



DOSSIER · SUBSTANCE

Adaptogens

Adaptogens are not a substance but a conceptual framework: plants believed to enhance the body's resilience to stress. This page examines what lies behind the collective term—and which of the associated plants have actually been studied in humans.

5,621

STUDIES IN
TOTAL

730

IN HUMANS

305

OF WHICH
CONTROLLED

940

IN ANIMALS

880

IN THE LAB

Figures from the IHR study database · Last updated 2026-10-15

How to Read This Dossier

ESTABLISHED

measured in humans, with a comparison group

PLAUSIBLE

supported by mechanism, animal studies or observation

HYPOTHESIS

a likely connection that still needs to be tested

Adaptogens at a glance

ORIGIN:

Adaptogens are a conceptual framework from Soviet research in the 1940s describing plants that are purported to non-specifically enhance resistance to stress without disrupting normal bodily functions. The term encompasses chemically diverse plants such as *Rhodiola rosea*, *Withania somnifera*, *Panax ginseng*, and others, but it is not sharply defined pharmacologically.

EVIDENCE BASE:

5,621 evaluated publications · 305 controlled human studies · 425 observational studies · 494 review articles · 940 animal studies · 755 cell culture studies

STRONGEST EVIDENCE:

- **Oncology:** – Fatigue in cancer patients Ginseng (*Panax quinquefolius*) demonstrated dose-dependent improvements in cancer-related fatigue in randomised, placebo-controlled trials, particularly during active therapy. Tolerability was good, with effects appearing after 4–8 weeks.
- **Cognition and mental health:** – Memory and stress *Bacopa monnieri* (300–450 mg extract) improved cognitive processing speed in meta-analyses among older participants. Ashwagandha reduced stress and anxiety scores (HAM-A, PSS) in a dose-dependent manner after 8–12 weeks.
- **Fatigue and stress:** *Rhodiola rosea* showed positive effects on mental fatigue in systematic reviews, albeit with methodological weaknesses. Ashwagandha significantly lowered perceived stress (PSS) in controlled trials.
- **Gut-brain axis** – Cognitive effects *Bacopa monnieri* improved verbal learning and memory (AVLT) in a study with older participants after 12 weeks, with good tolerability. Potential effects via the gut-brain axis remain a hypothesis and have not been directly investigated in humans.

LIMITATIONS:

- Most controlled human studies are small (often <100 participants), short-term (8–12 weeks), and include a mix of subjective endpoints (e.g., questionnaires) and some objective measures. Direct comparisons with established therapies or other adaptogens are lacking.
- Evidence on metabolism, immunomodulation, and long-term safety is still emerging. Preclinical mechanisms (e.g., HPA axis modulation in animal or cell studies) suggest potential pathways but have not been validated in humans.
- Methodological flaws, such as unclear randomisation, lack of blinding, or heterogeneous populations, limit the robustness of findings. Oncology, cognition, and stress are better studied than other areas.

CLASSIFICATION:

Adaptogens are a pharmacologically imprecise umbrella term for plants such as rhodiola, ashwagandha, or ginseng, whose **compounds** may show effects in controlled studies—primarily for fatigue, cognition, and stress—but with methodological weaknesses and unclear long-term effects.

1. What the Term Means

The term originates from Soviet research in the 1940s and refers to plants that non-specifically enhance resistance to stress without disrupting normal functions. Primarily included are *Rhodiola rosea* (roseroot), *Withania somnifera* (ashwagandha), *Panax ginseng*, *Eleutherococcus*, *Schisandra*, and *Bacopa*.

The term is not sharply defined pharmacologically—it describes an expected type of effect, not a substance class. The plants grouped under it share little chemically. When discussing 'adaptogens,' one is referring to highly diverse substances.

2. What the Studies Show in Detail

The key human studies and most important reviews—by application area, including population, duration, preparation, outcome measures, and results, as reported in the original publications. Numbers are included only where the study provides them.

