

Gravistimulation on Different Orientations to Checked the Accumulation Pattern and Expression of OsPIN Genes Encoding Auxin Efflux Facilitator in the *Oryza Sativa* cv. Nagdong Seedlings

Muhammad Farooq¹, Kyung-Min Kim^{1*}

¹Division of plant Biosciences, School of Applied Biosciences, College of Agriculture & Life Science, Kyungpook National University, Daegu, 41566, Korea.

[Introduction]

The Phytohormones auxin (indole-3-acetic acid: IAA) is imperative regulator of many plant developmental process, including embryogenesis, root patterning, vascular tissues differentiation, apical dominance, phototropism, gravitropism and other physiological process (Friml et al., 203; Mattsson et al., 2003; Kimura and Kagawa, 2006; Palme et al., 2006). As a efflux carriers of auxin PIN proteins mediate acropetal flow to the root tip through the central vasculature and basipetal flow through the epidermis (Friml et al., 2003; Rashotte et al., 2000). It was proposed that rootward PIN1 and PIN2 distinctively sensitive to shootward relocation (Rahman et al., 2010). The other homologues, PIN3, PIN4 and PIN7, appear to function in tropisms, root meristem patterning and establishing embryonic polarity, respectively (Friml et al., 2002a,b, 2003; Blilou et al., 2005). When the encoding a putative auxin efflux carrier was interrupted Arabidopsis mutant developed needle-like apices therefore this mutant was simply pin1 or called pin formed (Okada et al. 1991).

[Materials and Methods]

In this study we used *Oryza sativa* cv. Nagdong seeds, large size petri dish, plant agar (Duchefa Biochemie), for growing condition. I used four orientation that is horizontal, vertical, 90 degree rotated and one axis clinostat rotatory machine to checked the expression site of OsPIN genes on above mention orientation. Parameter of study was kept root shoot length, root shoot fresh weight Quantitative and RT-PCR. Healthy seed of rice were selected by dipping in water and after 4 to 5 days soaking seed were kept on agar media and also containing some treated hormones like IAA, 6BA, PPA, JA, GA. Primers were design by using NCBI to study related genes. OsPIN1 : [5'GCGTCCGCACACCCAA3' (forward primer), 5'GCCAGTATCATCGCCACGTA3' (reverse Primer)], OsPIN2 : [5'AAGACCGTTGCGACATTTGC3' (forward primer), 5'AGTACTCCCCTGAGCCCAAT3' (reverse Primer)], OsPIN3a : 5'CCATGTACGGGCCATACTCC3' [(forward primer), 5'CAGGCCGCTGACTTCTGA3' (reverse Primer)].

[Results and Discussions]

The rice (*Oryza sativa* L.) genome contains 12 putative PIN genes encoding auxin efflux transporters, including four PIN1 (named OsPIN1a,b,c and d1), OsPIN2, three OsPIN5 genes are three (PIN5abc), OsPIN8 and three monocot-specific PIN genes (OsPIN10a and OsPIN10b) it was proposed that PIN1 and PIN2 effectively root ward sensitive to shoot ward relocation while other homologues genes PIN3, PIN4 and PIN7, appear to function in root meristem, embryonic polarity and tropisms respectively. In this study I worked on 3 auxin efflux carrier genes OsPIN1, PIN2 and OsPIN3a for this purpose. I suggest four orientation vertical, horizontal, 90° rotated and including one axis clinostat rotatory machine, for this purpose I used petri dishes contains plant agar media (Duchefa Biochemie). It is clear that vertically located rice seedling root, and root shoot junction (apical region) show highly expression of OsPIN3a through quantitative and RT-PCR means that OsPIN3a signaling to gravitropism beside this rotatory machine and vertical position also help in shoot elongation.

[Acknowledgements]

This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2017R1D1A3B04028676).

*Corresponding author: Tel. +82-53-950-5711, E-mail. kkm@knu.ac.kr