



PRESS RELEASE

Strength of European rat genetics research highlighted in special focus issue of *Nature Genetics*

Researchers from the 6th European Framework Programme Integrated Project "European Rat Tools for Functional Genomics (EURATools)" co-author seven articles in *Nature Genetics* demonstrating the remarkable advances made in rat genetics since the sequencing of the rat genome four years ago. The five scientific articles, the overview of rat genome online resources and the community perspective signed by more than 250 rat researchers across the globe are published in the current rat research focus issue (May 2008) of the high impact factor journal and show the strides being made in our understanding of human diseases from heart disease to renal failure as a direct result of the study of rat genetics. This success is partly down to the collaborative spirit fostered amongst researchers by EURATools.

EURATools is a highly integrated research project involving scientists from 17 research institutes in Europe and China. Within the first two years of the project runtime it was established as the voice of the European rat research community. It has contributed to international efforts to improve knowledge about the rat genome and has shown how the strong similarities between the rat and human genomes can advance our understanding of human diseases.

The rat is used as a model organism for common human diseases. In studies of the rat genome, EURATools investigators report the identification and characterisation of millions of single nucleotide variations and investigated the extent of gene copy number variation in the rat genome and its impact on gene expression and likely consequences for disease development.

Utilising the information from the rat genome, several single genes were identified to play a role in cardiovascular and inflammatory diseases. *Jund* was found to be associated with glomerulonephritis, a major cause of human kidney failure. Osteoglycin (*Ogn*) was identified as a determinant of left ventricular cardiac mass and soluble epoxide hydrolase (*Ephx2*) as a susceptibility gene for heart failure.

Tim Aitman, Medical Research Council Clinical Science Centre London and Scientific Coordinator of EURATools, and Howard Jacob, Medical College of Wisconsin and Principal Investigator of the Rat Genome Database (RGD), together with 29 further co-authors, compiled the Perspective "*Progress and prospects in rat genetics: a community view*". The review of the field shows the major advances in understanding of a range of common human diseases resulting from genetics and

genomics research in the rat. The vision for the future outlines six fundamental principles for the continuation and strengthening of research in this model system.

Professor Aitman said: "The outstanding contributions of European genome scientists and geneticists, reported in this rat-focused issue of *Nature Genetics*, have emphasised the value of the rat as a model for studying the mechanisms underlying several common human diseases. Disease genes for heart failure, kidney failure and heart enlargement were identified in the rat and the genes were shown to have very similar functions in the corresponding human diseases. The EURATools funding has brought together scientists from 17 institutions in 8 countries to achieve these remarkable advances".

EURATools co-authored papers published in the May 2008 issue of Nature Genetics:

- Aitman T, Critser JK, Dominiczak A, Cuppen E, Fernandez XM, Flint J, Gauguier D, Geurts AM, Gould M, Harris PC, Holmdahl R, Hübner N, Izsvak Z, Jacob H, Kuramoto, T, Kwitek AE, Marrone A, Mashimo T, Moreno-Quinn C, Mullins J, Mullins L, Olsson T, Pravenec M, Riley L, Saar K, Serikawa T, Shull JD, Szpirer C, Twigger SN, Voigt B, Worley K: **Progress and prospects in rat genetics: a community view.**
- Behmoaras J, Bhargal G, Smith J, McDonald K, Mutch B, Chin Lai P, Domin J, Game L, Salama A, Foxwell BM, Pusey CD, Cook HT, Aitman TJ: **JunD is a determinant of macrophage activation and glomerulonephritis susceptibility.**
- Guryev V, Saar K, Adamovic T, Verheul M, van Heesch S, Cook S, Pravenec M, Aitman T, Jacob H, Shull JD, Hubner N, Cuppen E: **Selection Bias and Functional Impact of DNA Copy Number Variation in the Rat.**
- Monti J, Fischer J, Paskas S, Heinig M, Schulz H, Gösele C, Heuser A, Fischer R, Schmidt C, Schirdewan A, Gross V, Hummel O, Maatz H, Patone G, Saar K, Vingron M, Weldon SM, Hammock BD, Rohde K, Dietz R, Cook SA, Schunck W-H, Luft FC, Hubner N: **Soluble epoxide hydrolase (Ephx2) is a susceptibility gene for heart failure in a rat model of human disease.**
- Petretto E, Sarwar R, Grieve I, Lu H, Kumaran MK, Muckett PJ, Mangion J, Schroen B, Benson M, Punjabi PP, Prasad SK, Pennell DJ, Kiesewetter C, Tasheva ES, Corpuz LM, Webb MD, Conrad GW, Kurtz TW, Kren V, Fischer J, Hubner N, Pinto YM, Pravenec M, Aitman TJ, Cook SA: **Integrated genomic approaches implicate osteoglycin (Ogn) in the regulation of left ventricular mass.**
- STAR consortium: **SNP and haplotype mapping for genetic analysis in the Rat.**
- Twigger SN, Pruitt KD, Fernandez-Suarez XM, Karolchik D, Worley K, Maglott D, Brown G, Weinstock G, Gibbs R, Kent J, Birney E, Jacob HJ: **What everybody should know about the Rat Genome and its online resources.**

You can find out about EURATools by visiting the website: <http://www.euratools.eu>

Notes to editors

To speak to Prof. Tim Aitman, please call the MRC press office on 0207 637 6011.

EURATools participating research partners are:

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- University of Edinburgh (John Mullins, Ian Wilmut)
- Czech Academy of Sciences, Prague (Michal Pravenec, Vladimír Landa, Vladimír Křen)
- European Bioinformatics Institute, Hinxton (Ewan Birney, Xosé Fernández)
- University of Glasgow (Anna Dominiczak, Walter Kolch)
- Lund University (Rikard Holmdahl)
- Université Libre de Bruxelles (Claude Szpirer)
- Commissariat à l’Energie Atomique, Paris (Mark Lathrop, Ivo Gut, Jean Weissenbach)
- University of Oxford (Dominique Gauguier; Jonathan Flint)
- Autonomous University of Barcelona (Alberto Fernandez-Teruel)
- Karolinska Institutet, Stockholm (Tomas Olsson)
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