Distribution of **controlled human studies** by application area—the numbers are not additive, as a single study may be assigned to multiple areas:

APPLICATION AREA	CONTROLLED STUDIES
Safety and tolerability	182
Fatigue and stress	143
Cognition and mental health	118
Inflammatory processes	63
Immune system	52
Metabolism	40
Musculoskeletal system	37
Oncology	35

Oncology – Fatigue in Cancer Patients

The primary endpoint was the change in the **General Subscale** of the Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF) after 4 weeks. While only a non-significant trend in favour of ginseng was observed after 4 weeks (14.4 points vs. 460–467 in the placebo and low-dose groups), the effect on fatigue scores was particularly pronounced in patients undergoing active cancer therapy. Tolerability was rated as good, with no significant differences in reported adverse effects or according to CTCAE criteria, but no clinical outcomes beyond these fatigue scores were assessed ¹.

Vitality scores on the SF-36 improved by 10.5–14.6 points vs. 7.3–7.8 points. More than twice as many participants on ginseng reported subjective improvement in vitality scores. The studies did not assess clinical outcomes beyond these vitality scores, and no differences in adverse effects were observed between the groups ³.

HYPOTHESIS The data provide a hint that **ginseng** may have a dose-dependent effect on cancer-related fatigue, particularly in patients undergoing ongoing therapy. However, direct comparisons with other adaptogens or non-pharmacological interventions are lacking, and the study population was heterogeneous (various cancer types, treatment regimens).

Long-term studies on the efficacy and safety of **ginseng** in oncological fatigue are lacking, as are studies specifically targeting subgroups (e.g., by tumour entity or therapy phase).

Cognition and Mental Health – Memory, Stress, Sleep

A meta-analysis (2014) of nine randomised, placebo-controlled trials involving 518 healthy older participants examined the effects of *Bacopa monnieri* (300–450 mg extract daily) over at least 12 weeks. The pooled analysis showed a significant reduction in reaction time on the Trail Making Test Part B by 17.9 ms ($p < 0.001$) and a reduction in choice reaction time ($p < 0.001$). While overall study quality was high, some studies had methodological weaknesses (e.g., unclear randomisation). The results provide an indication of improved cognitive processing speed, though other cognitive domains (e.g., auditory perception) were not assessed ⁹.

A randomised, double-blind study (2019) involving 60 stressed adults compared 240 mg of Ashwagandha extract (Shoden) daily with placebo over 60 days. Primary endpoints were scores on the Hamilton Anxiety Rating Scale (HAM-A) and the Depression Anxiety Stress Scale (DASS-21). The study showed improvements in these scores, though tolerability was good, with no serious adverse effects ⁴.

Another study (2019) involving 60 healthy adults examined two dosages of Ashwagandha (125 mg and 300 mg daily) over 8 weeks. Both dosages led to a significant reduction in the Perceived Stress Scale (PSS) after 8 weeks ($p < 0.001$), with the higher dose showing a stronger trend. The study suggests a dose-dependent effect on stress perception, though a direct comparison with other adaptogens was lacking ⁶.

A randomised, placebo-controlled study (2019) involving 60 participants with insomnia and anxiety disorders examined 300 mg of Ashwagandha extract daily over 10 weeks. The study assessed tolerability, which was good, though long-term data were lacking ¹².

HYPOTHESIS **Withanolides (Ashwagandha) and bacosides (*Bacopa*)** may exert neuroprotective and stress-modulating effects (e.g., cortisol regulation, GABAergic mechanisms). However, the evidence base is heterogeneous: while some studies show robust effects, direct comparisons with established therapies (e.g., SSRIs) or non-pharmacological approaches (e.g., cognitive behavioural therapy) are often lacking.

Controlled human studies on the efficacy and safety of **adaptogenic compounds (e.g., withanolides, bacosides)** in cognitive disorders and mental health conditions form a smaller part of the evidence base. Long-term data and studies specifically investigating mechanisms of action (e.g., neurotransmitter modulation) remain scarce.

Gut and Microbiome – Cognitive Effects via the Gut-Brain Axis

A randomised, double-blind study (2010) involving 98 healthy participants aged over 55 examined 300 mg of *Bacopa monnieri* extract (BacoMind™) daily over 12 weeks. Primary endpoints were verbal learning and memory (Rey Auditory Verbal Learning Test, AVLT). *Bacopa* led to significant improvements in delayed recall (Trial a7: $p = 0.000$) and learning (Trial a4: $p = 0.000$; Trial a5: $p = 0.016$). Tolerability was good, though data on long-term effects and potential drug interactions were lacking ⁵.

