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Dr Anna Peacock MChem, PhD

Lecturer in Chemistry

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About

Anna Peacock was appointed as a Lecturer in the School of Chemistry in 2009.

Anna's research interests lie in the field of bioinorganic chemistry and *de novo* peptide design. In particular, research is directed towards the development of novel metallopeptides with potential therapeutic applications.

Group Web Pages (http://chemweb.bham.ac.uk/~peacoafa/Peacock_Website.htm)

Qualifications

Lecturer in Chemistry:

- PhD in Chemistry, University of Edinburgh, 2007
- MChem (Hons) in Chemistry, University of York, 2003

Biography

Anna Peacock qualified with a MChem (Hons) in Chemistry from the University of York in 2003. She performed her dissertation with Professor Robin N. Perutz and Dr Anne-Kathrin Duhme-Klair on the development of a metal-based lumophore tailored to sense biologically relevant oxometalates. She then went on to study for a PhD with Professor Peter J. Sadler FRS at the University of Edinburgh on the design of osmium(II) arene anticancer complexes. This work resulted in a patent application being filed by the University of Edinburgh.

In 2007 Anna moved to a post-doctoral position at the University of Michigan with Professor Vincent L Pecoraro to work on the *de novo* design of metallopeptides. In 2009 Anna took up her first academic post as a Lecturer in the School of Chemistry here at the University of Birmingham

Teaching

Teaching Programmes

Anna is involved in various teaching activities in the School of Chemistry. Current lecture courses include Supramolecular Chemistry, and Bioinorganic & Coordination Chemistry.

Postgraduate supervision

Anna is interested in supervising doctoral research students in the following areas:

- *De novo* design of lanthanide peptide coiled coils
- DNA binding peptide sensors

If you are interesting in studying any of these subject areas please contact Anna on the contact details above, or for any general doctoral research enquiries, please email: **dr@contacts.bham.ac.uk (mailto:dr@contacts.bham.ac.uk)** | or call +44 (0)121 414 5005.

For a full list of available Doctoral Research opportunities, please visit our **Doctoral Research programme listings. (http://www.bham.findaphd.com/?es=y&apl=y&aplt=&show)** .

Research

RESEARCH THEMES

De novo peptide design, DNA binding metallopeptides, gadolinium coiled coils

RESEARCH ACTIVITY

Design of peptide architectures for DNA binding

Our group is interested in the design of peptide sequences which fold into well-defined structures capable of both selective DNA recognition and binding. This is achieved by utilising the α-helix as the DNA major groove recognition domain. We are interested in the design of metal sites which are able to preorganise the α-helices so as to enhance DNA binding, and which are capable of providing a measurable output with potential sensor applications.

Development of gadolinium coiled coil complexes

A second project within the group involves the design, synthesis and evaluation of gadolinium coiled coil complexes as potentially novel MRI contrast agents. By correlating peptide design, solution studies and computational modelling with MR data, we aim to understand the mechanism by which we produce contrast and develop a new class of gadolinium complexes with enhanced relaxivity.

Other activities

- Member of COST D39 "Metallo-Drug Design and Action"
- Associate faculty member of Faculty of 1000 Biology
- Member of the Royal Society of Chemistry

Publications

Publications:

Berwick, M. R.; Lewis, D. J.; Pikramenou, Z.; Jones, A. W.; Cooper, H. J.; Wilkie, J.; Britton, M. M.; Peacock, A. F. A.* (2014) "**De Novo Design of Ln(III) Coiled Coils for Imaging Applications (http://pubs.acs.org/doi/pdf/10.1021/ja408741h)**" **Journal of the American Chemical Society**, 136, 1166-1169.

Oheix, E.; Peacock, A. F. A.* (2014) "**Metal-ion-regulated miniature dna-binding proteins based on GCN4 and non-native regulation sites (http://onlinelibrary.wiley.com/doi/10.1002/chem.201303747/abstract)**" **Chemistry a European Journal**,20, 2829-2839.

Peacock, A. F. A.*(2013) **"Incorporating metals into de novo proteins (http://www.sciencedirect.com/science/article/pii/S136759311300183X)" Current Opinion in Chemical Biology, 17,** 934-939.Invited contribution Special Edition. Eds D. N. Woolfson, S.-C. Hung.

Oakley, M. T.*; Oheix, E.; Peacock, A. F. A.*; Johnston, R. L.* (2013) "**Computational and Experimental Investigations into the Conformations of Cyclic Tetra-α/β-Peptides (http://pubs.acs.org/doi/abs/10.1021/jp4043039)**" **The Journal of Physical Chemistry B**, 117, 8122-8134.

