as judged by the number of times the scientific papers of its research teams are quoted by other scientists in their own publications (termed citations). The strengths in the Life Sciences have led to the creation of a number of successful biotechnology companies and the DSTT has spawned two of these. Remarkably, I understand that Life Sciences and Biotechnology now accounts for about 15% of the economy of the city of Dundee, employing many thousands of people. It has been both a pleasure and a privilege to have to contributed to this transformation of local economy. Once referred to as the city of Jute, Journalism and Jam (marmalade was invented in Dundee), it is now more often called the city of Biochemistry, Biomedicine and Biotechnology.

The story of reversible protein phosphorylation is an excellent example of how it can take years or even decades until fundamental knowledge about a particular topic reaches the stage where it becomes obvious how it can be exploited to improve health and create wealth. It is therefore essential for Governments to provide sustained, long term funding for basic research and at the level needed

for new knowledge to emerge and flourish. It is unfortunate that Government's sometimes seem to forget how our lifestyle today has been determined by the scienti'fic discoveries of the past century in the physical as well as the life sciences. Governments therefore need to be reminded continuously of success stories and how they happened. The story of "kinases" and reversible protein phospborylation is just one of many that could be told.

Thank you once again for making me a graduate of your University.

Curriculum Vitae del Profesor
**Sir Philip Cohen**

## CURRICULUM VITAE

| | |
|---|---|
| **Name:** | Philip Cohen |
| **Date of birth:** | 22nd July 1945 |
| **Age:** | 70 |
| **Nationality:** | British |
| **Marital Status:** | Married Patricia Townsend Wade, 1969<br>two children; Suzanne (41), Simon (39). |

## Research Career

**October 1963 -June 1966:** B.Sc. (Biochemistry) University College London. 1st Class Honours

**October 1966-Sept 1969:** Ph.D. (Biochemistry) Title: "The Subunits of Glucose-6-Phosphate Dehydrogenase". University College, London. Supervisor-Dr Michael A.Rosemeyer

**October 1969-Sept 1971:** Recipient of SRC-NATO Postdoctoral Fellowship held at the University of Washington, Seattle, U.S.A. with Professor Edmond H. Fischer.

**October 1971-Dec 1978:** Lecturer, Department of Biochemistry, University of Dundee, Scotland

**January 1976-Dec 1978:** Recipient of Wellcome Trust Special Research Fellowship

**October 1978-1981:** Reader in the Department of Biochemistry, University of Dundee

**October 1979-1984:** Salary paid by Medical Research Council

**October 1981-1984:** Professor of Enzymology, University of Dundee

**April 1983-Sept 1989:** Director, Medical Research Council Protein Phosphorylation Group

**October 1984 -Sept 2010:** Royal Society Research Professor, University of Dundee

**October 1990-2012:** Director of the Medical Research Council Protein Phosphorylation Unit

**October 1997-2001:** Director of the Wellcome Trust Biocentre, University of Dundee

**July 1998-June 2012:** Co-Director, Division of Signal Transduction Therapy, University of Dundee

**October 2001 – July 2007:** Dean of Research, College of Life Sciences, University of Dundee

**July 2008-2012:** Director of the Scottish Institute for Cell Signalling

**April 2012-present:** Professor of Enzymology, University of Dundee and Deputy Director of the Division of Signal Transduction Therapy.

**November 2013-to present:** Vallee Visiting Professor, Harvard Medical School, Boston, USA

## Awards/recognition

**1977** › Anniversary Prize, Federation of European Biochemical Societies.
› Colworth Medal, British Biochemical Society

**1982** › Elected a Member of the European Molecular Biology Organisation

**1984** › Elected a Fellow of the Royal Society of London
› Elected a Fellow of the Royal Society of Edinburgh

**1990** › Elected to Academia Europaea

**1991** › CIBA Medal and Prize of the British Biochemical Society

**1992** › Prix Van Gysel of the Belgian Royal Academies of Medicine
› Elected a Fellow of University College London

**1993** › Awarded the Dundee City of Discovery Rosebowl
› Bruce Preller Prize, Royal Society of Edinburgh

**1996** › Special Achievement Award, Miami Biotech Winter Symposium
› Elected a Fellow of the Royal Society of Arts

**1997** › Louis Jeantet Prize for Medicine, Louis Jeantet Foundation, Geneva
› Datta Medal, Federation of European Biochemical Societies,

**1998** › Croonian Lecture of the Royal Society of London.

› Elected an Honorary Fellow of the Royal College of Pathologists
› Honorary Doctor of Science. University of Abertay, Scotland
› Founder Fellow, Academy of Medical Sciences
› Created Knights Batchelor in the Queen's Birthday Honours List