HYPOTHESIS The observed cognitive effects of *Bacopa* may be partially mediated via the gut-brain axis, as bacosides influence gut permeability and exhibit anti-inflammatory effects in the gut.

Studies specifically addressing the influence of **adaptogenic plant extracts**, including those like *Bacopa monnieri* or *Rhodiola rosea****, on the gut microbiome and the gut-brain axis are lacking, as are long-term data on safety and efficacy in older populations.

Fatigue and Stress – Adaptogenic Effects

A systematic review (2012) analysed randomised controlled trials on *Rhodiola rosea* for physical and mental fatigue. Of six included studies, two showed significant improvement in physical fatigue, while three of the five studies addressing mental fatigue reported positive effects. The review noted that several studies had a high risk of bias or methodological flaws (e.g., unclear randomisation, small sample sizes).

A randomised, double-blind study (2017) involving 52 chronically stressed adults examined 300 mg of Ashwagandha extract daily over 8 weeks. Primary endpoints were the Perceived Stress Scale (PSS) and the Food Cravings Questionnaire. Tolerability was good, though comparison groups with other adaptogens or non-pharmacological approaches were lacking ⁷.

HYPOTHESIS **Adaptogenic compounds** may exert effects via modulation of the hypothalamic-pituitary-adrenal (HPA) axis and antioxidant mechanisms. Several studies showed such effects, but the evidence remains inconsistent, and many studies have methodological limitations (e.g., lack of blinding, short duration).

Direct comparative studies between different **adaptogenic plants (e.g., Ashwagandha vs. Rhodiola)** are lacking, as are studies specifically investigating long-term effects and mechanisms of action (e.g., gene expression, neurotransmitter regulation).

Metabolism and Inflammation – Immunomodulation and Antioxidant Effects

A review (2018) summarised the molecular mechanisms of ginsenosides (Rb1, Rg1, Rg3). These **active compounds** modulate signalling pathways such as PI3K/Akt, AMPK, and NF-κB, which are involved in inflammation, oxidative stress, and cell survival. Preclinical studies (in vitro and in vivo) demonstrate antioxidant, anti-apoptotic, and immunomodulatory effects, though these findings are not yet confirmed in human studies and remain preclinical.

A review (2012) analysed the cardiovascular effects of ginsenosides. Preclinical models (in vitro and animal studies) showed antioxidant effects, improved vasomotor function, and reduced platelet aggregation. However, these findings are not yet clinically validated in humans, and available clinical studies on cardiovascular outcomes are rare and often of low quality (e.g., small sample sizes, short duration) ²⁵.

HYPOTHESIS **Adaptogenic compounds** may exert metabolic regulatory effects via modulation of inflammatory mediators (e.g., cytokines, NF-κB) and antioxidant mechanisms. Clinical data confirming this hypothesis are still under investigation.

There are controlled clinical studies investigating the immunomodulatory and antioxidant effects of **adaptogenic plant extracts** in humans, though fewer focus on long-term effects in metabolic disorders (e.g., diabetes, obesity).

Overall Picture

The available studies suggest that the active compounds—particularly ginsenosides, withanolides, and bacosides—may be effective in various clinical contexts. The strongest evidence exists for their use in cancer-related fatigue (ginseng), cognitive impairment (Bacopa), and stress (ashwagandha). The effects are often dose-dependent and typically manifest only after several weeks (usually 8–12 weeks). Tolerability is good in most studies, but systematic investigations into long-term safety and interactions with other medications are lacking.

However, the data are heterogeneous: many studies exhibit methodological weaknesses (e.g., small sample sizes, short duration, lack of blinding), and direct comparisons between different adaptogenic compounds or with established therapies are largely absent. Furthermore, the underlying mechanisms of action are often unclear, and there are few studies that specifically investigate particular signalling pathways (e.g., neurotransmitter modulation, gene expression). Evidence is particularly sparse for applications outside oncology, cognition, and stress (e.g., metabolism, immunomodulation).

Methodology of the evidence base

Many controlled studies on adaptogenic plants are randomised, placebo-controlled, double-blind trials lasting 8–12 weeks. Typical endpoints include subjective scales (e.g., MFSI-SF, HAM-A, PSS) and objective parameters (e.g., cortisol levels, cognitive tests). Some studies also use biomarkers (e.g., cytokines, neurotransmitters) or imaging techniques (e.g., EEG). Systematic weaknesses include: (1) small sample sizes (often < 100 participants), (2) short follow-up periods, (3) lack of dose-response analyses, (4) unclear randomisation and blinding methods, and (5) absence of direct comparisons with other therapies. Additionally, preclinical studies validating the postulated mechanisms of action (e.g., modulation of the HPA axis, antioxidant effects) in humans are often lacking.

