

Plant Aurora kinases are required for maintaining the level of endoreduplication

Hana Jeřábková¹, Beáta Petrovská¹, Věra Cenklová², Pavla Suchánková¹, Pavla Binarová³

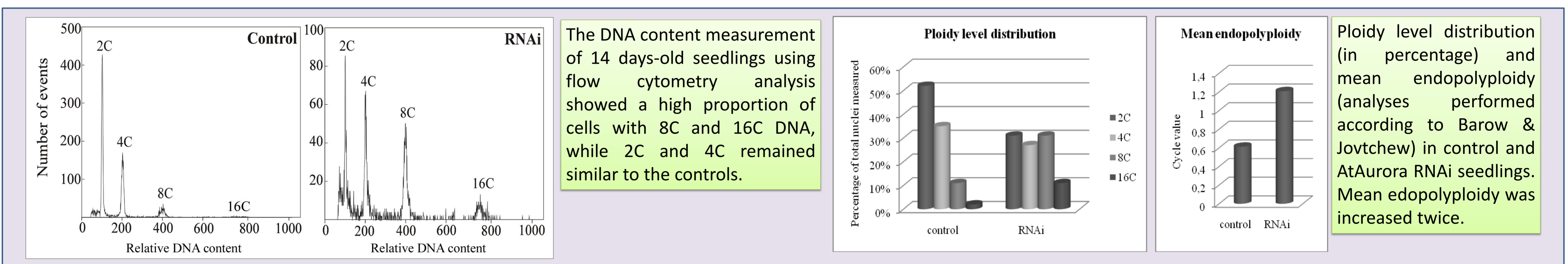
¹Centre of the Region Haná for Biotechnological and Agricultural Research, Institute of Experimental Botany AS CR, v.v.i., Sokolovská 6, Olomouc 772 00, Czech Republic,

²Institute of Experimental Botany, AS CR, v.v.i., Sokolovská 6, 772 00, Olomouc, Czech Republic, ³Institute of Microbiology, AS CR, v.v.i., Vídeňská 1083, 142 20 Prague 4, Czech Republic

INTRODUCTION: Metazoan Aurora kinases (A, B and C) belong to the major regulators of cell cycle and cytokinesis and are expressed in many types of cancer cells. In *Arabidopsis thaliana* (L.) Heynh. three Aurora kinases (1, 2 and 3) were identified. AtAurora 1 and 2 with high level of homology were localized to the interphase nuclei, during mitosis to the spindle and to the cell plate during cytokinesis. AtAurora 3 engages the role of chromosomal passenger-like protein with its localisation to chromosomes. The initiation of endoreduplication process is crucial during development in *Arabidopsis thaliana* seedlings. RNA interference (RNAi) approach revealed increased level of endoreduplication and requirement of AtAurora kinases for maintaining meristematic activity and controlling the cell differentiation.

