"Functional Analysis of Imprinted Genes in *Arabidopsis thaliana*"

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Flour you use to make bread in your everyday life, malt is used to make beer, you might also like popcorn and coconut water; ever thought from where all these are coming from? They are all derived from the endosperm of plants. Very similar to the placenta in mammals, it is the nutritive tissue needed for the growth of the embryo of plants. Though it is not contributing to the next generation, it is needed for successful embryo formation and hence successful seed development. The endosperm is a triploid tissue. As seeds are an important source of human nutrition world wide, it is important to understand how seeds develop and the role of the endosperm plays in this process.

To know this, scientists study the model plant *Arabidopsis thaliana*. It is a small weed from the mustard family. Understanding the mechanisms the endosperm employs in seed development would be of immense agricultural and economical use. Some genes in the endosperm are expressed in imprinted fashion. You would have learnt in high school that genes from mother and father are expressed equally. But there are indeed exceptions for it in the case of some flowering plants and mammals. Such an exception indeed applies to *Arabidopsis*. This exceptional phenomenon is called genomic imprinting. It is an epigenetic mechanism; meaning it acts on genes; imparting variety of epigenetic modifications like methylation. Thus this mechanism works against the Mendelian laws of inheritance and creates diversity in gene expression.

The endosperm is a triploid tissue and contains 2 maternal and 1 paternal genome (2M: 1P). This ratio is in most species essential for successful seed development. Crossing plants of different ploidy levels causes seed abortion as imprinted gene expression is deregulated. This is because imprinted genes may encode dosage sensitive regulators that control seed development. Thus deviating from the 2:1 genome ratio would have lethal effects. Understanding the role players involved in imprinting and the molecular mechanisms employed in seed development is quest for future for plant biologists!

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