

Richard P. Grant

Personal Details

Name : Richard Paul Grant *Date of birth :* 14 April 1969
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Academic Qualifications

MA (Oxon) 1991 Department of Biochemistry
DPhil (Oxon) 1994 Sir William Dunn School of Pathology

Career History

Current Position

November 1999 - present
Career Development Fellow
Division of Structural Studies, MRC Lab of Molecular Biology

Previous Posts

1997 - 1999
Senior Research & Development Scientist
Cambridge Molecular Technologies (now Whatman Bioscience)

1994 - 1997
Postdoctoral Research Assistant
The University of Oxford Nuffield Department of Obstetrics and
Gynaecology, John Radcliffe Hospital

Research Achievements

I use structural, protein engineering and cell biological methods to characterize the molecular interactions of proteins involved in cellular movement and nuclear trafficking. I determine structures using X-ray crystallography and NMR and use this information to engineer specific mutants that alter interactions and can be used to probe function in a cellular context. This approach has yielded an understanding of how the polymerization of filaments in lamellipodia generates protrusive force [1]. I also solved the structure of proteins that enhance motility in crawling cells [2].

In the nuclear trafficking field, I characterized the C-terminal domain of the mRNA export protein Tap1 and showed how it binds to nuclear pores [3, 4]. I am applying these methods to the questions of tRNA and microRNA export from the nucleus.

While at Oxford I showed how adjacent structural domains in fibronectin act in synergy to bind cells and initiate integrin-mediated signalling to bring about attachment and spreading [7, 8]. I designed and made fibronectin domain constructs and examined their affect on phosphorylation and the actin cytoskeleton.

Insights gained from my time in the biotech industry, where I implemented DNA extraction procedures in kit and automated forms, have enabled me to appreciate the commercial applicability of academic research.

Teaching Experience

I have supervised and trained research students and undergraduates in the laboratory, in Oxford and at the MRC-LMB. The summer students I have had the privilege to supervise have subsequently gone on to do postgraduate research.

I taught molecular biology and cell biology to undergraduates at the University of Oxford, successfully tutoring a cohort of Medicine and Biology students through their first year Biochemistry and Cell Biology requirements. This experience was both challenging and enjoyable.

I am a clear and confident seminar speaker, and enjoy presenting my work to an audience.

Education and Training

University

1991 - 1994;

The Sir William Dunn School of Pathology, University of Oxford.

D. Phil. thesis;

'Structural and Functional Studies of the Cytoskeletal Protein Talin'

1987 - 1991;

Lady Margaret Hall, University of Oxford.

Biochemistry BA (Hons)

Training Courses

2005

Medical Research and the Public

1998 - 1999

Building a market focused strategy

ISO9001 (internal)

Professional Activities & Awards

1992 – present: Member, the Biochemical Society

1993 – present: Member, the British Society for Cell Biology

1994: Honor Fell Travel Award

1996 – 2004: Contributor, Editorial Panel of *The Biochemist*.

1999 – present: Editor, *Current Issues in Molecular Biology*

Peer-reviewed research papers

1. Miao, L., Vanderlinde, O., Liu, J., **Grant, R. P.**, Wouterse, A., Philipse, A., Stewart, M. and Roberts, T. M. Filament packing dynamics generate protrusive force in amoeboid cell motility. *Manuscript in preparation*.
2. **Grant, R. P.**, Buttery, M. S., Ekman, G. C., Roberts, T. M and Stewart, M. (2005) Structure of MFP2 and its Function in Enhancing MSP Polymerization in *Ascaris* Sperm Amoeboid Motility. *J. Mol. Biol.* **347**: 583-595.
3. **Grant, R. P.**, Neuhaus, D. and Stewart, M. (2003). Structural basis for the interaction between the Tap/NXF1 UBA domain and FG nucleoporins at 1Å resolution. *J. Mol. Biol.* **326**: 849 - 858.
4. **Grant, R. P.**, Hurt, E., Neuhaus, D. and Stewart, M. (2002). Structure of the C-terminal FG-nucleoporin binding domain of Tap/NXF1. *Nature Struct. Biol.* **9**:247 - 251.
5. Stewart, M., Baker, R. P., Bayliss, R., Clayton, L., **Grant, R. P.**, Littlewood, T. and Matsuura, Y. (2001). Molecular mechanism of translocation through nuclear pore complexes during nuclear protein import. *FEBS Lett.* **498**:145 - 149.
6. Calderwood, D. A., Zent, R., **Grant, R.**, Rees, D. J., Hynes, R. O. and Ginsberg, M. H. (1999). The Talin head domain binds to integrin beta subunit cytoplasmic tails and regulates integrin activation. *J. Biol. Chem.* **274**:28071 - 28074.
7. **Grant, R. P.**, Spitzfaden, C., Altroff, H., Campbell, I. D. and Mardon, H. J. (1997). Structural requirements for biological activity of the ninth and tenth FIII domains of human fibronectin. *J. Biol. Chem.* **272**: 6159 - 6166.
8. Spitzfaden, C., **Grant, R. P.**, Mardon, H. J. and Campbell, I. D. (1997). Module-module interactions in the cell binding region of fibronectin: Stability, flexibility and specificity. *J. Mol. Biol.* **265**: 565 - 597.
9. Mardon, H. J., **Grant, R. P.**, Grant, K. E. and Harris, H. (1993). Fibronectin splice variants are differentially incorporated into the extracellular matrix of tumorigenic and non-tumorigenic hybrids between normal fibroblasts and sarcoma cells. *J. Cell Sci.* **104**: 783 - 792.

Protein structures by PDB ID

- 1go5 Structure Of The C-Terminal Fg-Binding Domain Of Human Tap
1oai Complex Between Tap Uba Domain and Fxfg Nucleoporin Peptide
2bjq Crystal structure of the nematode sperm cell motility protein MFP2A
2bjr Crystal structure of the nematode sperm cell motility protein MFP2B
2bvu D83R mutant of *Ascaris suum* major sperm protein (MSP)

Books

Cabibbo, A., Grant, R. P. and Helmer-Cetterich, M. (Eds) 2002. The internet for cell and molecular biologists. Horizon Scientific Press, UK

Grant, R. P. (Ed) September 2004. Computational Genomics: Theory and Application. Horizon Scientific Press, UK. ISBN: 1904933017

Referees

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