30. The Role of Plant p23 on Hsp90 Chaperone Complex

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Hsp90 샤페론 복합체내 식물 p23의 역할

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<Introduction>

Hsp90 (Heat shock protein 90) is one of ubiquitous and abundant molecular chaperones. It has essential functions in thermotolerance, signal transduction, and the activation of cell regulatory proteins. Although Hsp90 has anti-aggregant property *in vitro*, its activity *in vivo* depends on association with a set of co-chaperones (Hsp90, Hsp70, Hop, Hsp40, and p23) and folding client proteins. Best characterized model for the function of co-chaperone comes from studies on the interaction of Hsp90 with nuclear receptors such as glucocorticoid receptor (GR). In this model, the co-chaperones appear to enter and exit Hsp90-GR complexes. p23 was firstly identified as a component of hsp90 complex with the progesterone receptor in animal, and was revealed that can regulate the association of hormone-bound nuclear receptors with Hsp90. Although many kinds of Hsp are also found in plants and each of them has chaperone activity *in vitro*, our knowledge about their complex remains limited.

<Conclusion>

Here we report the characteristics of plant p23 on Hsp90 complex. Until now, plant p23 was only discovered from Arabidopsis and rape, and the role of p23 in the Hsp90 chaperoning pathway is still not clear. Hsp90 and p23 strongly inhibited the thermal induced aggregation of substrate, respectively. We also confirmed the *in vivo* interaction between Hsp90 and p23 by yeast-two hybrid system, and the protein complex (Hsp90 and p23) was shown to have higher chaperone activity than single addition. To better understand the role of p23, we screened client proteins of p23 using yeast-two hybrid. Clients of Hsp90 are known to include a variety of transcription factors, protein kinases, enzymes, and cell cycle regulators. Screened clients of p23 were revealed protein kinases, phosphatase, transcription factors, ADP/ATP carrier, and many enzymes. Interestingly, many clients of p23 were same with the clients of Hsp90. It has recently been indicated that competition between co-chaperones for both Hsp90 and clients leads to distinct functional outcomes depending on the combination of co-chaperone expressed. Therefore, p23 may have a broad and major role for binding between Hsp90 and clients, not like other co-chaperones which have a distinct role for Hsp90.

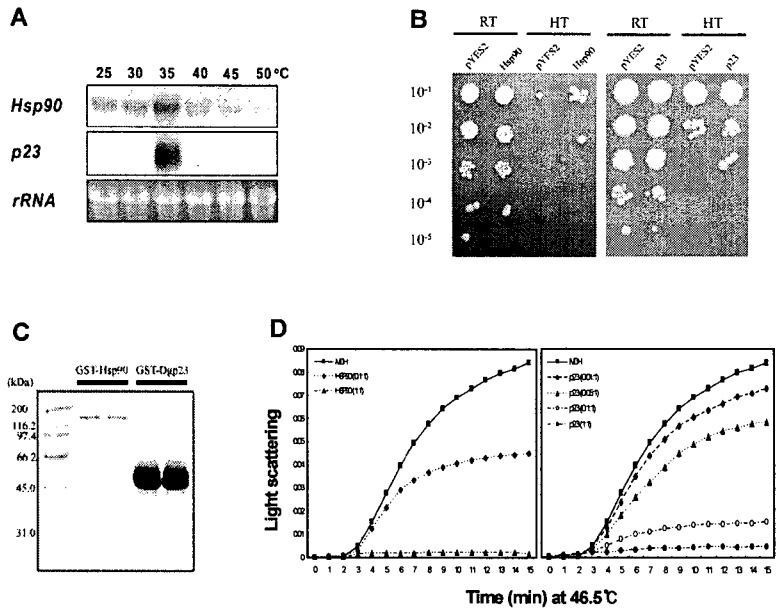

Fig. 1. Molecular and biochemical characteristics of Hsp90 and p23.

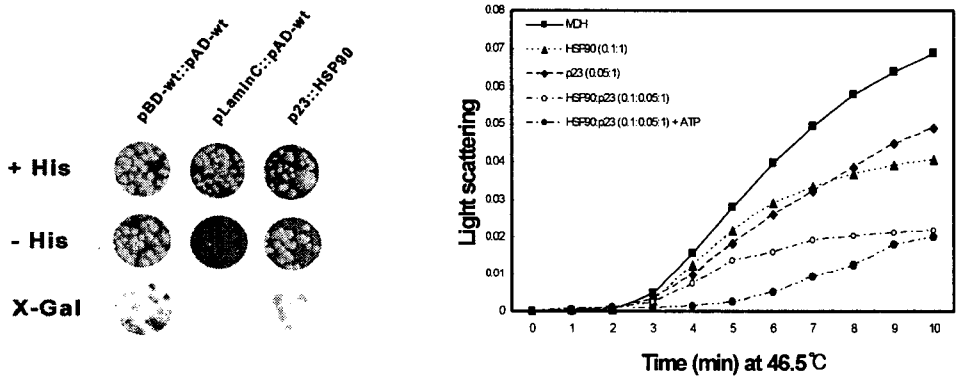

Fig. 2. Protein-protein interaction and chaperone activity of Hsp90 and p23 complex.

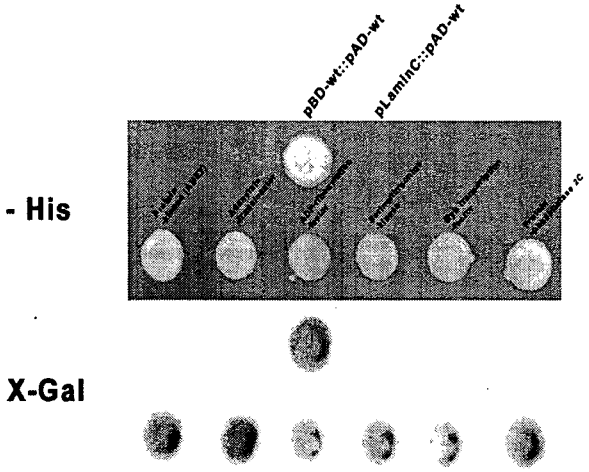

Fig. 3. Screening of p23 client proteins.