Laboratoire de Biologie Cellulaire
Institut Jean-Pierre Bourgin

Nicolas BOUCHE INRA Versailles - IJPB, France January 2013

1 Post-Doctoral position funded by the ANR for 24 months

Epigenetic Natural Variation in Arabidopsis

The complex mechanisms underlying epigenetic modifications and chromatin dynamic are now very widely studied, in particular in plant models such as Arabidopsis, but the significance of inherited epigenetic alterations in natural populations is still poorly understood. Our group is focusing on several aspect of epigenetic modifications and small RNAs regulated pathways in Arabidopsis. We are looking for a highly motivated post-doctoral scientist with skills in genetics and molecular biology to develop a project focusing on a new allelic incompatibility. For more details, please read our recent paper published in Current Biology (Rapid Establishment of Genetic Incompatibility through Natural Epigenetic Variation ; Durand et al, 2012; abstract below).

The successful candidate should have a PhD degree in genetics / molecular biology. An experience with epigenetic marks and/or Arabidopsis is a plus. He/she will work in a stimulating environment of PIs (N BOUCHE, O LOUDET, C CAMILLERI) combining their expertise on Arabidopsis epigenetics and natural variation. A strong interest in epigenetics, quantitative/population genetics and working in a team is necessary. Fluency in English is essential with excellent oral and written communication skills. The position is available for 24 months, starting between March and July 2013, with a net salary (depending on experience) of about 24-27,000 € (= 32-36,000 $) per year (with social security coverage).

Please send CV, names and contact information of references and a short statement of interest to Nicolas Bouché (Nicolas.Bouche@versailles.inra.fr). I am also available by email to answer any additional questions.

Rapid Establishment of Genetic Incompatibility through Natural Epigenetic Variation
Durand, Bouché, Perez, Loudet and Camilleri, Current Biology, 2012

Abstract :Epigenetic variation is currently being investigated with the aim of deciphering its importance in both adaptation and evolution. In plants, epimutations can underlie heritable phenotypic diversity, and epigenetic mechanisms might contribute to reproductive barriers between or within species. The extent of epigenetic variation begins to be appreciated in *Arabidopsis*, but the origin of natural epialleles and their impact in the wild remain largely unknown. Here we show that a genetic incompatibility among *Arabidopsis thaliana* strains is related to the epigenetic control of a pair of duplicate genes involved in fitness: a transposition event results in a rearranged paralogous structure that causes DNA methylation and transcriptional silencing of the other copy. We further show that this natural, strain-specific epiallele is stable over numerous generations even after removal of the duplicated, rearranged gene copy through crosses. Finally, we provide evidence that the rearranged gene copy triggers de novo DNA methylation and silencing of the unlinked native gene by RNA-directed DNA methylation. Our findings suggest an important role of naturally occurring epialleles originating from structural variation in rapidly establishing genetic incompatibilities following gene duplication events.

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