

Les conférences FR TransBioMed

Invitation : François Moreau-Gaudry – U 1035

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« Gene regulation by microRNAs: everything that shines is not gold »

Lundi 26 novembre à **11h00**

Salle de conférences CGFB - site de Carreire zone sud,
université de Bordeaux

Gene regulation is traditionally assessed by molecular assays, probing the physical interaction between regulators and their targets (transcription factors with promoters, RNA-binding proteins with mRNAs, ...). The advent of high-throughput techniques now allows a sensitive detection of molecular interactors for the regulators of interest - and these experiments usually identify hundreds or thousands of targets per regulator. This is particularly true for microRNAs ("miRNAs"), which are therefore believed to control most coding genes in mammals. Functional importance of these interactions is apparently confirmed by comparative genomics, which suggests that many miRNA binding sites are conserved in evolution. Yet several observations suggest that miRNAs do not have such a broad biological effect; in particular, miRNA-guided repression is surprisingly small (targets are usually repressed less than 2-fold, and gene activity is typically insensitive to such small changes in gene expression). We thus decided to revisit the biological relevance of miRNA/target interactions, and our results are indeed inconsistent with the notion that miRNAs regulate functionally so many genes. It appears that molecular biology techniques, as well as computational predictions, tend to over-estimate broadly the miRNA target pool, and just a subset of the identified targets are really, functionally targeted. Other regulatory events appear to be buffered by homeostasis, and they are inconsequential at the macroscopic scale. These notions are generalizable to every type of gene regulator, and they could promote a profound redefinition of "gene regulation".