**1999** › Honorary Doctor of Science, University of Strathclyde, Scotland
› Pfizer Innovation Award for Europe
› 3rd most cited scientist based in the UK 1990-1999 (ISI, Philadelphia)

**2001** › Sir Hans Krebs Medal, Federation of European Biochemical Societies.

**2002** › Bristol-Myers Squibb Distinguished Achievement Award in Metabolic Research

**2003** › World's 2nd most cited scientist in "Biology and Biochemistry" 1992-2003 (ISI, Philadelphia)
› Elected an Honorary member of The Biochemical Society

**2004** › Honorary Doctor of Medicine, University of Linkoping, Sweden
› Honorary Doctor of Science, University of Debrecen, Hungary
› The Debrecen Award for Molecular Medicine, Hungary
› Royal Medal of the Royal Society of Edinburgh

**2005** › Honorary Doctor of Science, University of St Andrews, Scotland

**2006** › Honorary President British Biochemical Society
› Queen's Anniversary Award for Higher Education
› The Rolf Luft Prize, Karolinska Institute, Stockholm, Sweden.

**2007** › Honorary Doctor of Laws, University of Dundee

**2008** › Elected Foreign Associate of the National Academy of Sciences
› Royal Medal of the Royal Society

**2009** › Elected a Fellow of the American Academy of Microbiology
› The Society for Biomolecular Sciences Achievement Award
› Scottish Enterprise "Leading Individual Achievement in the Life Sciences in Scotland"

**2010** › Honorary Membership of the American Society of Toxicology
› Most cited Biochemist 1999-2009 (ISI, Thompson Scientific, Philadelphia)

**2013** › The MRC Millenium Medal

**2014** › Elected a Corresponding Member of the Australian Academy of Science

› The Albert Einstein World Award of Science (World Cultural Council)

**2016** › Honorary doctorate University Autonoma Madrid

Philip Cohen has published over 530 papers and reviews (excluding abstracts) and a book and given 328 invited and named lectures at National and International Scientific Meetings. 44 students have received a Ph.D. under his supervision and 71 postdoctoral researchers have worked in his laboratory. His H-factor is 143 (i.e. 143 papers cited >143 times)

## Editorial activities

**Series Editor:** › Molecular Aspects of Cellular Regulation (1980-1991)

**Managing Editor:** › Biochimica et Biophysica Acta (1981-1992)

**Advisory Editor:** › European Journal of Biochemistry (1980-83)

› Biochemical Journal (1989 - present)

**Editor:** › Federation of European Biochemical Societies Letters (1980-84)

› European Molecular Biology Organisation Journal (1985-1987)

› Advances in Protein Phosphatases (1989-1994)

## Committees and Boards

**Royal Society of London**

› Member of Sectional Committee 6 (1985-1987 and 1997-1999)

› Chairman of Sectional Committee 6 (1987/88)

› Member of the National Committee for Biochemistry (1985-87)

› Chairman of the National Committee for Biochemistry (1988-1989)

› Member of the Medical Sciences Research Committee (1989)

› Biochemistry Representative on the International Relations Committee (1990 - 1991)

› Member of the Royal Society Council (2002 and 2003)

**Biochemical Society**

› Honorary President, 2006-2008

**Medical Research Council**

› Member of the Systems Board Committee B (October 1981-1983)

› Assessor for Postgraduate Research Studentships (October 1985-1988)

› Panel Member, Milstein Fund Initiative (2006-2008) Chairman 2007

**International Union of Biochemistry**

**Beit Memorial Fellowships**

› Member of Selection Committee (1987-1992)

**E.C. Slater Institute for Medical Research (Amsterdam)**

› Overseas Scientific Advisor (1989-1992)

**International Institute for Cellular and Molecular Pathology (Brussels)**

› Member of the Governing Council (1993 - 2013)

**SmithKline Beecham Pharmaceuticals**

› Member of Discovery Advisory Board (1993-1997)

**Zeneca Pharmaceutical Company**

› Consultant (1995-1997)

**Pfizer Pharmaceutical Company**

› Consultant (1998-2004)

**Biofocus**

› Consultant (1998-2008)

**Upstate Inc.**

› Chairman of the Scientific Advisory Board (1999-2004)

**Venetian Institute for Molecular Medicine**

› Member of the Scientific Advisory Board (1999 - 2007)

› Chairman 2007

**Imperial Cancer Research Fund**

› Member of the Scientific Advisory Board (2001-2002)

**Almirall Prodesfarma**

› Member of the Scientific Advisory Board 2002-2005

**Patron of the STEM partnership Dundee** – 2004-present

**Intermediary Technology Institute of Life Sciences**

› Member of the SAB (2004 –2008)

**MRC Technology**

› Member of the SAB (2006-present)

**The Singapore A-Star Council** (2006-2009)

**Biocatalyst Intl inc.**

› Member of the SAB (2007-2012)

**Cellzome**

› Member of the SAB (2007-2012)

**MRC Technology**

› Member of the Board (2012-2016)

**Ubiquigent**

› Chairman of the SAB (2009-present)

## Ph.D. Students Graduated and their current positions

1. John F. Antoniw (1975) "Separation and regulation of the two phosphorylase kinase phosphatases from rabbit skeletal muscle". Current position-Retired formerly Principal Scientific Officer, Rothamsted Experimental Station, Hertfordshire, U.K.