Why the collective term itself is problematic

"Adaptogen" is neither a protected nor pharmacologically defined term. It groups plants with differing chemistry and varying levels of evidence under a common expectation.

For assessment, this means:
THE QUESTION MUST ALWAYS PERTAIN TO THE INDIVIDUAL PLANT
, never to the group. Ashwagandha is well-studied, Rhodiola less so, and other plants included in the category scarcely at all. A statement about "adaptogens" is not a statement about anything specific.

3. How Robust the Research Is

Controlled studies are unevenly distributed: ashwagandha and rhodiola are the most frequently investigated, primarily for stress, fatigue, sleep, and cortisol levels; ginseng is additionally studied for cognitive performance.

Methodologically, the field is challenging. Endpoints are predominantly **self-reported**—perceived stress, fatigue, sleep quality—and these are highly susceptible to expectation bias. Studies are typically small and run for only a few weeks; independent replications are rare.

4. Common Claims—and What the Data Support

CLAIM	EVIDENCE BASE
Stress and fatigue	The most frequently studied area, with results primarily derived from questionnaires. Controlled studies are available, though they tend to be small and of short duration.
Cortisol levels	Investigated on multiple occasions. However, this does not answer whether an altered cortisol profile holds clinical significance.

CLAIM	EVIDENCE BASE
Cognitive performance	Vor allem zu Ginseng untersucht, mit uneinheitlichen Ergebnissen.
Athletic performance	Popular field of application with a weak evidence base; studies are small and often methodologically flawed.

5. The Most Robust Studies

Ranked by evidential strength, not by prominence. The full evaluation includes significantly more studies; only the most reliable are listed here.

Controlled Human Trials

- ¹ Wisconsin Ginseng (*Panax quinquefolius*) to improve cancer-related fatigue: a randomised, double-blind trial, N07C2 (2013)
- ² Neuropharmacological review of the nootropic herb *Bacopa monnieri* (2013)
- ³ Pilot study of *Panax quinquefolius* (American ginseng) to improve cancer-related fatigue: a randomised, double-blind, dose-finding evaluation: NCCTG trial (2010)
- ⁴ An investigation into the stress-relieving and pharmacological actions of an ashwagandha (*Withania somnifera*) extract: a randomised, double-blind, placebo-controlled study (2019)
- ⁵ Does *Bacopa monnieri* improve memory performance in older persons? Results of a randomised, placebo-controlled, double-blind trial (2010)
- ⁶ Adaptogenic and anxiolytic effects of ashwagandha root extract in healthy adults: a double-blind, randomised, placebo-controlled clinical study (2019)
- ⁷ Body weight management in adults under chronic stress through treatment with ashwagandha root extract: a double-blind, randomised, placebo-controlled study (2017)
- ⁸ The cognitive-enhancing effects of *Bacopa monnieri*: a systematic review of randomised, controlled human clinical trials (2012)
- ⁹ Meta-analysis of randomised controlled trials on the cognitive effects of *Bacopa monnieri* extract (2014)
- ¹⁰ Clinical evaluation of the spermatogenic activity of ashwagandha (*Withania somnifera*) root extract in oligospermic males: a pilot study (2013)
- ¹¹ Safety and clinical effectiveness of *Withania somnifera* (Linn.) Dunal root in human ailments (2020)
- ¹² Efficacy and safety of ashwagandha (*Withania somnifera*) root extract in insomnia and anxiety: a double-blind, randomised, placebo-controlled study (2019)
- ¹³ Efficacy and safety of ashwagandha root extract in subclinical hypothyroid patients: a double-blind, randomised, placebo-controlled trial (2018)
- ¹⁴ *Rhodiola rosea* for physical and mental fatigue: a systematic review (2012)
- ¹⁵ *Rhodiola rosea* versus sertraline for major depressive disorder: a randomised placebo-controlled trial (2015)
- ¹⁶ *Rhodiola rosea* L. as a putative botanical antidepressant (2016)
- ¹⁷ A randomised, double-blind, placebo-controlled, crossover study examining the hormonal and vitality effects of ashwagandha (*Withania somnifera*) in ageing adults (2019)
- ¹⁸ Double-blind randomised controlled trial for immunomodulatory effects of tulsi (*Ocimum sanctum* Linn.) leaf extract on healthy volunteers (2011)
- ¹⁹ Effects of 12-week *Bacopa monnieri* consumption on attention, cognitive processing, working memory, and functions of both cholinergic and monoaminergic systems (2012)
- ²⁰ Safety of ashwagandha root extract: a randomised, placebo-controlled study in healthy volunteers (2021)
- ²¹ Efficacy and safety of ashwagandha root extract on cognitive functions in healthy, stressed adults: a randomised, double-blind, placebo-controlled study (2021)
- ²² Adjunctive use of a standardised extract of *Withania somnifera* (ashwagandha) to treat symptom exacerbation in schizophrenia: a randomised, double-blind, placebo-controlled study (2018)
- ²³ Ginseng for cognition (2010)
- ²⁴ Clinical evaluation of the pharmacological impact of ashwagandha root extract on sleep in healthy volunteers and insomnia patients: a double-blind, randomised, controlled trial (2021)

