BIOGRAPHICAL SKETCH

NAME Paul Workman FRS FMedSci	POSITION TITLE Chief Executive and President, The Institute of Cancer Research (ICR); Director of the CRUK Centre at ICR/Royal Marsden NHS Trust; Harrap Professor of Pharmacology and Therapeutics,
eRA COMMONS USER NAME (credential, e.g., agency login)	

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YY	FIELD OF STUDY
University of Leicester, UK	BSc (Hons)	1973	Biological Sciences
University of Leeds, UK	PhD	1977	Cancer Pharmacology

A. Personal Statement

I am Chief Executive and President of The Institute of Cancer Research (ICR), London and Harrap Professor of Pharmacology and Therapeutics. From 1997 to February 2016 I was Head of the Section/Division of Cancer Therapeutics at ICR and Director of the Cancer Research UK Cancer Therapeutics Unit – the largest non-profit cancer drug discovery group in the world. I previously held a senior leadership role at Zeneca Pharmaceuticals and was a scientific founder of the biotechnology companies Piramed Pharma (acquired by Roche) and Chroma Pharmaceuticals. I am a scientific leader in cancer drug discovery, molecular pharmacology and chemical biology and have been instrumental in more than 20 drugs entering clinical trials, including protein kinase, PI3 kinase and HSP90 inhibitors. I conceived and exemplified the Pharmacologic Audit Trail for decision-making in drug development. My current interests are in innovative personalized medicines, new drug targets, extending the druggable cancer genome, chemical probes, the HSF1 stress pathway, and overcoming adaptive feedback loops, clonal evolution and drug resistance. I have promoted and exemplified the centre of excellence model for academic drug discovery. I am on the board of several journals, Deputy Editor of Molecular Cancer Therapeutics, Review Editor of Cancer Cell and Board Director of the Chemical Probes Portal. I also write, blog and lecture on cancer drugs and the drug discovery and development ecosystem.

B. Positions and Honors

1976-1979, Postdoctoral Scientist, MRC Clinical Oncology Unit, Cambridge University, UK
1979-1983, Limited Tenure Appointment (MRC Grade 2), MRC Clinical Oncology Unit, Cambridge University, UK
1983-1987, Tenured Career Appointment (MRC Grade 1), MRC Clinical Oncology Unit, Cambridge University, UK
1987, Senior Appointment (MRC Grade 2), MRC Clinical Oncology Unit, Cambridge University, UK
1987-1990, MRC Special Appointment (Professorial equivalent), MRC Clinical Oncology Unit, Cambridge University, UK
1990, UICC Visiting Fellow, Stanford University and Stanford Research International, CA, USA
1991-1993, Director of Laboratory Research and CRC Professor of Experimental Cancer Therapy, Department of Medical Oncology, CRC Beatson Laboratories, University of Glasgow, UK
1993-1997, Head of Bioscience Section, Zeneca (formerly ICI, now AstraZeneca) Pharmaceuticals
1997-2016, Director, CRUK Cancer Therapeutics Unit, The Institute of Cancer Research, London, UK (ICR)
1997-present, Team Leader, Signal Transduction and Molecular Pharmacology, ICR
1997-present, Harrap Professor of Pharmacology and Therapeutics, ICR
2011-2014, Deputy Chief Executive, ICR
2014-present, Director, Cancer Research UK Centre the ICR and RMH NHS Foundation Trust

2014-present, Chief Executive and President, ICR
2016-present, Director, Cancer Research Centre of Excellence, ICR & Imperial College

1985 European School of Oncology Award for Excellence in Oncology Research
1990 UICC ICRETT Fellowship
1991 Cancer Research UK Life Fellow
1993 External Professor of Cancer Pharmacology, Institute of Cancer Studies, University of Leeds UK
1986 Visiting Professor in Pharmacology, School of Biological Sciences, University of Manchester UK
1999 Tannlege Olav Aase og Feu Memorial Lecture, Norwegian Cancer Forum
2001 Fellow of the Royal Society of Biology
2002 Fellow of the Academy of Medical Sciences
2002 Perkin Elmer Life Sciences Lecture, British Association for Cancer Research
2002 Merlin Lecture of Cancer Research UK
2003 Bruce Cain Memorial Award Lecturer of the New Zealand Society for Oncology
2006 Dutch New Drug Development Office Award for Cancer Drug Development
2007 ICON Distinguished Lecturer of the University of Manchester
2007 Fellow of the Royal Society of Medicine
2009 Honorary DSc University of Leicester UK
2009 Tom Connors Award Lecturer of the British Association for Cancer Research and National Cancer Research Institute
2010 Royal Society of Chemistry George and Christine Sosnovsky Award in Cancer Therapy
2010 Fellow of the Royal Society of Chemistry
2011 Bruce Cain Memorial Award Lecturer of the New Zealand Society for Oncology
2012 Lineberger Lecturer, UNC Lineberger Comprehensive Cancer Center, Chapel Hill, NC, USA
2012 American Association of Cancer Research Team Science Award (PW Team Leader)
2012 Royal Society of Chemistry World Entrepreneur of the Year Award
2013 Cancer Research UK Translational Cancer Research Prize
2014 International Raymond Bourgine Award for Excellence in Cancer Research
2015 British Pharmacological Society 'Putting UK Pharmacology on the Map' Award, (to ICR)
2016 Fellow of the Royal Society

