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AN *ARABIDOPSIS* IONOTROPIC GLUTAMATE LIKE RECEPTOR PLAYS A CRITICAL ROLE FOR THE PROPER DEVELOPMENT OF ROOT HAIRS

DOCCULA F.G.*, BONZA M.C.*, CANDEO A.**, RESENTINI F.*, LUONI L.*, BEHERA S.*, BASSI A.**, COSTA A.*

*) Department of Biosciences, University of Milan, Via Celoria, 26, 20133 Milano (Italy)
**) Politecnico di Milano, Dipartimento di Fisica, Piazza Leonardo da Vinci 32, Milano (Italy)

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The Arabidopsis genome has 20 genes encoding for putative ionotropic glutamate receptors (iGLRs). Despite of a considerable interest in uncovering their physiological functions only few members have been extensively studied. For many of these receptors neither their channel formation and/or physiological roles nor their localization within the plant cells is known. Here, we provide new information about the biological roles of the AtGLR3.7, a member of subfamily 3 of plant glutamate receptors.

Published data reported that GLRs can mediate aminoacid (AA)-induced cytosolic Ca^{2+} transients, hence, to define if GLR3.7 is involved in such mechanism a *glr3.7* KO mutant was transformed with the Ca^{2+} probe Cameleon. Wild type and *glr3.7* seedling roots were treated with different AA and the Ca^{2+} responses monitored *in vivo*. The analyses revealed that the lack of GLR3.7 had a clear effects on AA-induced Ca^{2+} transients in root tip cells, demonstrating a key role of this channel in the regulation of Ca^{2+} fluxes. Microscopy analyses of roots showed that the *glr3.7* mutant had a clear root hair (RH) phenotype. In detail the *glr3.7* mutant showed: i) reduced number of RH, ii) shorter RH; iii) and in several cases the lack of a defined RH polarity. In order to link the RH growth defects with Ca^{2+} fluxes we employed the SPIM-FRET technology and investigated simultaneously, the growth rate and tip Ca^{2+} oscillations of RH in the two genetic backgrounds. Interestingly, the *glr3.7* mutant showed a slower rate of RH growth. the lack of a Ca^{2+}tip gradient and altered Ca^{2+} oscillations as confirmed by the Fourier analyses. This result supports an involvement of the *GLR3.7* channel activity in the proper regulation of the root hair growth.