6. Summary

The available studies suggest that **active compounds**, such as ginsenosides (ginseng), withanolides (ashwagandha), and bacosides (*Bacopa*), may be effective in specific contexts. Effects are often dose-dependent and manifest after several weeks. Tolerability is generally described as good in most studies, though systematic data on long-term safety or interactions are lacking.

HYPOTHESIS **Active compounds in adaptogens** may act via neuroprotective, stress-modulating (e.g., cortisol regulation, GABAergic effects), or antioxidant mechanisms. In cancer-related fatigue, ginsenosides may be dose-dependently effective, particularly during ongoing therapy. The cognitive effects of *Bacopa* could be partially mediated via the gut-brain axis, as bacosides influence intestinal permeability and inflammatory processes. For ashwagandha, modulation of the HPA axis is discussed, which may contribute to stress-reducing effects. However, these mechanisms have not been sufficiently investigated in humans, and the evidence base remains heterogeneous.

Future studies should specifically address the following gaps: (1) Direct comparisons between different **adaptogenic compounds** or with established therapies (e.g., SSRIs, cognitive behavioural therapy), (2) Long-term studies on efficacy and safety, particularly in older populations or chronic conditions, (3) Investigations into specific mechanisms of action (e.g., neurotransmitter modulation, gene expression, gut-brain axis), (4) Studies using objective biomarkers (e.g., cortisol, cytokines) instead of subjective endpoints, and (5) Targeted analyses of subgroups (e.g., by tumour entity, therapy phase, or metabolic status). Additionally, preclinical studies validating postulated mechanisms in humans are lacking.

7. Broader Context

In controlled human studies, adaptogens—particularly *Rhodiola rosea* and *Withania somnifera*—demonstrate reproducible effects on subjective stress parameters, fatigue, and sleep quality. The evidence regarding cortisol levels is heterogeneous, but some studies document a reduction in the morning cortisol peak under standardised stress conditions. Since the endpoints are primarily self-reported, expectation bias remains a key confounding factor. Nevertheless, meta-analyses suggest that the effects are not solely attributable to placebo: the impact of *Rhodiola* on mental fatigue persists even in studies with active controls (e.g., caffeine). The link to the 'stress–cortisol–inflammation' chain arises from the fact that chronically elevated cortisol levels can weaken the intestinal barrier and upregulate pro-inflammatory cytokines such as IL-6. Adaptogens may intervene here by dampening the cortisol response to acute stress, thereby preventing an inflammatory cascade.

Mechanistically, adaptogens are associated with modulation of the hypothalamic–pituitary–adrenal (HPA) axis, particularly through the regulation of glucocorticoid receptors and the inhibition of enzymes such as 11 β -hydroxysteroid dehydrogenase type 1. Animal studies show that extracts of *Withania somnifera* and *Rhodiola rosea* increase the expression of heat shock proteins (e.g., HSP70) and antioxidant enzymes (SOD, catalase) under stress conditions, suggesting non-specific cellular resilience. Additionally, evidence from in vitro models indicates that certain adaptogens may reduce intestinal barrier permeability by stabilising the expression of tight junction proteins such as occludin and ZO-1. These effects could bridge the gap to inflammation regulation: an intact barrier prevents the translocation of lipopolysaccharides (LPS), which would otherwise activate NF- κ B via TLR4 signalling and promote systemic inflammation. However, the applicability of these mechanisms to humans remains unconfirmed, as most data derive from cell or animal models.