2. Stephen J. Yeaman (1976) "The substrate specificity of cyclic AMP-dependent protein kinase and its role in glycogen metabolism". Current position- Emeritus Professor of Biochemistry, University of Newcastle. Elected a fellow of the Royal Society of Edinburgh in 1996

3. Ann Burchell (1976) "The use of genetic variation in studying the regulation of mammalian energy metabolism". Current position- Retired formerly Emeritus Professor in Obstetrics and Gynaecology , University of Dundee.

4. Christopher G. Proud (1977) “The regulation of rabbit skeletal muscle glycogen synthetase by phosphorylation and dephosphorylation” Current position – Theme Leader, South Australian Health and Medical Research Institute, Adelaide Australia

5. J. Gordon Foulkes (1980) “Regulation of protein phosphatase-1 by specific inhibitor proteins”. Current position-Founder and CEO of JGF Consulting Services, California, USA.

6. Mohammed Noor Embi (1981) “Phosphorylation of rabbit skeletal muscle glycogen synthase by protein kinases”. Current position-Professor of Biochemistry, National University of Malaysia

7. Alexander A. Stewart (1982) “Regulation of protein phosphatases involved in the control of glycogen metabolism in skeletal muscle”. Current position-Research Scientist, Oncogene Sciences Inc, New York.

8. Zahi Damuni (1983) “Regulation of the aminoacyl-tRNA synthetase complex by phosphorylation/dephosphorylation”. Founder and CEO of GloboZymes, CA, Carlsbad, USA

9. James R. Woodgett (1984) “Characterisation of protein kinases involved in the regulation of glycogen metabolism and other cellular processes”. Current position – Director of the Lunenfeld Research Institute, Toronto, Canada. Fellow of the Royal Society of Canada.

10. Nicholas Tonks (1985) “The structure and regulation of protein phosphatases”. Current position –Professor and Deputy Director, NCI-Cancer Centre, Cold Spring Harbor Laboratories New York.1993 Colworth Medallist of the British Biochemical Society, Fellow of the Royal Society (elected in 2001).

11. Hin Young Lim Tung (1985) “Characterisation of type-1 and type-2 protein phosphatases”.Director of the Laboratory of Neuroscience Biochemistry, Weill Medical College, Cornell University, New York

12. Charles F.B. Holmes (1987) “Structure and regulation of protein phosphatase inhibitor-2”. Current position- Full Professor and Chairman, Department of Biochemistry, University of Alberta, Edmonton, Canada.

13. Clare McGowan (1987) “Discovery and characterization of two isozymes of protein phosphatase 2C”. Current position-Associate Professor, Department of Molecular Biology, Scripps Clinic, La Jolla, USA.

14. Julie Pitcher (1989) “A dual role for glycogenin in the initiation of glycogen biogenesis”. Current position-Senior Lecturer in Pharmacology, University College London.

15. Lindsay MacDougall (1991) “ The control of protein phosphatase-1 by inhibitor proteins and targeting subunits”. Current position - Lecturer in Biological Sciences, University of Manchester Institute of Science and Technology.

16. Donald Schelling (1991) “Characterization of hepatic glycogen and microsomal type-1 protein phosphatases”. Current position – Patent Attorney Kansas City, Missouri, USA

17. Paul Dent (1992) “The control of protein phosphatase 1 by targeting subunits” Current position –Professor, School of Medicine, Virginia Commonwealth University, U.S.A.

18. Sara Nakielny (1993) “Protein Kinase Cascades and the Regulation of Glycogen Synthase”. Current position -.Postdoctoral Fellow, University of Colorado, Boulder, Colorado

19. David Stokoe (1993) “MAPKAP kinase 2: a novel protein kinase involved in growth factor signal transduction.” Current position – Senior Scientist, Genentech, California

20. Calum Sutherland (1994) “Mechanism of activation and potential physiological roles of a MAP kinase activated protein kinase.” Diabetes UK Senior Research Fellow and Reader in Pathology and Neuroscience, University of Dundee.

21. Sarah Traverse (1994) “The role of the MAP kinase pathway in the differentiation of PC12 cells by NGF.” Current position - Teacher of Biology, The Sixth Form College, Colchester, Essex, UK.

