

Adaptogens

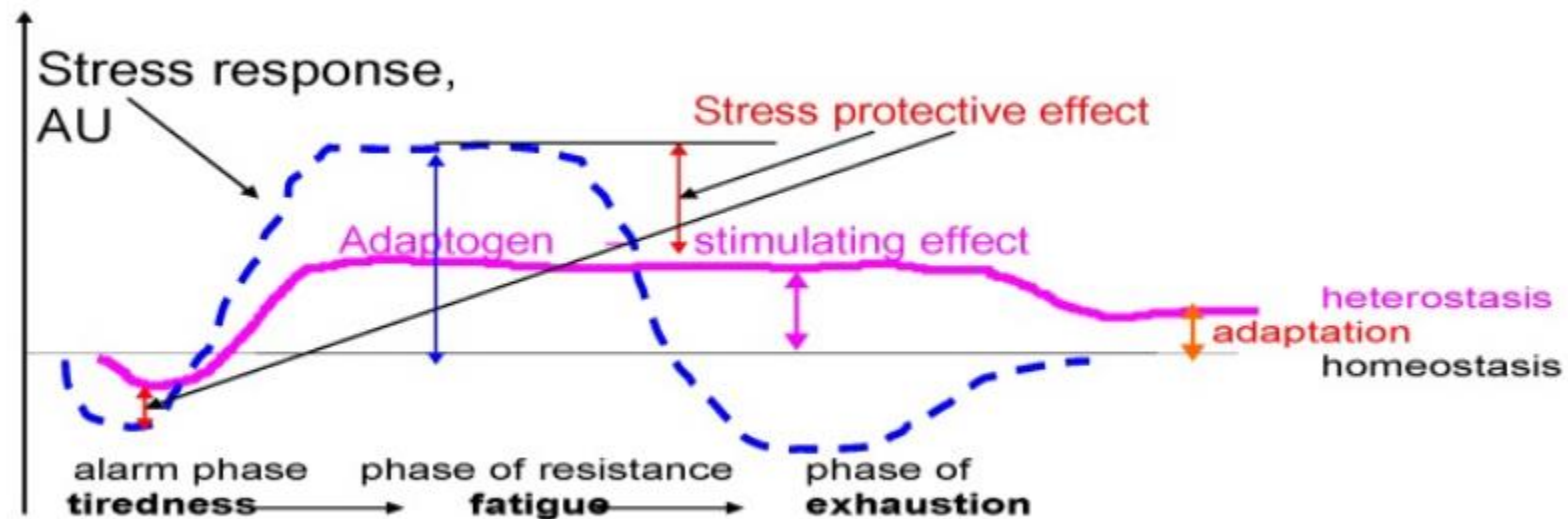
Wellness Wednesdays

12/4/19 – Aspen, CO

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Adaptogens

- Increase the resistance to stress
- Decrease sensitivity to stressors (stress protection effect)
- Stimulate the body's overall physiology
- Limit fatigue
- All of the above create "heterostasis" - a condition of the body better adapted than normal homeostasis



Popular Adaptogens and their Pharmacological Effects

Pharmacological profile of adaptogens: summary of in vitro or in animal studies.

Regulatory System: effect	Pharmacological Effects	<i>Rhodiola</i>	<i>Eleutherococcus</i>	<i>Schisandra</i>
	CNS-stimulating: enhancing of physical performance, cognitive performance (learning and memory)	+	+	+
	Neuroprotective	+		+
	Hepatoprotective	+	+	+
	Cardioprotective	+		+
Stress-system (neuro-endocrine-immune complex): Anti-stress/stress-mimetic/ stress-protective	Gastroprotective		+	+
	Oxidative stress/Radioprotective	+	+	+
	Anti-atherosclerosis		+	+
	Vasodilatory/hypotensive			+
	Anti-hyperglycemic		+	
	Anti-inflammatory/allergy	+	+	+
	Immunotropic	+	+	+
	Antidepressive	+		
	Anxiolytic	+	+	

