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QUALIFICATIONS

BSc Hons (First Class), University of Otago, New Zealand
PhD, University of Sydney, Australia

AREAS OF EXPERTISE

Molecular and cellular biology of cancer; molecular pharmacology; gene cloning and protein biochemistry, gene expression and silencing including RNAi and knockout mice, cancer (breast, ovarian, prostate, etc), oncogenes and tumour suppressor genes, tumour energy metabolism, nuclear receptors, steroid antagonists eg tamoxifen.

CAREER SUMMARY

Following a Postdoctoral Fellowship at the Imperial Cancer Research Fund, London (now Cancer Research (UK)) I joined the Garvan Institute of Medical Research, Sydney, and established an independent research group within the Cancer Research Program focusing on the molecular biology of steroid hormone action in breast cancer and the identification and characterisation of novel cancer-related genes. I have published over 60 research papers and book chapters in these fields.

I have also been a Project Leader in the CRC for Biopharmaceutical Research and the scientific communications editor for a start-up biotechnology company.

Currently, I am an independent scientific consultant.

2010- Project Manager, Cancer Therapeutic Drug Development Lab, Garvan Institute of Medical Research

2004- Independent Consultant

2004-2005 Apollo Life Sciences Ltd, Scientific Communications Editor

1996-2004 Garvan Institute of Medical Research, Sydney, Australia.
Senior Research Fellow, Cancer Research Program.

- 1996-2007** Conjoint Senior Lecturer, Department of Medicine, University of New South Wales.
- 1993-96** Cooperative Research Center for Biopharmaceutical Research. Project Leader, Receptor-Based Anti-Cancer Drugs Program
- 1990-96** Senior Research Officer, Cancer Research Program, Garvan Institute of Medical Research.
- 1986-89** Post-Doctoral Research Fellow, Hormone Biochemistry Dept, Imperial Cancer Research Fund, London, UK.
- 1985-86** Research Officer, Garvan Institute of Medical Research, St. Vincent's Hospital, Sydney, Australia.
- 1980-85** Senior Research Assistant, Ludwig Institute for Cancer Research, University of Sydney, Sydney, Australia.
- 1978-79** Scientific Officer, Dept. of Human Nutrition, University of Otago, Dunedin, New Zealand.

HONOURS AND AWARDS

- 1991-94 NHMRC R. Douglas Wright Fellow
- 1986-89 Imperial Cancer Research Fund Post-Doctoral Fellowship
- 1978 Muriel Bell Memorial Prize in Human Nutrition
- 1977 M.R.C. Summer Studentship
- 1977 University of Otago Award for Science
- 1970 University Junior Scholarship

PUBLICATIONS

Journal Articles

1. Watts CKW, Murphy LC, Sutherland RL (1984). Microsomal binding sites for nonsteroidal antiestrogens in MCF 7 human mammary carcinoma cells. Demonstration of high affinity and narrow specificity for basic ether derivatives of triphenylethylene. **J. Biol. Chem.** **259:4223-4229.**
2. Watts CKW, Sutherland RL (1984). High affinity specific antiestrogen binding sites are concentrated in rough microsomal membranes of rat liver. **Biochem. Biophys. Res. Commun.** **120:109-115.**
3. Watts CKW, Sutherland RL (1986). Microsomal binding sites for antioestrogens in rat liver: properties and detergent solubilization. **Biochem. J.** **236:903-911.**
4. Ruenitz PC, Bagley JR, Watts CKW, Hall RE, Sutherland RL (1986). Substituted vinyl hydroxytriarylethylenes, 1-[4-[2-(diethylamino)ethoxy] phenyl]-1-(4-hydroxyphenyl)-2-phenylethylenes: Synthesis and effects on MCF-7 breast cancer cell proliferation. **J. Med. Chem.** **29:2511-2519.**

