

# Dandelion

## Uses

- Rx for liver disease (e.g., liver congestion, hepatitis, jaundice)
- Rx for gallbladder disease
- Rx for appendicitis
- Rx for fluid retention (diuretic)
- Rx for appetite stimulate
- Less commonly used for mastitis, heartburn, boils, fevers, heart failure, among other uses
- Dietary supplement as a source of vitamins and minerals, including vitamin A, B, C, and D as well as minerals iron, potassium, and zinc

## Perioperative Risks

- No clinical trial to date on hemodynamic instability.
- There is no clinical trial to date, but dandelion use may include risk of bleeding secondary to decreased clotting, especially if pt already taking blood thinners.
- Potential for lyte imbalances due to diuretic effects.
- Potential increase in stomach acid.

## Worry About

- If used in combination with prescription diuretic drugs, effects of either or both drugs may be enhanced, leading to a hypovolemic state.
- Multiple minerals in dandelion may ↓ systemic absorption of PO-administered drugs (e.g., ciprofloxacin, famotidine, and esomeprazole).

- Given dandelion's ability to lower blood glucose, if used in combination with diabetic medications, there is risk for hypoglycemia.
- May worsen side effects of lithium.
- Too much vitamin A.

## Overview/Pharmacology

- Dandelion leaves and root contain quercetin, luteolin, p-hydroxyphenylacetic acid, germacranolide acids, chlorogenic acid, cichoric acid, and monocaffeoyltartaric acid. The leaves contain scopoletin, aesculetin, aesculin, cichoriin, arnidiol, and faradiol. The roots contain caffeic acid, taraxacoside, taraxasterol, and the polysaccharide inulin.
- Primary effect in relieving dyspepsia disorder is caused by taraxerol.
- Stimulates bile release by the liver and gallbladder, hence improving both bile flow (cholagogue effect) and release (cholagogue effect).
- Diuretic activity comparable to that of furosemide has been demonstrated in mice; however, because dandelion replaces potassium lost through diuresis, metabolic complications occur only rarely.
- Insulin, a polysaccharide fiber composed of long chains of fructose-containing molecules contained in the plant, may act to buffer fluctuations in blood sugar levels.

## Usual Dose

- Dosing of dandelion depends on several factors; there is no scientific data to determine a exact dosing requirement.
- Root used for general tonic and mild liver remedy up to tid.
  - Dried root: 2–8 g by infusion, or decoction
  - Fluid extract: 4–8 mL
  - Tincture, alcohol based: Not recommended secondary to high dosage required
  - Juice of fresh root: 4–8 mL
  - Powdered solid extract: 250–500 mg
- Leaf preparations used for diuretic effects tid.
  - Dried leaf by infusion: 4–10 g
  - Fluid extract: 4–10 mL

## Toxicity

- Generally considered one of the safest medicinal plants used.
- Potential for allergic reaction when taken by mouth or applied to skin of sensitive pts.
- May be potentially toxic because of the high content of K, Mg, and other minerals, and vitamin A.

## Assessment Points

System	Effect	Assessment by Hx	PE	Test
CV	Hypovolemia	Orthostasis, polyurea, polydipsia	Decreased skin turgor, hypotension, tachycardia, orthostasis	Orthostatic BP, HR
GI	Increased gastric secretion	Diarrhea		
RENAL	Prerenal failure	Polyurea, polydipsia	As for CV	BUN/Cr
METAB	Hypoglycemia	Lightheaded, clammy, shaky	Sweaty	Blood glucose

**Key References:** Murray MT, Pizzorno Jr JE: *Taraxacum officinale* (dandelion). In Pizzorno Jr JE, Murray MT, editors: *Textbook of natural medicine*, ed 2, London, 1999, Churchill Livingstone, pp 979–982; Jellin JM, Gregory PJ, Batz F, et al (eds): *Dandelion. Natural medicines: pharmacist's letter/prescriber's letter natural medicines comprehensive database*, ed 13, Stockton, CA, 2012, Therapeutic Research Faculty, pp 511–512.

## Perioperative Implications

### Preoperative Concerns

- Unknown effects in pediatric and pregnant pts.
- Rely on pt self-report. ASA guidelines hold all herbal products 2–3 d prior to surgery, as half-lives of these products are unknown.
- Due to increased stomach acid production, antacids may not work as well.

### Monitoring

- Routine.
- May require fluid bolus if there is an indication of hypovolemia and UO.
- Consider intraoperative blood glucose monitoring as indicated.

