
FILIPPO CIABRELLI

ABSTRACT

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October, 29th-30th, 2015, Barcelona**Filippo Ciabrelli**, Institute of Human Genetics, Montpellier, France**Short talk “Polycomb-Mediated Repression in Transgenerational Epigenetic Inheritance”**

Transgenerational epigenetic inheritance is a hotly debated phenomenon whereby a non-genetically determined phenotype can be transmitted to the next generation. So far, this mode of inheritance has been described in few cases and it was suggested that chromatin components might be involved, including Polycomb group proteins, which act as repressors of key developmental genes and coordinate cell differentiation and proliferation. The molecular mechanisms linking Polycomb-mediated silencing to transgenerational epigenetic inheritance are far from being understood. Therefore, we developed an experimental system in *Drosophila melanogaster* to induce stable transgenerational epigenetic inheritance, in which alternative gene expression states can be inherited in the presence of the same genetic sequence. Starting from these highly stable epialleles, we could dissect some of the genetic properties of the induced epialleles, such as their quantitative inheritance and their ability to trans-communicate. Moreover, the epialleles displayed synergy in their expression and transmission. One of the molecular signatures of the epialleles is the differential presence of the Polycomb repressive complexes and their related epigenetic marks. This diverse distribution is independent of the transcriptional activity of the downstream genes, at least in an early developmental stage, and could influence the three-dimensional organization of the locus involved. Intriguingly Ago2, an RNAi pathway component, has been found to genetically interact with the epialleles and to be directly bound on their chromatin. Our results make a case for strong and stable transgenerational epigenetic inheritance in metazoan and provide a model that is amenable for the molecular dissection of this phenomenon

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