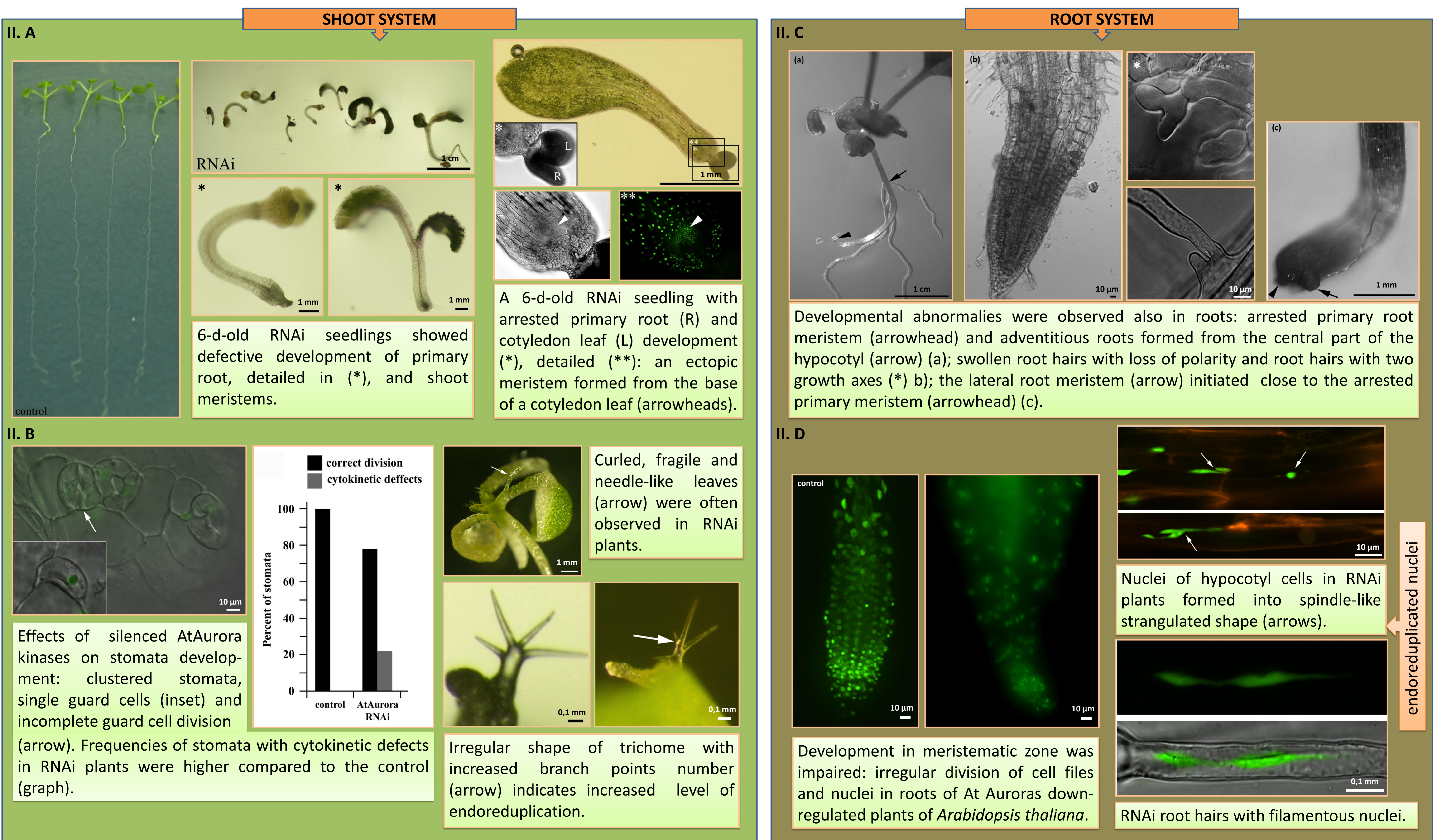
RESULTS:

I. Level of endoreduplication was higher in RNAi seedlings compared to wild-type.



CONSEQUENCE

II. Plant AtAurora kinases are implicated in maintaining meristematic cells.



CONCLUSION: Phenotypic analysis of RNAi plants revealed developmental defects in both root and aerial parts. Defective cell division, arrested primary meristems, ectopic meristems, trichoms with supernumerary branches, cells with large nuclei or cells with several nuclei of irregular shape were often observed. Down-regulating Aurora kinases in *Arabidopsis thaliana* plants also resulted in higher levels of endoreduplication. Thus it can be assumed that defects in cell division and primary meristematic proliferation are accompanied by entry into endoreduplication programme.

Results of this study reveal the importance of plant AtAurora kinases in the control of cell division, their requirement for maintaining of meristematic activity and for the switch from meristematic cell proliferation to the differentiation and endoreduplication.

REFERENCES: Petrovská et al. (2012). Plant Aurora kinases play a role in maintenance of primary meristems and control of reduplication. *New Phytologist* 193: 590–604; Barow, M., and Jovtchew, G. (2007). Endopolyploidy in plants and its analysis by flow cytometry. 349-372. In: Doležel, J., Greilhuber, J., Suda, J. (eds.): *Flow Cytometry with Plant Cells*, Pp. 454. Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, 2007.