If adaptogens do indeed modulate the HPA axis and stabilise the intestinal barrier, they could play a preventive role in stress-induced inflammatory conditions—such as irritable bowel syndrome, metabolic syndrome, or even neurodegenerative processes associated with low-grade inflammation. It would be essential to determine whether the effects on cortisol and inflammatory markers (e.g., hs-CRP, IL-6) are reproducible in long-term studies using objective biomarkers, particularly in populations with chronic stress (e.g., shift workers, caregivers). Furthermore, data on dose–response relationships and interactions with other natural compounds targeting similar pathways (e.g., polyphenols for barrier stabilisation or omega-3 fatty acids for anti-inflammatory effects) are lacking. A critical question is whether adaptogens only exert effects in individuals with a dysregulated HPA axis or if they also provide a 'buffering' effect in healthy individuals. Studies employing standardised stress tests (e.g., the Trier Social Stress Test) with parallel measurement of cortisol, intestinal permeability (e.g., lactulose/mannitol test), and microbiome composition would be informative.

8. Unresolved Questions

- **Standardisation:** Extracts vary considerably; which constituents are critical is mostly unclear.
- **Duration:** Nearly all studies run for weeks. Whether long-term use over months is beneficial has scarcely been examined.
- **Interactions:** Several of these plant-based compounds interfere with hormonal and enzymatic systems—this is rarely investigated systematically.

9. Further Paths

Topics, mechanisms and chains in which this substance appears — for those who want to look beyond the substance.

- From exclusion to inflammation: stress, cortisol, gut

Frequently Asked Questions

What makes a plant an adaptogen?

There is no binding definition. Historically, three criteria were intended: non-specific enhancement of resistance, balancing effects, and largely harmless nature. The term is not recognised as a pharmacological category.

Which adaptogen is the most extensively studied?

Ashwagandha, followed by Rhodiola and ginseng. The evidence base in humans is significantly weaker for the other associated plants.

Are adaptogens safe?

Not universally. Several interact with hormonal and enzyme systems, which may be relevant in thyroid disorders, pregnancy, and when taking medication concurrently. Systematic safety studies are rare.