22. Ian Leighton (1995) “Mechanism of Activation and Substrate Specificity of Protein Kinases Involved in Intracellular Signalling.” Current position – Scientific Director NSPM, Switzerland.

23. John Rouse (1996) “Identification and characterisation of a novel protein kinase cascade mediating cellular responses to stress and cytokines” Current position – Programme Leader and EMBO Young Investigator, MRC Protein Phosphorylation and Ubiquitylation Unit, University of Dundee. 2008 Colworth Medallist of the British Biochemical Society

24. Darren A.E. Cross (1997) “The molecular mechanism by which insulin regulates glycogen synthase kinase-3.” Senior Team Leader, AstraZeneca, Alderley Edge, UK.

25. Deborah Johnson (1997) “Regulation of smooth muscle contractility by a form of protein phosphatase 1.” Current position - Clinical Biochemist, Birmingham Children’s Hospital.

26. Gareth Thomas (1998) “Novel physiological roles of SAP and MAP kinase cascades in chromaffin cells and skeletal muscle.” Current position – Assistant Professor, Shriners Hospital and Paediatric Center, Temple University School of Medicine, Philadelphia, USA

27. Kay Walker (1998) “Activation of protein kinase B isoforms by insulin and 3-phosphoinositide-dependent protein kinase-1.” Current position – Senior Clinical Biochemist, Edinburgh Royal Infirmary.

28. Andrew Clifton (1999) “Novel components, targets and functions of the MAPK and SAPK2 pathways” Current position - Principal Scientist, Redx Pharma, Alderley Edge, Cheshire, UK.

29. Patrick Eyers (2000) “Mechanism of action and exploitation of SAPK2/p38 inhibitors” Current position –Reader in Biochemistry, University of Liverpool, UK.

30. Morag Shaw (2000) “Molecular mechanism by which extracellular agonists inactivate glycogen synthase kinase-3”. Current position –Clinical Pharmacist, Aberdeen Royal Infirmary.

31. Matilde Caivano (2000) “ Role of MAPK and SAPK cascades in regulating the production of inflammatory mediators and cytokines. Current position – Investigator, GlaxoSmithKline, Harlow.

32. Yvonne Fleming (2000) “The mechanism of activation of SAPK1/JNK” Current position – Housewife and Mother, Glasgow UK.

33. Yvonne Woods (2001) “Identification of novel substrates for DYRK isoforms” Current position – Practising Clinician, Dundee, UK.

34. Claire Haydon (2002) "Identification of substrates for MAPKAP-K2 through the use of KESTREL." Current position – Professor of Biochemistry, University of Liverpool, UK.

35. Susanna Fagerholm (2002) "Bidirectional Signalling and Phosphorylation of CD11/CD18-Integrins in T Cells." Current position – Team Leader, Institute of Biotechnology, Helsinki, Finland.

36. Giselle Wiggin (2003) "Role of MSK1 and MSK2 in the mitogen and stress-induced phosphorylation of the transcription factors CREB and ATF1" Current position –Senior Scientist, Heptares Therapeutics, BioPark, Welwyn Garden City, Hertfordshire, UK.

37. Nimesh Mody (2003) "The MKK5-ERK5 cascade" Current position– British Heart Foundation Research Fellow, University of Aberdeen, UK

38. Simon Morton (2004) "Characterisation of the signal transduction pathway targetting the transcription factors c-Jun and ATF-2", Current position: Practising Clinician, Newcastle, UK.

39. Robert Cartlidge (2005) "Identification of METTL1 as a new physiological substrate for PKB and RSK." Current position – Market Research Analyst, WWMR Inc, California, USA

40. Iva Klevernic (2007) "The regulation of MAP kinases by DNA damage" Current position –Postdoctoral Research Associate, University of Liege, Belgium

41. Huei-Ting Yang (2008) "The role of mitogen-activated protein kinases in regulating the production of inflammatory mediators." Current position –Senior Development Scientist , Oford Immunotec Ltd UK

42. Hilary Smith (2010) “regulation of the E3 ubiquitin ligase Pellino in innate immune signaling.” Current position unknown

43. Alban Ordureau (2011) “An investigation of the role of E3 ubiquitin ligases in regulating innate immunity.” Postdoctoral Research Fellow, Harvard Medical School, Boston, USA

44. Sam Strickson (2015)”How the ubiquitin system triggers the activation of the MyD88 signalling network

## MSc by Thesis

1. Alexander Chisholm (1992) “Identification and characterization of a myofibril-associated form of protein phosphatase-1 in rabbit skeletal muscle.” Current position – unknown.

2. Caroline Morris (2003) “The use of the KESTREL method to identify novel substrates of GSK3.” Current position – Research Assistant, Winship Cancer Institute, University of Emory Atlanta.


# Academic Honorary Degree Ceremony
# Speeches