Identification and molecular characterization of Medicago truncatula NRT2 and NAR2 families

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Résumé en anglais
Nitrate transporters received little attention to legumes probably because these species are able to adapt to N starvation by developing biological N2 fixation. Still it is important to study nitrate transport systems in legumes because nitrate intervenes as a signal in regulation of nodulation probably through nitrate transporters. The aim of this work is to achieve a molecular characterization of nitrate transporter 2 (NRT2) and NAR2 (NRT3) families to allow further work that would unravel their involvement in nitrate transport and signaling. Browsing the latest version of the Medicago truncatula genome annotation (v4 version) revealed three putative NRT2 members that we have named MtNRT2.1 (Medtr4g057890.1), MtNRT2.2 (Medtr4g057865.1) and MtNRT2.3 (Medtr8g069775.1) and two putative NAR2 members we named MtNAR2.1 (Medtr4g104730.1) and MtNAR2.2 (Medtr4g104700.1). The regulation and the spatial expression profiles of MtNRT2.1, the coincidence of its expression with that of MtNAR2.1 and MtNAR2.2 and the size of the encoded protein with 12 transmembrane (TM) spanning regions strongly support the idea that MtNRT2.1 is a nitrate transporter with a major contribution to the high-affinity transport system (HATS), while a very low level of expression characterized MtNRT2.2. Unlike MtNRT2.1, MtNRT2.3 showed a lower level of expression in the root system but was expressed in the shoots and in the nodules thus suggesting an involvement of the encoded protein in nitrate transport inside the plant and/or in nitrate signaling pathways controlling post-inoculation processes that govern nodule functioning.
Liens

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