5. Sutherland RL, Watts CKW, Ruenitz PC (1986). Definition of two distinct mechanisms of action of antiestrogens on human breast cancer cell proliferation using hydroxytriarylethylenes with high affinity for the estrogen receptor. **Biochem. Biophys. Res. Commun.** **140:523-529.**
6. Watts CKW, Sutherland RL (1987). Studies on the ligand specificity and potential identity of microsomal antiestrogen binding sites. **Mol. Pharmacol.** **31:541-551.**
7. Sutherland RL, Watts CKW, Hall RE, Ruenitz PC (1987). Mechanisms of growth inhibition by nonsteroidal antioestrogens in breast cancer cells. **J. Steroid Biochem.** **27:891-897.**
8. Ewing TM, Murphy LJ, Ng M-L, Pang GY-N, Lee CSL, Watts CKW, Sutherland RL (1989). Regulation of epidermal growth factor receptor by progestins and glucocorticoids in human breast cancer cell lines. **Int. J. Cancer** **44:744-752.**
9. Watts CKW, Parker MG, King RJB (1989). Stable transfection of the oestrogen receptor gene into a human osteosarcoma cell line. **J. Steroid Biochem.** **34:483-490.**
10. Handel ML, deFazio A, Watts CKW, Day RO, Sutherland RL (1991). Inhibition of DNA binding and transcriptional activity of a nuclear receptor transcription factor by aurothiomalate and other metal ions. **Mol. Pharmacol.** **40:613-618.**
11. Watts CKW, Handel ML, Sutherland RL, King RJB (1992). Oestrogen receptor gene structure and function in breast cancer. **J. Steroid Biochem Molec. Biol.** **41:529-536.**
12. Buckley MF, Sweeney KJE, Hamilton JA, Sini RL, Manning DL, Nicholson RI, deFazio A, Watts CKW, Musgrove EA, Sutherland RL (1993). Expression and amplification of cyclin genes in human breast cancer. **Oncogene.** **8:2127-2133.**
13. Musgrove EA, Hamilton JA, Lee CSL, Sweeney KJE, Watts CKW, Sutherland RL (1993). Growth factor, steroid and steroid antagonist regulation of cyclin gene expression associated with changes in T-47D human breast cancer cell cycle progression. **Mol. Cell. Biol.** **13:3577-3587.**
14. Hu XF, Veroni M, De Luise M, Wakeling A, Sutherland R, Watts CKW, Zalcborg JR (1993). Circumvention of tamoxifen resistance by the pure antiestrogen ICI 182,780. **Int. J. Cancer.** **55:873-876.**
15. Sutherland RL, Watts CKW, Musgrove EA (1993). Cyclin gene expression and growth control in normal and neoplastic human breast epithelium. **J. Steroid Biochem. Molec. Biol.** **47:99-106.**
16. Handel ML, Sivertsen S, Watts CKW, Day RO, Sutherland RL (1993). Comparative effects of gold on the interactions of transcription factors with DNA. **Agents and Actions. Suppl** **44: 219-223.C**
17. Watts CKW, Sweeney KJE, Warlters A, Musgrove EA, Sutherland RL (1994). Antiestrogen regulation of cell cycle progression and cyclin D1 gene expression in MCF-7 human breast cancer cells. **Breast Cancer Res. Treat.** **31:95-105.**