C. Selected Peer-reviewed Publications (from a total of >528)

1. Sarker D, Ang JE, Baird R, Kristeleit R, Shah K, Moreno V, Clarke PA, Raynaud FI, Levy G, Ware JA, Mazina K, Lin R, Wu J, Fredrickson J, Spoerke JM, Lackner MR, Yan Y, Friedman LS, Kaye SB, Derynck MK, Workman P, de Bono JS. First-in-human phase I study of pictilisib (GDC-0941), a potent pan-class I phosphatidylinositol-3-kinase (PI3K) inhibitor, in patients with advanced solid tumors. Clin Cancer Res 2015; 21:77-86.

2. Samant RS, Clarke PA, Workman P. E3 ubiquitin ligase Cullin-5 modulates multiple molecular and cellular responses to heat shock protein 90 inhibition in human cancer cells. Proc Natl Acad Sci U S A 2014; 18:6834-9.

3. Polier S, Samant RS, Clarke PA, Workman P, Prodromou, Pearl LH. ATP-competitive inhibitors block protein kinase recruitment to the Hsp90-Cdc37 system. Nat Chem Biol 2013; 9:307-12 (Joint senior author)

4. Smith JR, Clarke PA, de Billy E, Workman P. Silencing the cochaperone CDC37 destabilizes kinase clients and sensitizes cancer cells to HSP90 inhibitors. Oncogene 2009; 28:157-69.

5. Raynaud FI, Eccles SA, Patel S, Alix S, Box G, Chuckowree I, Folkes A, Gowan S, de Haven Brandon A, Di Stefano F, Hayes A, Henley AT, Lensun L, Pergl Wilson G, Robson A, Saghir N, Zhyvoloup A, McDonald E, Sheldrake P, Shuttleworth S, Valenti M, Wan NC, Clarke PA, Workman P. Biological properties of potent

inhibitors of Class I phosphatidylinositide 3-kinases: From PI-103 through PI-540, PI-620 to the oral agent GDC-0941. Mol Cancer Ther 2009; 8:1725-38.

6. Powers MV, Clarke PA, Workman P. Dual targeting of HSC70 and HSP72 inhibits HSP90 function and induces tumor-specific apoptosis. Cancer Cell 2008; 14:250-62.
7. Holmes JL, Sharp SY, Hobbs S, Workman P. Silencing of HSP90 co-chaperone AHA1 expression decreases client protein activation and increases cellular sensitivity to the HSP90 inhibitor 17-allylamino-17-demethoxygeldanamycin (17-AAG). Cancer Res 2008; 68:1188-97.

8. Eccles SA, Massey A, Raynaud F, Sharp SY, Box G, Valenti M, Patterson L, de Haven Brandon A, Gowan S, Boxall F, Aherne W, Rowlands M, Hayes A, Martins V, Urban F, Boxall K, Prodromou C, Pearl L, James K, Matthews TP, Cheung KM, Kalusa A, Jones K, McDonald E, Barril X, Brough PA, Cansfield JE, Dymock B, Drysdale MJ, Finch H, Howes R, Hubbard RE, Surgenor A, Webb P, Wood M, Wright L, Workman P. NVP-AUY922: A novel heat shock protein 90 inhibitor active against xenograft tumor growth, angiogenesis and metastasis. Cancer **Res 2008; 68:2850-60.**

9. Brough PA, Aherne W, Barril X, Borgognoni J, Boxall B, Cansfield JE, Cheung KM, Collins I, Davies NGM, Drysdale MJ, Dymock B, Eccles SA, Finch H, Fink A, Hayes A, Howes R, Hubbard RE, James K, Jordan AM, Lockie A, Martins V, Massey A, Matthews T, McDonald E, Northfield CJ, Pearl LH, Prodromou C, Ray S, Raynaud FI, Roughley SD, Sharp SY, Surgenor A, Walmsley DL, Webb P, Wood M, Workman P, Wright L. 4,5-Diaryl isoxazole Hsp90 chaperone inhibitors: Potential therapeutic agents for the treatment of cancer. J Med Chem 2008; 51:196-218.

