Conclusions

1. Transcriptomic analysis of the *Arabidopsis thaliana* RabGDI genes revealed overlapping expression of AtGDI1 and AtGDI2 in sporophytic tissues, and pollen specific expression of AtGDI3.
2. Single homozygous Arabidopsis mutants with T-DNA insertions in AtGDI1 and AtGDI2 genes were identified, and the absence of functional full-length transcripts was proved using RT-PCR analysis. No observable phenotypic deviation was detected in both single mutants under normal growth conditions.
3. Double heterozygous *gdi* mutant was obtained by crossing of homozygous single *gdi* mutants. Segregation of F2 and F3 generation of double *gdi* mutant showed absence of double homozygous *gdi1gdi2* progeny. Evidence for embryo lethality of *gdi1-/-gdi2-/-* was obtained from genetic and embryonic analyses.
4. Simultaneous transfer of *gdi1-* and *gdi2-* mutant alleles via both male and female gamets was shown in reciprocal crosses of double *gdi* mutants with wild type plants. Importance of AtGDI2 expression in male gametofyte was derived from results showing reduced transmission of the mutant *gdi2-* allele by pollen in reciprocal crosses of double *gdi* mutants.
5. A T-DNA insertional mutant in the AtRabGGTB1 gene, encoding β subunit of RabGGT, was isolated. Plants carrying homozygous *ggtb1* insertion exhibited a complex phenotypic deviation, including a remarkable secretory deficiency