18. Watts CKW, King RJB (1994). Overexpression of the estrogen receptor in HTB 96 human osteosarcoma cells results in estrogen-induced growth inhibition and receptor cross-talk. **J. Bone Min. Res.** **9:1251-1258.**
19. Handel ML, Watts CKW, deFazio A, Day RO, Sutherland RL (1995). Inhibition of AP-1 binding and transcription by gold and selenium involving conserved cysteine residues in Jun and Fos. **Proc. Natl. Acad. Sci. USA.** **92:4497-4501.**
20. Sutherland RL, Hamilton JA, Sweeney KJE, Watts CKW, Musgrove EA (1995). Expression and regulation of cyclin genes in breast cancer. **Acta Oncologica.** **34: 651-656.**
21. Watts CKW, Brady A, Sarcevic B, deFazio A, Musgrove EA, Sutherland RL (1995). Antiestrogen inhibition of cell cycle progression in breast cancer cells is associated with inhibition of cyclin-dependent kinase activity and decreased retinoblastoma protein phosphorylation. **Mol. Endocrinol.** **9:1804-1813.**
22. Mottershead DG, Polly P, Lyons RJ, Sutherland RL, Watts CKW (1996). High activity, soluble, bacterially expressed human vitamin D receptor and its ligand binding domain. **J. Cell. Biochem.** **61:325-337.**
23. Musgrove EA, Hui R, Sweeney KJE, Watts CKW, Sutherland, RL (1996). Cyclins and breast cancer. **J. Mammary Gland Biology and Neoplasia.** **1:153-162.**
24. Handel ML, Watts CKW, Sivertsen S, Day RO, Sutherland RL. (1996). D-Penicillamine causes free radical-dependent inactivation of activator protein-1 DNA binding. **Mol. Pharmacol.** **50:501-505.**
25. deFazio A, Chiew Y-E, McEvoy M, Watts CKW, Sutherland RL (1997). Antisense estrogen receptor RNA expression increases epidermal growth factor receptor gene expression in breast cancer cells. **Cell Growth Differ.** **8:903-911.**
26. Hamilton JA, Callaghan MJ, Sutherland RL, Watts CKW (1997). Identification of PRG1, a novel progestin-responsive gene with sequence homology to 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase. **Mol. Endocrinol.** **11:490-502.**
27. Prall OWJ, Sarcevic B, Musgrove EA, Watts CKW, Sutherland RL (1997). Estrogen-induced activation of Cdk4 and Cdk2 during G₁-S phase progression is accompanied by increased cyclin D1 expression and decreased CDK inhibitor association with cyclin E/Cdk2. **J. Biol. Chem.** **272:10882-10894.**
28. Nicholl J, Hamilton JA, Sutherland GR, Sutherland RL, Watts CKW (1997). The third human isoform of 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase (PFKFB3) Map position 10p14-p15. **Chromosome Res.** **5:150.**
29. Sutherland RL, Prall OWJ, Alle KM, Wilcken NRC, R Hui R, Ball J, Musgrove EA and Watts CKW (1997). Cyclin dependent kinases as downstream targets of oestrogen action: potential prognostic indicators and therapeutic targets. **Endocrine-Related Cancer.** **4:357-370.**
30. Sutherland RL, Prall OWJ, Watts CKW, Musgrove, EA (1998) Estrogen and progestin regulation of cell cycle progression. **J. Mammary Gland Biol. Neoplasia.** **3: 63-71.**

31. Prall OJW, Rogan EM, Musgrove EA, Watts CKW, Sutherland RL (1998). C-myc or cyclin D1 mimic estrogen effects on cyclin E-Cdk2 activation and cell cycle re-entry. **Mol. Cell. Biol.** **18:4499-4508**.
32. Callaghan MJ, Russell AJ, Woolatt E, Sutherland GR, Sutherland RL and Watts CKW (1998). Identification of a human HECT family protein with homology to the Drosophila tumor suppressor gene hyperplastic discs. **Oncogene.** **17:9479-9491**.
33. Nahum A, Danilenko M, Watts CKW, Prall OWJ, Levy J and Sharoni Y. (2001). Lycopene inhibition of cell cycle progression in MCF-7 breast cancer cells is associated with reduction in cyclin D levels and prevention of p27^{kip1} translocation between the cdk2 and cdk4 complexes. **Oncogene.** **20:3428-3436**.
34. Henderson MJ, Russell AJ, Hird S, Munoz M, Clancy JL, Lehrbach GM, Calanni ST, Jans DA, Sutherland RL and Watts CKW (2002) EDD, the human hyperplastic discs protein, has a role in progesterone receptor coactivation and potential involvement in DNA damage response. **J Biol Chem.** **277:26468-26478**.
35. Leung K-C, Ballesteros M, Doyle N, Watts CKW, Low T-H, Ross RJM and Ho KY (2003) Estrogen inhibits growth hormone (GH) signalling by suppressing GH-induced JAK2 phosphorylation. **Proc. Natl. Acad. Sci. USA.** **100:1016-1021**.
36. Eblen S, Kumar NV, Shah K, Henderson MJ, Watts CKW, Shokat KM, and Weber MJ. (2003) Identification of novel ERK2 substrates through use of an engineered kinase and ATP analogs. **J. Biol. Chem.** **278:14926-14935**.
37. Clancy, JL, Henderson, MJ, Russell AJ, Anderson, DW, Bova, RJ, Campbell, IG, Choong, DYH, Macdonald, GA, Mann, GJ, Nolan, T, Brady, G, Olopade, OI, Woollatt, E, Davies, MJ, Segara, D, Hacker, NF, Henshall, SM, Sutherland, RL, Watts, CKW (2003). EDD, the human orthologue of the *hyperplastic discs* tumour suppressor gene, is amplified and overexpressed in cancer. **Oncogene.** **22:5070-5081**.
38. Saunders DN, Hird SL, Withington SL, Dunwoodie SL, Henderson MJ, Biben C, Sutherland RL, Ormandy CJ, Watts CKW (2004). Edd, the murine hyperplastic discs gene, is essential for yolk sac vascularization and chorioallantoic fusion. **Mol. Cell. Biol.** **24(16):7225-34**.
39. Nahum A, Zeller L, Danilenko M, Prall OWJ, Watts CKW, Sutherland RL, Levy J and Sharoni Y (2006). Lycopene inhibition of IGF-induced cancer cell growth depends on the level of cyclin D1. **Eur. J. Nutr.** **45:275-282**.
40. Henderson MJ, Munoz MA, Saunders DN, Clancy JL, Russell AJ, Williams B, Pappin D, Khanna KK, Jackson SP, Sutherland RL, Watts CKW (2006). EDD mediates DNA damage-induced activation of CHK2. **J. Biol. Chem.** **281:39990-40000**.
41. Butt AJ, Roberts CG, Seawright AA, Oelrichs PB, Macleod JK, Liaw TY, Kavallaris M, Somers-Edgar TJ, Lehrbach GM, Watts CKW, Sutherland RL. (2006). A novel plant toxin, persin, with in vivo activity in the mammary gland, induces Bim-dependent apoptosis in human breast cancer cells. **Mol Cancer Ther.** **5:2300-2309**.