Sources

- 1 **Wisconsin Ginseng (*Panax quinquefolius*) to improve cancer-related fatigue: a randomized, double-blind trial, N07C2**
Barton DL, Liu H, Dakhil SR, Linquist B, Sloan JA, Nichols CR et al. · 2013
- 2 **Neuropharmacological review of the nootropic herb *Bacopa monnieri***
Agiar S, Borowski T · 2013
- 3 **Pilot study of *Panax quinquefolius* (American ginseng) to improve cancer-related fatigue: a randomized, double-blind, dose-finding evaluation: NCCTG trial N03CA**
Barton DL, Soori GS, Bauer BA, Sloan JA, Johnson PA, Figueras C et al. · 2010
- 4 **An investigation into the stress-relieving and pharmacological actions of an ashwagandha (*Withania somnifera*) extract: A randomized, double-blind, placebo-controlled study**
Lopresti AL, Smith SJ, Malvi H, Kodgule R · 2019
- 5 **Does *Bacopa monnieri* improve memory performance in older persons? Results of a randomized, placebo-controlled, double-blind trial**
Morgan A, Stevens J · 2010
- 6 **Adaptogenic and Anxiolytic Effects of Ashwagandha Root Extract in Healthy Adults: A Double-blind, Randomized, Placebo-controlled Clinical Study**
Salve J, Pate S, Debnath K, Langade D · 2019
- 7 **Body Weight Management in Adults Under Chronic Stress Through Treatment With Ashwagandha Root Extract: A Double-Blind, Randomized, Placebo-Controlled Trial**
Choudhary D, Bhattacharyya S, Joshi K · 2017
- 8 **The cognitive-enhancing effects of *Bacopa monnieri*: a systematic review of randomized, controlled human clinical trials**
Pase MP, Kean J, Sarris J, Neale C, Scholey AB, Stough C · 2012
- 9 **Meta-analysis of randomized controlled trials on cognitive effects of *Bacopa monnieri* extract**
Kongkeaw C, Dilokthornsakul P, Thanarangsarit P, Limpeanchob N, Norman Scholfield C · 2014
- 10 **Clinical Evaluation of the Spermatogenic Activity of the Root Extract of Ashwagandha (*Withania somnifera*) in Oligospermic Males: A Pilot Study**
Ambiye VR, Langade D, Dongre S, Aptikar P, Kulkarni M, Dongre A · 2013
- 11 **Safety and clinical effectiveness of *Withania Somnifera* (Linn.) Dunal root in human ailments**
Tandon N, Yadav SS · 2020
- 12 **Efficacy and Safety of Ashwagandha (*Withania somnifera*) Root Extract in Insomnia and Anxiety: A Double-blind, Randomized, Placebo-controlled Study**
Langade D, Kanchi S, Salve J, Debnath K, Ambegaokar D · 2019
- 13 **Efficacy and Safety of Ashwagandha Root Extract in Subclinical Hypothyroid Patients: A Double-Blind, Randomized Placebo-Controlled Trial**
Sharma AK, Basu I, Singh S · 2018
- 14 ***Rhodiola rosea* for physical and mental fatigue: a systematic review**
Ishaque S, Shamseer L, Bukutu C, Vohra S · 2012
- 15 ***Rhodiola rosea* versus sertraline for major depressive disorder: A randomized placebo-controlled trial**
Mao JJ, Xie SX, Zee J, Soeller I, Li QS, Rockwell K et al. · 2015
- 16 ***Rhodiola rosea* L. as a putative botanical antidepressant**
Amsterdam JD, Panossian AG · 2016
- 17 **A Randomized, Double-Blind, Placebo-Controlled, Crossover Study Examining the Hormonal and Vitality Effects of Ashwagandha (*Withania somnifera*) in Aging, Overweight Males**
Lopresti AL, Drummond PD, Smith SJ · 2019
- 18 **Double-blinded randomized controlled trial for immunomodulatory effects of *Tulsi* (*Ocimum sanctum* Linn.) leaf extract on healthy volunteers**
Mondal S, Varma S, Bamola VD, Naik SN, Mirdha BR, Padhi MM et al. · 2011
- 19 **Effects of 12-Week *Bacopa monnieri* Consumption on Attention, Cognitive Processing, Working Memory, and Functions of Both Cholinergic and Monoaminergic Systems in Healthy Elderly Volunteers**
Peth-Nui T, Wattanathorn J, Muchimapura S, Tong-Un T, Piyavhatkul N, Rangseekajee P et al. · 2012
- 20 **Safety of Ashwagandha Root Extract: A Randomized, Placebo-Controlled, study in Healthy Volunteers**
Verma N, Gupta SK, Tiwari S, Mishra AK · 2021
- 21 **Efficacy and Safety of Ashwagandha Root Extract on Cognitive Functions in Healthy, Stressed Adults: A Randomized, Double-Blind, Placebo-Controlled Study**
Gopukumar K, Thanawala S, Somepalli V, Rao TSS, Thammatam VB, Chauhan S · 2021
- 22 **Adjunctive Use of a Standardized Extract of *Withania somnifera* (Ashwagandha) to Treat Symptom Exacerbation in Schizophrenia: A Randomized, Double-Blind, Placebo-Controlled Study**
Chengappa KNR, Brar JS, Gannon JM, Schlicht PJ · 2018
- 23 **Ginseng for cognition**
Geng J, Dong J, Ni H, Lee MS, Wu T, Jiang K et al. · 2010
- 24 **Clinical evaluation of the pharmacological impact of ashwagandha root extract on sleep in healthy volunteers and insomnia patients: A double-blind, randomized, parallel-group, placebo-controlled study**
Langade D, Thakare V, Kanchi S, Kelgane S · 2021
- 25 **Cardiovascular Diseases and *Panax ginseng*: A Review on Molecular Mechanisms and Medical Applications**
Kim JH · 2012

International Health Research

Research, put in context. Every statement leads to the original paper; the decision in the individual case rests with the treating professional.
ih-research.com/en/knowledge/adaptogens/ · Last updated 2026-10-15