10. Sharp SY, Boxall K, Rowlands M, Prodromou C, Roe SM, Maloney A, Powers M, Clarke PA, Box G, Sanderson S, Patterson L, Matthews TP, Cheung KMJ, Ball K, Hayes A, Raynaud F, Marais R, Pearl L, Eccles S, Aherne W, McDonald E, Workman P. In vitro biological characterization of a novel, synthetic diaryl pyrazole resorcinol class of HSP90 inhibitors. Cancer Res 2007; 67:2206-16.

11. Raynaud FI, Eccles S, Clarke PA, Hayes A, Nutley B, Alix S, Henley A, Di Stefano F, Ahmad Z, Guillard S, Bjerke LM, Kelland L, Valenti M, Patterson L, Gowan S, de Haven Brandon A, Hayakawa H, Koizumi T, Ohishi T, Patel S, Saguir N, Parker P, Waterfield M, Workman P. Pharmacological characterisation of a potent inhibitor of class I phosphatidylinositide 3-kinases. Cancer Res 2007; 67:5840-50.

12. Maloney A, Clarke PA, Naaby-Hansen S, Stein R, Koopman JO, Akpan A, Yang A, Zvelebil M, Cramer R, Stimson L, Aherne W, Banerji U, Judson I, Sharp S, Powers M, de Billy E, Salmons J, Walton M, Burlingame A, Waterfield M, Workman P. Gene and protein expression profiling of human ovarian cancer cells treated with the heat shock protein 90 inhibitor 17-allylamino-17-demethoxygeldanamycin. Cancer Res 2007; 67:3239-53.

13. Hayakawa M, Kaizawa H, Kawaguchi K, Ishikawa N, Koizumi T, Ohishi T, Yamano M, Koada M, Ohta M, Tsukamoto S, Raynaud FI, Waterfield MD, Parker P, Workman P. Synthesis and biological evaluation of imidazo[1,2-a]pyridine derivatives as novel PI3 kinase p110□ inhibitors. Bioorg Med Chem 2007; 15:403-12.

14. Cheung KMJ, Matthews TP, James K, Rowlands MG, Boxall KJ, Sharp SY, Maloney A, Roe SM, Prodromou C, Pearl LH, Aherne GW, McDonald E, Workman P. The identification, synthesis, protein crystal structure and in vitro biochemical evaluation of a new 3,4-diarylpyrazole class of Hsp90 inhibitors. Bioorg Med Chem Lett 2005; 15:3338-43.

15. Banerji U, O'Donnell A, Scurr M, Pacey S, Stapleton S, Asad Y, Simmons L, Maloney A, Raynaud F, Campbell M, Walton M, Lakhani S, Kaye S, Workman P, Judson I. Phase I pharmacokinetic and pharmacodynamic study of 17-allylamino,17-demethoxygeldanamycin in patients with advanced malignancies. J Clin Oncol 2005; 23:4152-61. (Joint senior author).

16. Hostein I, Robertson D, Di Stefano F, Workman P, Clarke PA. Inhibition of signal transduction by the Hsp90 inhibitor 17-allylamino-17-demethoxygeldanamycin results in cytostasis and apotosis. Cancer Res 2001; 61:4003-9. (Senior author)

D. Research Support

6 years from 2011 - Cancer Research UK (Programme) £35,000,000
CRUK Cancer Therapeutics Unit quinquennial core funding
Drug Discovery Programme
Role: PI

9 years from 2008 - Wellcome Trust (Programme) £4,900,000
Mechanism-based drug discovery PhD Training Programme
Non clinical and clinical PhD training programme
Role: Programme Director

3 years from 2014 - Cancer Research UK (Programme) £12,600,000
Cancer Research UK Centre Grant to The Institute of Cancer Research/The Royal Marsden
Infrastructure and research programme
Role: Programme Director

1 year from 2015 - Cancer Research UK £1,000,000
Cancer Therapeutics Cancer Equipment Award
Capital Equipment
Role: PI

20 years from 1997 – Cancer Research UK (Personal Award) £108,000 p.a.
Cancer Research UK/Harrap Chair of Pharmacology and Therapeutics
Contribution to personal salary in recognition of being a CRUK Life Fellow

3 years from 2014 - Prostate Cancer UK (Project) £393,000
Implications to outcome and treatment in prostate cancer
Prostate cancer treatment
Role: Co-PI

2 years from 2014 - Cancer Research Technology Pioneer Fund (Project) £1,600,000
Inhibiting the HSF1 Pathway
Discovery of HSF1 pathway inhibitor
Role: PI

2 years from 2014 - National Health & Medical Research Council (Project) £30,000
Developing novel molecules that target hormone receptors as an alternative therapy
Targeting hormone receptors as an alternative therapy
Role: PI