42. Munoz M, Saunders DN, Henderson MJ, Clancy JL, Russell AJ, Lehrbach G, Musgrove EA, Watts CKW and Sutherland RL (2007). The E3 ubiquitin ligase EDD regulates S Phase and G2/M DNA Damage Checkpoints. **Cell Cycle**. **6:3070-3077**.
43. Ohshima R, Ohta T, Wu W, Koike A, Iwatani T, Henderson M, Watts CKW, and Otsubo T (2007). Putative tumor suppressor EDD interacts with and up-regulates APC. **Genes to Cells** **12:1339-4135**.
44. O'Brien PM, Davies MJ, Scurry J, Smith AN, Barton CA, Henderson MJ, Saunders DN, Gloss BS, Patterson KI, Clancy JL, Heinzelmann-Schwarz VA, Murali R, Scolver RA, Zeng Y, Williams ED, Scurr L, DeFazio A, Quinn DI, Watts CKW, Hacker NF, Henshall SM, Sutherland RL. (2008). The E3 ubiquitin ligase EDD is an adverse prognostic factor for serous epithelial ovarian cancer. and modulates cisplatin resistance in vitro. **Br. J. Cancer** **998: 1085-1093**.
45. Saunders DN and Watts CKW (2011). Effects of EDD on p53 function are context-specific. **J. Biol. Chem.** **286: 1e13 (letter)**.

Book Chapters

1. Sutherland RL, Watts CKW, Murphy LC (1982). Binding properties and ligand specificity of an intracellular binding site with specificity for synthetic oestrogen antagonists of the triphenylethylene series. In: Agarwal MK, ed. **Hormone Antagonists**. Walter De Gruyter, Berlin. pp. **147-162**.
2. Murphy LC, Watts CKW, Sutherland RL (1983). Structural requirements for binding of antiestrogens to a specific high affinity site in MCF 7 human mammary carcinoma cells: Correlation with antitumor activity *in vitro*. In: Chabner BA, ed. **Rational Basis for Chemotherapy**. Alan R. Liss, Inc., New York. pp. **195-210**.
3. Sutherland RL, Murphy LC, Hall RE, Reddel RR, Watts CKW, Taylor IW (1984). Effects of antioestrogens on human breast cancer cells *in vitro*. Interaction with high affinity intracellular binding sites and effects on cell proliferation kinetics. In: Bresciani F, *et al*, eds. **Hormones and Cancer 2. Progress in Cancer Research and Therapy** **31:193-212**.
4. Watts CKW, Murphy LC, Sutherland RL (1986). Properties of high affinity intracellular binding sites for antiestrogens. In: Jordan VC, ed. **Estrogen/Antiestrogen Action and Breast Cancer Therapy**. University of Wisconsin Press, Madison. pp. **93-114**.
5. Sutherland RL, Watts CKW, Hall RE (1986). Kinetic basis for cell synchronization by antioestrogens and oestrogens in human breast cancer cells. In: Baulieu EE, *et al*, eds. **Endocrinology and Malignancy: Basic and Clinical Issues**. Parthenon Press, London. pp. **121-129**.
6. Watts CKW, Murphy LC, Sutherland RL (1987). Antioestrogen binding sites. In: Furr BJA, Wakeling AE, eds. **Pharmacology and Clinical Uses of Inhibitors of Hormone Secretion and Action**. Holt-Saunders, London. pp. **20-40**.

