UNUSUAL TARGETING OF TOMATO FTSH TO THYLAKOID MEMBRANES.

Borgonovi, C.M[1]; Barata, R.M[1]; Silva-Filho, M.C[1]
[1] Departamento de Genética, ESALQ, Universidade de São Paulo, Av. Pádua Dias, 11, C.P. 83, 13400-970 Piracicaba, SP, Brazil;

Many proteins of the chloroplast thylakoid membranes are encoded in the nucleus, synthesized in the cytosol, and localized by a two-step process. In the first step, cytosolic precursors are imported across the chloroplasts envelope membranes into the stroma. In the second step, stromal intermediates are integrated into the thylakoid membranes or transported across into the lumen. Chloroplasts share with bacteria at least four distinct export-type pathways, i.e., Sec, Tat, SRP and spontaneous insertions. The chloroplast FtsH protease is a member of the AAA family of ATPases. The targeting of the FtsH to the thylakoid membrane has been shown to depend on components of the Tat system. Analyses of genomic data suggested that a subset of cp-FtsH proteins do not contain a twin arginine motif, the usual determinant of Tat substrates. We cloned the gene of such a twin Arginine less FtsH homolog from tomato, constructed four different FtsH-GFP fusion proteins, and analyzed its targeting to chloroplasts in heterologous expression system. Our data suggest that the determinant for thylakoid targeting of FtsH is not in the N-terminal region, but rather in the hydrophilic C-terminal domain. We conclude that the transport of the tomato cp-FtsH does not require the twin arginine motif which significantly differs from the known substrates of Tat system.

Key words: FtsH, Tat system.

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