

# Adaptogens Exert a Stress-Protective Effect by Modulation of Expression of Molecular Chaperones

[Alexander Panossian](#)<sup>1</sup>, [Georg Wikman](#), [Punit Kaur](#), [Alexzander Asea](#)

Affiliations

- PMID: **19188053**
- DOI: [10.1016/j.phymed.2008.12.003](https://doi.org/10.1016/j.phymed.2008.12.003)

## Abstract

Adaptogens are medicinal plants that augment resistance to stress, and increase concentration, performance and endurance during fatigue. Experiments were carried out with BALB/c mice taking ADAPT-232 forte, a fixed combination of three genuine (native) extracts of *Eleutherococcus senticosus*, *Schisandra chinensis* and *Rhodiola rosea*, characterised for the content of active markers eleutherosides, schisandrins, salidroside, tyrosol and rosavin and in doses of about 30, 90 and 180 mg/kg for seven consecutive days followed by forced swimming test to exhaustion. ADAPT-232 forte strongly augments endurance of mice, increasing the time taken to exhaustion (TTE) in a dose-dependent manner from 3.0±0.5 to 21.1±1.7 min, approximately seven fold. Serum Hsp72 was measured by EIA both in normal and stressful conditions before and after swimming test. Repeated administration of adaptogen dose dependently increases basal level of Hsp72 in serum of mice from 0.8-1.5 to 5.5-6.3 pg/ml. This effect is even stronger than the effect of stress, including both physical (swimming) and emotional impacts: 3.2±1.2 pg/ml. Cumulative effect of stress and adaptogen was clearly observed in groups of animals treated with adaptogen after swimming to exhaustion, when serum Hsp72 increased to 15.1±1 pg/ml and remained at almost the same level during the 7 days. It can be concluded that adaptogens induce increase of serum Hsp72, regarded as a defense response to stress, and increase tolerance to stress (in our model combination of physical and emotional stresses). It can be suggested that increased tolerance to stress induced by adaptogen is associated with its stimulation of expression of Hsp70 and particularly with Hsp72 production and release into systemic circulation, which is known as a mediator of stress response involved in reparation of proteins during physical load. Our studies suggest that this could be one of the mechanisms of action of plant adaptogens.

## Similar articles

- [Evaluation of molecular chaperons Hsp72 and neuropeptide Y as characteristic markers of adaptogenic activity of plant extracts](#). Asea A, Kaur P, Panossian A, Wikman KG. *Phytomedicine*. 2013 Nov 15;20(14):1323-9. doi: 10.1016/j.phymed.2013.07.001. Epub 2013 Aug 6. PMID: 23920279

- [Stimulating effect of adaptogens: an overview with particular reference to their efficacy following single dose administration.](#) Panossian A, Wagner H. *Phytother Res.* 2005 Oct; 19(10):819-38. doi: 10.1002/ptr.1751. PMID: 16261511 Review.
- [Adaptogens stimulate neuropeptide y and hsp72 expression and release in neuroglia cells.](#) Panossian A, Wikman G, Kaur P, Asea A. *Front Neurosci.* 2012 Feb 1;6:6. doi: 10.3389/fnins.2012.00006. eCollection 2012. PMID: 22347152 Free PMC article.
- [Effects of various \*Eleutherococcus senticosus\* cortex on swimming time, natural killer activity and corticosterone level in forced swimming stressed mice.](#) Kimura Y, Sumiyoshi M. *J Ethnopharmacol.* 2004 Dec;95(2-3):447-53. doi: 10.1016/j.jep.2004.08.027. PMID: 15507373
- [Evidence-based efficacy of adaptogens in fatigue, and molecular mechanisms related to their stress-protective activity.](#) Panossian A, Wikman G. *Curr Clin Pharmacol.* 2009 Sep; 4(3):198-219. doi: 10.2174/157488409789375311. Epub 2009 Sep 1. PMID: 19500070 Review.

[See all similar articles](#)

## Cited by 14 articles

- [Reduction of acute mild stress corticosterone response and changes in stress-responsive gene expression in male Balb/c mice after repeated administration of a \*Rhodiola rosea\* L. root extract.](#) Dinel AL, Guinobert I, Lucas C, Blondeau C, Bardot V, Ripoche I, Berthomier L, Pallet V, Layé S, Joffre C. *Food Sci Nutr.* 2019 Oct 22;7(11):3827-3841. doi: 10.1002/fsn3.1249. eCollection 2019 Nov. PMID: 31763032 Free PMC article.
- [A preliminary review of studies on adaptogens: comparison of their bioactivity in TCM with that of ginseng-like herbs used worldwide.](#) Liao LY, He YF, Li L, Meng H, Dong YM, Yi F, Xiao PG. *Chin Med.* 2018 Nov 16;13:57. doi: 10.1186/s13020-018-0214-9. eCollection 2018. PMID: 30479654 Free PMC article. Review.
- [Effects of Adaptogens on the Central Nervous System and the Molecular Mechanisms Associated with Their Stress-Protective Activity.](#) Panossian A, Wikman G. *Pharmaceuticals (Basel).* 2010 Jan 19;3(1):188-224. doi: 10.3390/ph3010188. PMID: 27713248 Free PMC article. Review.
- [Non-Pharmacological Treatments for ADHD in Youth.](#) Sharma A, Gerbarg PL, Brown RP. *Adolesc Psychiatry (Hilversum).* 2015;5(2):84-95. doi: 10.2174/221067660502150430154937. PMID: 27489754 Free PMC article.
- [The central role of heat shock factor 1 in synaptic fidelity and memory consolidation.](#) Hooper PL, Durham HD, Török Z, Hooper PL, Crul T, Víggh L. *Cell Stress Chaperones.* 2016 Sep;21(5):745-53. doi: 10.1007/s12192-016-0709-1. Epub 2016 Jun 9. PMID:

27283588 Free PMC article.

[See all "Cited by" articles](#)