Oheix, E.; Spencer, N.; Gethings, L. A.; Peacock, A. F. A.* (2013) "**Conformational study of an artificial metal-dependent regulation site for use in designer proteins (http://onlinelibrary.wiley.com/doi/10.1002/zaac.201300131/abstract)**" **Zeitschrift für Anorganische und Allgemeine Chemie**, 639, 1370-1383. *Invited contribution Special Edition. Eds J. Reedijk, B. Krebs.*

Peacock, A. F. A*; Bullen, G. A.; Gethings, L.; Williams, J. P.; Kriel, F. H.; Coates, J. (2012) "***Gold-Phosphine Binding to De Novo Designed Coiled Coil Peptides (http://www.sciencedirect.com/science/article/pii/S016201341200178X)***", **Journal of Inorganic Biochemistry**, 117, 298-305. *Invited contribution Special Edition. Eds M. Capdevila, J. M. Dominguez-Vera, S. Atrian and Ò. Palacios.*

Zastrow, M.; Peacock, A. F. A.; Stuckey, J.; Pecoraro, V. L. (2012) "***Hydrolytic Catalysis and Structural Stabilization in a Designed Metalloprotein (http://www.nature.com/nchem/journal/v4/n2/abs/nchem.1201.html)***" **Nature Chemistry**, 4, 118-123 4, 118-123.

Chakraborty, S.; Touw, D. S.; Peacock, A. F. A.; Stuckey, J. A.; Pecoraro, V. L. (2010) "Structural Comparisons of Apo- and Metallated Three Stranded Coiled Coils Clarify Metal Binding Determinants in Thiolate Containing Designed Peptides**", Journal of the American Chemical Society**, **132, 13240-13250.**.

Bergamo, A.; Masi, A.; Peacock, A. F. A.; Habtemariam, A.; Sadler, P. J.; Sava, G. (2010) "*In vivo* tumour and metastasis reduction and *in vitro* effects on invasion assays of the ruthenium RM175 and osmium AFAP51 organometallics in the mammary cancer model" **Journal of Inorganic Biochemistry**, 104, 79-86.

Peacock, A. F. A.; Stuckey, J. A.; Pecoraro, V. L. (2009) "Chirally Switching Metal Coordination Environments in Designed Peptides", **Angewandte Chemie International Edition**, 48, 7371-7374. Inside Cover.

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Peacock, A. F. A.; Parsons, S.; Sadler, P. J. (2007) "Tuning the Hydrolytic Chemistry of Osmium Arene Complexes with N,O-Chelating Ligands to Achieve Cancer Cell Cytotoxicity" **Journal of the American Chemical Society, 129, 3348-3357.**, 129, 3348-3357.

Peacock, A. F. A.; Melchart, M.; Deeth R. J.; Habtemariam, A.; Parsons, S.; Sadler, P. J. (2007) "Osmium(II) and Ruthenium(II) Arene Maltolato Complexes: Rapid Hydrolysis and Nucleobase Binding" **Chemistry a European Journal**, 13, 2601-2613.

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Peacock, A. F. A.; Batey, H. D.; Raendler, C.; Whitwood, A. C.; Perutz, R. N.; Duhme-Klair, A.-K. (2005) "A Metal-Based Lumophore Tailored To Sense Biologically Relevant Oxometalates" **Angewandte Chemie, International Edition, 44, 1712-1714.**, 44, 1712-1714.

Book Chapters:

S. H. Van Rijt, A. F. A. Peacock, P. J. Sadler, Osmium arenes - a new class of potential anticancer agents. In: A. Bonetti, R. Leone, F. Muggia and S. B. Howell (eds.) Platinum and Other Heavy Metal Compounds in Cancer Chemotherapy: Molecular Mechanisms and Clinical Applications. Humana Press, 2009, pp 73-79, ISBN: 978-1-60327-458-6

V. L. Pecoraro, A. F. A. Peacock, O. Iranzo, M. Łuczkowski; Chapter 12: Understanding the Biological Chemistry of Mercury Using a *de novo* Protein Design Strategy. In: E. Long, M. Baldwin (eds.) Advances in Inorganic Biochemistry: From Synthetic Models to Cellular Systems. ACS Symposium Series No. 1012, 2009, pp 183-197, ISBN: 978-0-8412-6975-0.

A. F. A. Peacock, V. L. Pecoraro, (2013) in "Cadmium: From Toxicity to Essentiality" , Vol. 11 of Metal Ions in Life Sciences, Sigel, A.; Sigel, H.; Sigel, R.K.O.; Eds.; Springer Science + Business Media B.V., Dordrecht, pp 303-337.

Patent:

Sadler, P. J.; Peacock, A. F. A.; Van Rijt, S. H.; Habtemariam, A., *"Preparation and antitumor activity of organometallic osmium compounds"* PCT Int. Appl. (2008), 91pp. CODEN: PIXXD2 WO 2008017855 A1 20080214

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