re: Pessimistic Rats


Emma Harding

Rats housed in unpredictable conditions appear to have a more negative outlook than those housed in stable, settled conditions. Researchers at the Veterinary School found that whether an animal anticipates that something good or bad is going to happen can provide a clue as to the emotion it may be experiencing. Emma Harding, Liz Paul and Mike Mendl from the Centre for Behavioural Biology consider that the research offers a new way of measuring the emotional states of animals. It will also help scientists better understand the effects of housing conditions on animal emotion and welfare, so allowing the design of more welfare-friendly animal housing.

Previous research has shown that anxious and depressed people tend to expect bad things to happen – they see the glass as half empty rather than half full – while the opposite is true for happy people. The Bristol team have developed a new technique for investigating whether this is also the case in animals.

Rats were trained to recognise that a sound of a particular pitch predicted a good event – the arrival of food – and that another sound of a different pitch predicted a bad event – no food and a short noise. They were then presented with sounds of intermediate pitch to see whether they treated these ambiguous sounds as indicating the good or bad event. Rats kept in unpredictable housing conditions were less likely to treat these sounds as heralding the arrival of the good event than were those housed in stable environments. Their judgements show parallels with the negative outlook seen in some depressed people, suggesting that a disrupted home life also disrupts their mood. ■

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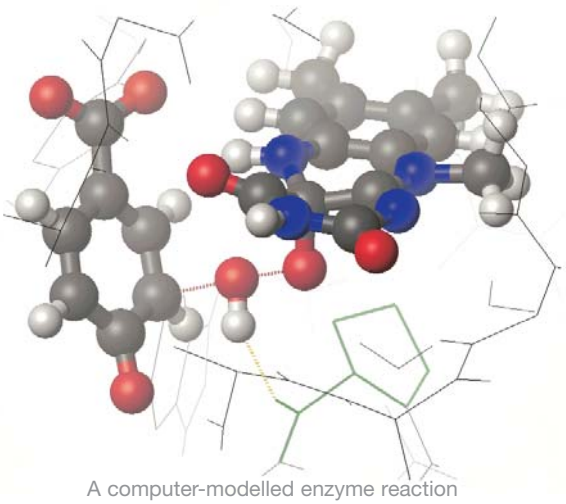
re: Reactions in Action

Enzymes enable biological systems to function, speeding up the myriad chemical reactions upon which life depends. Understanding how these biological catalysts work at the molecular level promises undreamt-of technological benefits in the form of new drugs, and new genetic analyses and catalytic processes. But the challenge is how to 'see' the interactions involved in a biological reaction 'as it happens'. Computer modelling can provide a uniquely detailed insight, beyond the reach of current experiments.

Using molecular modelling methods, Dr Adrian Mulholland in the Chemistry Department has examined a number of important biochemical mechanisms. For example, he has investigated enzymes that cause bacteria to break down and resist antibiotics, which will help to overcome the growing problem of antibiotic resistance and aid the development of new antibacterial therapies. His research into enzymes that metabolise drugs in the human body has yielded knowledge that will be useful in the development of more effective drugs. He has also studied the effects of genetic differences on the metabolism of foreign compounds in the body, producing models that will help predict how people differ in their susceptibility to carcinogens or drugs.

In addition, his collaborative research with experimental chemists and biologists has identified new catalytic interactions and processes. The modelling has included studying the principles of enzyme catalysts at their most fundamental level, and a calculation of the basic quantum mechanical properties of the reactions – all of which will make a vital contribution towards 'seeing' the most elemental processes of life. ■


A computer-modelled enzyme reaction

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Dr Mulholland has recently been awarded support from the IBM Life Sciences Outreach Programme and the Biotechnology and Biological Sciences Research Council for his work on computer modelling of enzyme reactions.