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3991026/>

Why Adaptogens Work

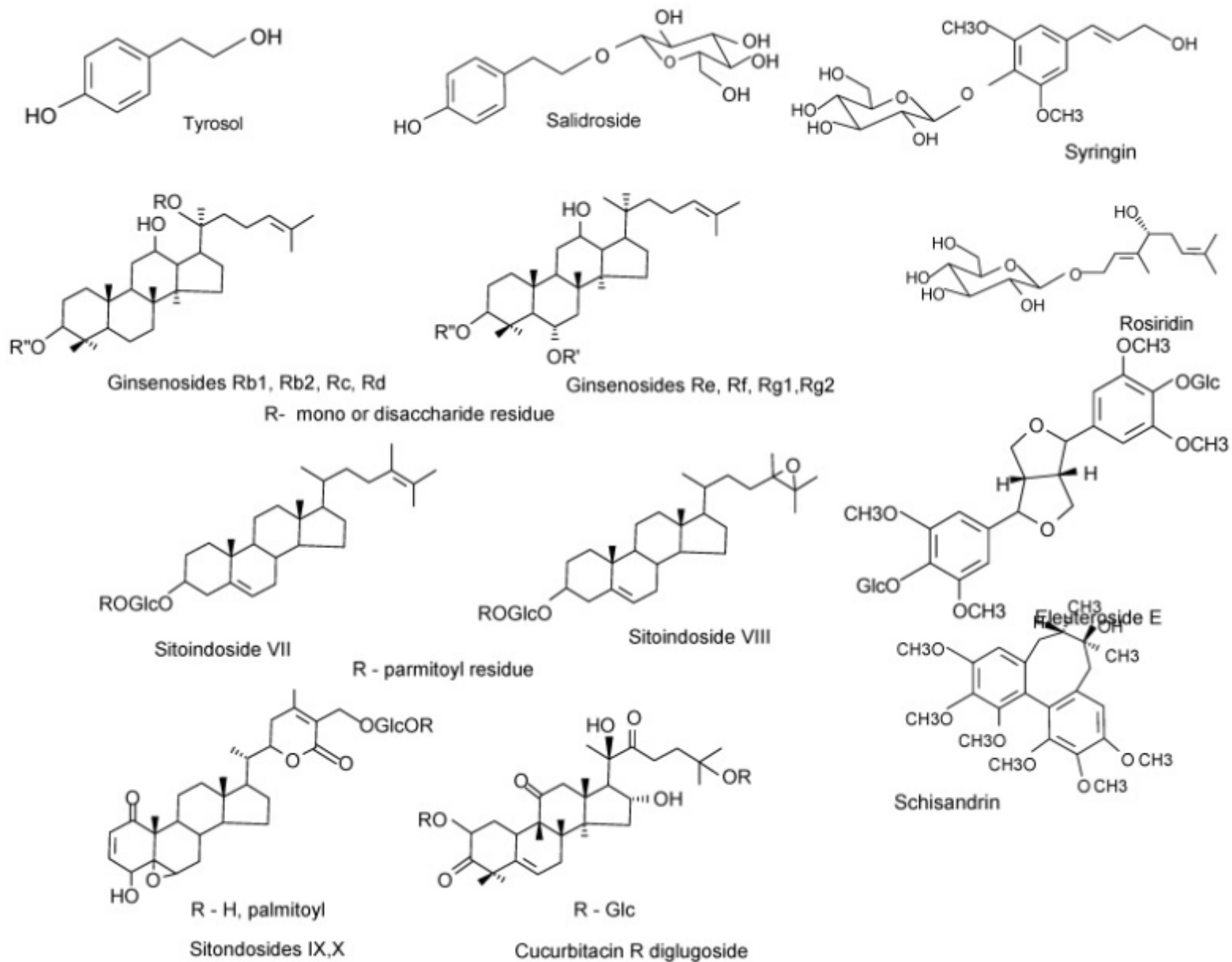
Adaptogens are complex phenolics or tetracyclic triterpenoids/ steroids

Phenolics: Structure is similar to catecholamines which are mediators of the sympathoadrenal system (SAS) early in the stress response

