

IRB BARCELONA 2011 ANNUAL REPORT

Research Programmes

CELL AND DEVELOPMENTAL BIOLOGY

Lluís Ribas: Gene Translation



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Highlights

- We have described a new non-canonical role for an aminoacyl-tRNA synthetase. These ancient enzymes are preferred scaffolds for the emergence of new signalling activities. In this case we have reported that lysyl-tRNA synthetase in the protozoan *Entamoeba histolytica* plays a role in the modulation of host inflammatory response. In collaboration with other groups we have shown that *Plasmodium falciparum* tryptophanyl-tRNA synthetase also acts as a cell signalling molecule in malaria infections.
- The laboratory has also reported on the mechanisms that allow for mutually exclusive expression of a family of *Plasmodium falciparum* genes unrelated to the VAR family. The formation of heterochromatin in bistable chromatin domains controls the repression of the clonally variant family of Clag genes in *P. falciparum*.

Publications

- Bhatt TK, Khan S, Dwivedi VP, Banday MM, Sharma A, Chandele A, Camacho N, Ribas de Pouplana L, Wu Y, Craig AG, Mikkonen AT, Maier AG, Yogavel M and Sharma A.
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- Castro de Moura M, Miro F, Han JM, Kim S, Celada A and Ribas de Pouplana L.
Entamoeba lysyl-tRNA synthetase contains a cytokine-like domain with chemokine activity towards human endothelial cells
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- Krog JS, Español Y, Giessing AM, Dziergowska A, Malkiewicz A, Ribas de Pouplana L, and Kirpekar F.
3-(3-amino-3-carboxypropyl)-5,6-dihydrouridine is one of two novel post-transcriptional modifications in tRNA^{Lys}(UUU) from Trypanosoma brucei
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- Olmedo-Verd E, Santamaría-Gómez J, Ochoa de Alda JA, Ribas de Pouplana L and Luque I.
Membrane anchoring of aminoacyl-tRNA synthetases by convergent acquisition of a novel protein domain
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- Jackson KE, Habib S, Frugier M, Hoen R, Khan S, Pham JS, Ribas de Pouplana L, Royo M, Santos MA, Sharma A and Ralph SA.
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- Crowley VM, Rovira-Graells N, Ribas de Pouplana L and Cortés A.
Heterochromatin formation in bistable chromatin domains controls the epigenetic repression of clonally variant Plasmodium falciparum genes linked to erythrocyte invasion
Mol Microbiol, **80**, 391-406 (2011)

PhD Theses

- *Epigenetic regulation of clonally variant gene expression in plasmodium falciparum*. Valerie Crowley, Universitat Pompeu Fabra (2011). Thesis director: Lluís Ribas de Pouplana. Honors: Summa Cum Laude

Research projects

- Bases moleculares de la regulación. Epigenética de la expresión génica clonal. Variante en Plasmodium Falciparum. SAF2010-20111 Proyectos Investigación Fundamental Spanish Ministry of Science and Innovation (MICINN) 2011 Principal investigator: Alfred Cortés
- Implicación de componentes del código genético en patologías humanas BIO2009-09776 Proyectos Investigación Fundamental Spanish Ministry of Science and Innovation (MICINN) 2011-2013 Principal investigator: Lluís Ribas de Pouplana
- Síntesis de proteínas en los orgánulos de Plasmodium falciparum PRI-PIBIN-2011-1279 Proyectos Internacionales-Programa Bilateral con India Spanish Ministry of Science and Innovation (MICINN) 2011-2014 Principal investigator: Lluís Ribas de Pouplana
- Targeting protein synthesis in the apicoplast and cytoplasm of plasmodium (MEPHITIS) 223024 FP7-Cooperation-Health-2007 European Commission (EC) 2009-2011 Principal investigator and consortium coordinator: Principal investigator: Lluís Ribas de Pouplana
- BIOLOGIA DE LA TRADUCCIÓ GENÈTICA 2009 SGR 1277 Grup de Recerca reconegut de la Generalitat de Catalunya Agency for Administration of University and Research Grants (AGAUR) 2009-2013 Principal investigator: Lluís Ribas de Pouplana

Collaborations

- *Role of AIMP1 in Entamoeba infections*, Antonio Celada, IRB Barcelona (Barcelona, Spain)
- *Characterisation of antimalarial activities of ARS inhibitors*, José Manuel Bautista, UCM Madrid (Madrid, Spain)
- *Design of new dual ARS inhibitors*, Miriam Royo, Barcelona Science Park (Barcelona, Spain)
- *In vivo activity of inhibitors of Plasmodium ARSs*, José Manuel Bautista, Universidad Complutense de Madrid (Madrid, Spain)
- *Plasmodium TyrRS structure and function*, Amit Sharma, International Centre for Genetic Engineering and Biotechnology (New delhi, India)
- *Solving the crystal structure of Entamoeba EELP*, Osamu Nureki, University of Tokyo (Tokyo, Japan)



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