

## **Determining the functional roles of long non-coding RNAs (lncRNAs) using next generation epigenomics during seed development.**

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Project Summary- Elucidating the molecular events underlying the biology of seed development is important in both understanding plant development and in developing new methods to enhance the productivity and qualities of grain crops. Seeds arguably undergo one of the most complex developmental programs of any plant organ and thus many gene regulation mechanisms contribute to this program. In recent years it has become clear that various classes of non-coding RNAs have important roles in gene regulation. The collaborating groups in this proposal are investigating aspects of seed biology that contribute to seed size in Arabidopsis and cereal crops and are currently collaborating on an ARC funded project to investigate the epigenetics of small non-coding RNAs in seeds. This proposal aims to investigate the functional roles of an emerging class of regulatory SIEF John Stocker Postgraduate Scholarship – Final Report RNAs, the long non-coding RNAs, in regulating events in seed development. Achievements- This challenging cutting-edge project identified thousands of novel long non-coding RNAs (lncRNAs) transcribed during seed development. Furthermore, the project demonstrated these lncRNAs are maternally or paternally expressed in a dynamic way depending on the parent of origin. The proposed immuno-precipitation (IP) experiments to determine association of the lncRNAs with a protein complex (PRC2) were not achieved due to the low abundance of the PRC2 complex. A manuscript is in preparation describing these lncRNAs. Instead, experiments were performed to establish endosperm and embryo nuclear purification method. This will allow purification of nuclei from specific tissue and sequencing to determine the tissue of origin on the lncRNAs. This experiment is currently underway by another student.