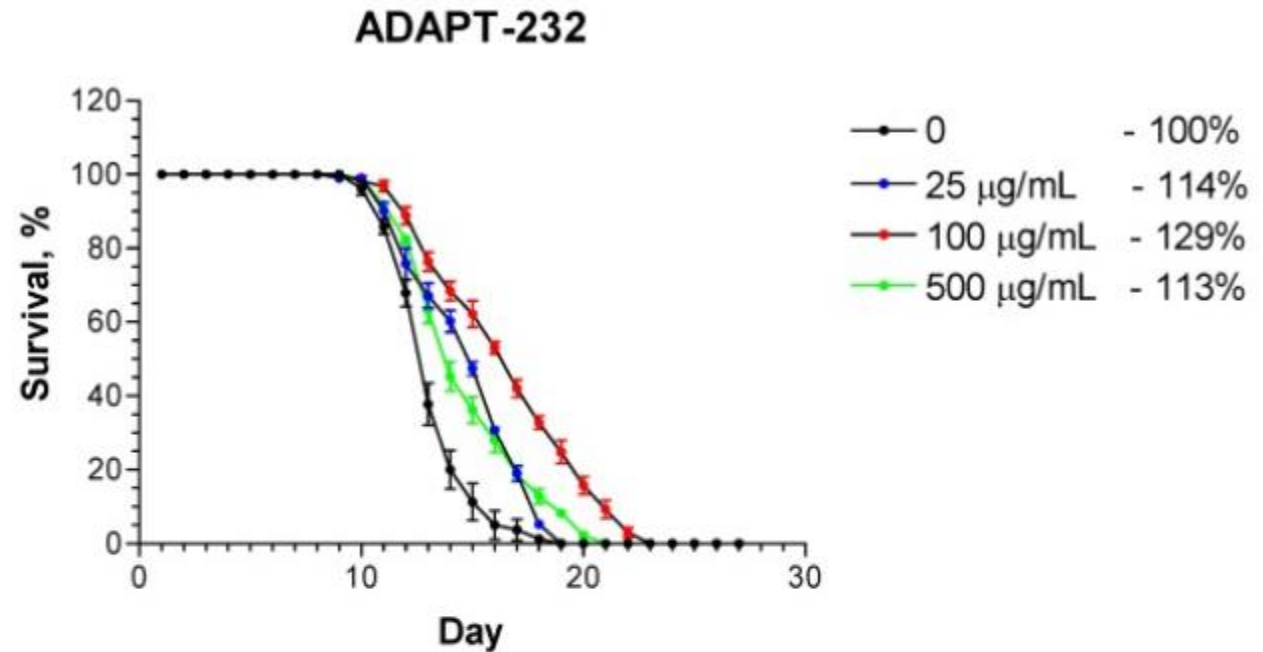
Tetracyclic triterpenoids: Structurally resemble the corticosteroid stress hormones for long-term protective inactivation of the stress system

Also, the monoterpene glucoside rosiridin from *Rhodiola rosea*, was found to inhibit monoamine oxidases A and B which may benefit depression and senile dementia

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Can Adaptogens Extend Life?



Area under the curves,	survival % x days	%
No treatment (control)	1,179	100
Chisan, 25 μg/mL	1,344	114
Chisan, 100 μg/mL	1,521	129
Chisan, 500 μg/mL	1,338	113

Fixed combination of *Rhodiola rosea*, *Schisandra chinensis* and *Eleutherococcus senticosus* extracts (ADAPT-232/Chisan) causes a concentration-dependant increase in life span of N2 wild-type *C. elegans*.

What Happens Cellularly with Stress

- Mitochondria: create oxygen-containing radicals that can damage native or repair proteins by distorting their 3-D structure
- With stressors: infection, cold, heat, radiation, physical load, emotional stress, a cascade of “signalling” proteins/enzymes (eg JNK)
- JNK: limits neuronal development, activates the immune system, and begins programmed cell death (apoptosis)

Adaptogen Cellular Response

- ADAPT-232
- Decreases NO, cortisol and JNK under stress
- Stimulate/activate the expression of Hsp70 and p-FoxO1
- With the following results:
 - Enhances the repair of damaged proteins, inhibits the stress-induced expression of NO genes, inhibits JNK and consequently apoptotic death and suppression of immune system via activation of GR and other mechanisms.
 - Maintains normal ATP levels the anti-fatigue and anti-depressive effects of adaptogens and with normal cognitive function (e.g., good attention, memory and learning).
 - Increased long-term resistance to stress and increased life span

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Effects of Chronic Stress on Humans

Brain/Spine:

- volume reductions of some structures (such as the PFC)
- decreased neuronal plasticity due to dendritic atrophy and neuronal death
- decreased spine density
- Stressed Brains and Depressed brains look morphologically similar

Immune system:

- psychological stress induces the same response as infections and causes tissue damage
- increase the levels of circulating cytokines and of various biomarkers of inflammation

Effects of Chronic Stress on Humans

Cardiovascular system:

- stress induces the release of noradrenaline by sympathetic nerve fibers targeting blood vessels
- promoting cell division and leukocyte mobilization into the bloodstream
- resulting in enhanced recruitment of inflammatory cells in atherosclerotic plaques, higher levels of proteases and increased plaque fragility
- Interestingly, beta blockers (blocking noradrenaline) limit or reverse the buildup of atherosclerotic plaques

Joints:

Proinflammatory cytokines induced by stress

Adaptogenic activity: Exercise counteracts stress, Glandular therapy targeting the hypothalamus, pituitary, and adrenals