

## **Sam Hay**

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## **Biography**

Sam received a first class honours degree in biochemistry from the University of Otago, New Zealand (2000), and his PhD in biophysics from the Australian National University (2005). He spent a year at Stockholm University as a Wenner-Gren visiting postdoctoral fellow (2004-2005) before moving to the University of Manchester to work with Nigel Scrutton as a postdoctoral research associate in the newly-formed Manchester Interdisciplinary Biocentre (MIB). Sam was a recipient of the RSC Rita and John Cornforth Award in 2009 and in 2010 he received a BBSRC David Phillips fellowship. He is now Professor of Biophysical Chemistry in the Department of Chemistry and MIB.

## **Publications**

### **Extracting Kinetic Isotope Effects From a Global Analysis of Reaction Progress Curves**

Hay, S., 20 Sept 2017, *Methods in Enzymology: Measurement and Analysis of Kinetic Isotope Effects*. Vol. 596.

### **Pressure effects on enzyme-catalyzed quantum tunneling events arise from protein-specific structural and dynamic changes**

Hay, S., Johannissen, L. O., Hothi, P., Sutcliffe, M. J. & Scrutton, N. S., 13 Jun 2012, In: *Journal of the American Chemical Society*. 134, 23, p. 9749-9754 5 p.

### **Good vibrations in enzyme-catalysed reactions**

Hay, S. & Scrutton, N. S., Mar 2012, In: *Nature Chemistry*. 4, 3, p. 161-168 7 p.

### **Examining the importance of dynamics, barrier compression and hydrogen tunnelling in enzyme catalysed reactions**

Hay, S. & Scrutton, N. S., 2011, In: *Procedia Chemistry*. 3, 1, p. 306-315 9 p.

### **Probing active site geometry using high pressure and secondary isotope effects in an enzyme-catalysed 'deep' H-tunnelling reaction**

Hay, S., Pudney, C. R., Sutcliffe, M. J. & Scrutton, N. S., Jul 2010, In: *Journal of Physical Organic Chemistry*. 23, 7, p. 696-701 5 p.

### **Barrier compression and its contribution to both classical and quantum mechanical aspects of enzyme catalysis**

Hay, S., Johannissen, L. O., Sutcliffe, M. J. & Scrutton, N. S., 6 Jan 2010, In: *BIOPHYSICAL JOURNAL*. 98, 1, p. 121-128 7 p.

### **Are the catalytic properties of enzymes from piezophilic organisms pressure adapted?**

Hay, S., Evans, R. M., Levy, C., Loveridge, E. J., Wang, X., Leys, D., Allemann, R. K. & Scrutton, N. S., 21 Sept 2009, In: *ChemBioChem: a European journal of chemical biology*. 10, 14, p. 2348-2353 5 p.

### **Structural and mechanistic aspects of flavoproteins: Probes of hydrogen tunnelling**

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### **Barrier compression enhances an enzymatic hydrogen-transfer reaction**

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**Probing coupled motions in enzymatic hydrogen tunnelling reactions: beyond temperature-dependence studies of kinetic isotope effects**

Hay, S., Sutcliffe, M. & Scrutton, N., 2009, *Quantum tunnelling in enzyme-catalysed reactions*. London: Royal Society of Chemistry, p. 199-218 20 p.

**Correction of pre-steady-state KIEs for isotopic impurities and the consequences of kinetic isotope fractionation**

Hay, S., Pudney, C. R., Hothi, P. & Scrutton, N. S., 18 Dec 2008, In: *Journal of Physical Chemistry A*. 112, 50, p. 13109-13115 6 p.

**H-transfers in Photosystem II: What can we learn from recent lessons in the enzyme community?**

Hay, S. & Scrutton, N. S., Oct 2008, In: *Photosynthesis Research*. 98, 1-3, p. 169-177 8 p.

**Incorporation of hydrostatic pressure into models of hydrogen tunneling highlights a role for pressure-modulated promoting vibrations**

Hay, S. & Scrutton, N. S., 16 Sept 2008, In: *Biochemistry*. 47, 37, p. 9880-9887 7 p.

**Solvent as a probe of active site motion and chemistry during the hydrogen tunnelling reaction in morphinone reductase**

Hay, S., Pudney, C. R., Sutcliffe, M. J. & Scrutton, N. S., 15 Sept 2008, In: *ChemPhysChem*. 9, 13, p. 1875-1881 6 p.

**Secondary kinetic isotope effects as probes of environmentally-coupled enzymatic hydrogen tunneling reactions**

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**Atomistic insight into the origin of the temperature-dependence of kinetic isotope effects and H-tunnelling in enzyme systems is revealed through combined experimental studies and biomolecular simulation**

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**Are environmentally coupled enzymatic hydrogen tunneling reactions influenced by changes in solution viscosity?**

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**Promoting motions facilitate nuclear tunneling in flavoprotein enzymes**

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**Redox characteristics of a de novo quinone protein**

Hay, S., Westerlund, K. & Tommos, C., 5 Apr 2007, In: *Journal of Physical Chemistry B*. 111, 13, p. 3488-3495 7 p.

**Promoting motions in enzyme catalysis probed by pressure studies of kinetic isotope effects**

Hay, S., Sutcliffe, M. J. & Scrutton, N. S., 9 Jan 2007, In: *Proceedings of the National Academy of Sciences of the United States of America*. 104, 2, p. 507-512 5 p.

**Moving a phenol hydroxyl group from the surface to the interior of a protein: Effects on the phenol potential and pK<sub>A</sub>**

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**Conversion of the Escherichia coli cytochrome b562 to an archetype cytochrome b: A mutant with bis-histidine ligation of heme iron**

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**Protein engineering of cytochrome b562 for quinone binding and light-induced electron transfer**

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