Abstract

Microtubules (MTs) are one of the essential cell structure that participate in a number of key events in the plant cells and their properties and functions are influenced and modified by many other proteins. These proteins belong to a group of microtubule- associated proteins (MAPs, microtubule-associated proteins). One of the MAPs, the molecular chaperone Hsp90, examines and fulfills a large number of different functions in the cell. Its colocalization with MTs has been demonstrated previously by Freudenreich and Nick (1998) and Petrášek *et al*. (1998). However, direct interaction with MTs was described only recently using cosedimentation assay. The specific cytosolic isoform of tobacco Hsp90 bound to MTs was called Hsp90_MT due to its ability to bind MTs. It has been also found that the binding to MTs is independent on the activity of ATP (Krtková *et al*., 2012). The authors also described a positive effect of Hsp90_MT on MT recovery after their exposure to cold stress.

Although MT cytoskeleton dynamics is influenced by a large number of MAPs, it is surprising that the molecular mechanism of MAPs interaction with MTs and their MT-binding domains have not been described yet. Therefore, we decided to determine the tobacco Hsp90_MT MT-binding domain by production of a set of recombinant proteins containing different combinations of putative MT-binding domains and subsequent cosedimentation assays with polymerized tubulin. We presumed the variable KE-rich domain to be responsible for MT binding due to its similarity to other MT-binding motives in other animal and plant MAPs. Our results show that the candidate Hsp90_MT section containing KE-rich domain is really the most binds to MT, and is therefore probably responsible for binding Hsp90_MT to MT. This result, however, will still be supported by additional experiments and can not be excluded that in addition to KE-specific motif could be also responsible for binding to MT hydrophobic interaction or for example a specific tertiary structure.

Key words: cesedimentation, Hsp90, microtubules