7. Sutherland RL, Watts CKW, Clarke CL (1988). Oestrogen actions. In: Cooke BA, King RJB, van der Molen, HJ, eds. **Hormones and their Action. New Comprehensive Biochemistry**. Elsevier Biochemical Press, Amsterdam. pp. 197-215.
8. Sutherland RL, Hamilton JA, Watts CKW, Musgrove EA (1994). Hormonal control of breast cancer cell cycle progression. In: Howell A, ed. **Endocrine Therapy of Breast Cancer**. European School of Oncology Monographs, Springer Verlag, Berlin. **Vol. 6, pp. 15-25.**
9. Daly RJ, deFazio A, Watts CKW, Musgrove EA, Sutherland RL (1994). Steroids, steroid antagonists and cell cycle progression. In: Dickson RB, Lippman ME, eds. **Drug and Hormonal Resistance in Breast Cancer: Cellular and Molecular Mechanisms. Part II**. Ellis Horwood. pp. 69 - 93.
10. Musgrove EA, Buckley M, deFazio A, Watts CKW, Sutherland RL (1994). Expression and regulation of cyclin genes in breast cancer cells. In: Hu V, ed. **The Cell Cycle: Regulators, Targets and Clinical Applications**. Plenum Press, N.Y. **pp. 323-329.**
11. Sutherland RL, Watts CKW, Musgrove EA (1995). Cell cycle control by steroid hormones in breast cancer: implications for resistance. **Endocrine Related Cancer 2:1-10.**
12. Sutherland RL, Hamilton JA, Sweeney KJE, Watts CKW, Musgrove EA (1995). Steroidal regulation of cell cycle progression. In: **Non-reproductive Actions of Sex Steroids** (Ciba Foundation Symposium 191) Wiley, Chichester. **pp. 218-234.**
13. Watts CKW, Wilcken NRC, Hamilton JA, Sweeney KJE, Musgrove EA, Sutherland RL (1995). Mechanisms of antiestrogen, progestin/antiprogestin and retinoid inhibition of cell cycle progression in breast cancer cells. In: Pasqualini JP and Katzenellenbogen BS, eds. **Hormone Dependent Cancers. Vol I**. Molecular and Cellular Endocrinology. Marcell Dekker, N.Y. **pp. 119-140.**
14. Sweeney KJE, Musgrove EA, Watts CKW, Sutherland RL (1995). Cyclins and breast cancer. In: Lippman ME, Dickson RB, eds. **Breast Cancer: Cellular and Molecular Biology, Vol 5. pp. 141-170.**
15. Watts CKW, Wilcken NRC, Warlters A, Musgrove EA, Sutherland RL (1996). Mechanisms of anti-estrogen and retinoid inhibition of breast cancer cell proliferation. In: Li JJ, Li SA, Gustafsson J-Å, Nandi S, Sekely LI, eds. **Hormonal Carcinogenesis II**. Springer-Verlag, New York. pp. 446-449.
16. Sutherland RL, Watts CKW, Lee CSL, Musgrove EA (1999). Breast cancer . In: Masters JRW, Palsson B, eds. **Human Cell Culture, Vol II**. Kluwer, GB. **pp 79-106.**
17. Prall OWJ, Rogan EM, Musgrove EA, Watts CKW, Sutherland RL (2000). Estrogen regulation of cell cycle progression. In: Li JJ, Daling JR, Li SA, eds. **Hormonal Carcinogenesis III**. Springer-Verlag, New York. **pp. 220-227.**
18. Watts CKW, Prall OWJ, Carroll JS, Wilcken NRC, Rogan EM, Musgrove EA, Sutherland RL (2002). Antiestrogens and the Cell Cycle. In: Jordan VC, Furr BJA,

eds. **Hormone Therapy in Breast and Prostate Cancer**. Humana Press, Totowa, New Jersey. **pp. 17-45**.

19. Carroll JS, Prall OWJ, Sergio CM, Rogan EM, Watts CKW, Musgrove EA and Sutherland RL (2002). Estrogen/estrogen antagonist regulation of the cell cycle in breast cancer cells. In: Bernstein KL, ed. **Steroid Hormones and Cell Cycle Regulation**. Kluwer Academic Publishers, N.Y. **pp 57-71**.