### Regional Anesthesia

- Not clear but can potentially affect platelet function and increased bleeding risk.

### Emergence/Extubation

- No known complications to date.

### Postoperative Period

- Continue to assess volume status and treat accordingly.
- Potentially increased bleeding.
- Continue to monitor blood glucose in pts on diabetic medications.

# Dehydroepiandrosterone

Alan David Kaye | Burton D. Beakley | Ethan Phan | Rachel J. Kaye

## Uses

- Proposed uses DHEA with insufficient evidence:
  - Vasodilation, anti-inflammatory, antiatherosclerotic, antiaging
  - Physical performance: Increase muscle mass, strength, and energy
  - SLE, multiple sclerosis, osteoporosis, adrenal insufficiency, Crohn disease, COPD
  - Alzheimer disease, Parkinson disease, fibromyalgia
  - Depression, schizophrenia, chronic fatigue, anorexia nervosa, sleep disorders
  - CV disease, diabetes, obesity, metabolic syndrome
  - Improve menopausal symptoms, bone mineral density, and vaginal atrophy
  - Improve erectile dysfunction in men; cervical dysplasia, trichia pubis, sexual dysfunction, and well-being in healthy women

## Risk

- May cause hirsutism, acne, headache, insomnia, wt gain, alopecia, deepening of voice, and abnormal menses in women, or gynecomastia in men.
- Cardiac arrhythmias occur rarely, even with large doses.
- May worsen liver diseases and polycystic ovary syndrome and lower HDL levels. (It also decreases total cholesterol, LDL, and triglycerides.)
- Associated with cases of mania and palpitations.
- Diabetics may be prone to hyperglycemia.
- Unknown coagulation and vasoconstriction/dilation effects.
- Use contraindicated in pregnancy, endometriosis, leiomyoma; breast, ovarian, uterine, and prostate cancers.
- Possibly unsafe with more side effects if used long term and in larger doses (higher than 50–100 mg/d).

## Perioperative Risks

- Single case report associated DHEA with cardiac arrhythmias and immune suppression.
- High DHEA levels can be associated with insulin resistance.
- Unknown effects on periop stress response, adrenal, and cardiac function.

## Overview/Pharmacology

- DHEA is naturally produced by the adrenal gland and converted to other forms of androgens and estrogens in the liver and peripheral tissues.
- FDA categorized DHEA as an unapproved drug in 1985; reclassified as a dietary supplement by 1994.
- Popularized after a *New England Journal of Medicine* report that high levels correlated with fewer cardiac

- events (Rancho-Bernardo study); later found to be untrue in a larger Rancho-Bernardo study.
- Banned by athletic agencies such as the NCAA, the NFL, and the Olympics.
- Marketed as a dietary supplement because it can be manufactured from natural sources, such as soy and wild yam. However, many of these products, depending on source and metabolism, are not converted into DHEA in humans and are not recommended or preferable.
- No data indicate benefits greater than long-term risk.
- Endogenous production in liver, adrenal gland, testes, and brain in minute quantities.
- Hepatic metabolism, urinary excretion with a 12-h half-life.
- Steroid hormone produced by adrenals, interconverted to testosterone, estrone, estradiol, androsterone.

- Considered a prohormone, so effects similar to those of anabolic steroids.
- May increase protein synthesis in skeletal muscles. However, increase of serum testosterone or enhancement of strength during resistance training is controversial. A placebo-controlled, randomized clinical trial reported in the *New England Journal of Medicine* in 2006 found that supplementation in the elderly had no significant beneficial effects on body composition, physical performance, insulin sensitivity, or quality of life.
- Decreasing serum cortisol levels may cause early activation of the anterior cingulate cortex (ACC) secondary to neuronal recruitment of the steroid sensitive ACC that may be involved in pre-hippocampal memory processing, thereby improving memory.

- DHEA levels decrease with CHF, oxidative stress, aging, and cancer.
- May have apoptotic effects in some cancer lines but is also shown to stimulate hormone-producing tumors.

**Usual Dose**

- 30–90 mg/d for depression, memory improvement, or cognition (two studies)
- 50–100 mg daily for 3–24 mo for possible improvements in well-being, cognitive function, body compositions
- 20-50 mg PO daily for adrenal insufficiency
- Vaginal: 10% cream; apply topically daily

Assessment Points				
System	Effect	Hx Assessment	PE	Test
HEENT	Hirsutism			
CV	Anabolic steroids associated with sudden cardiac arrest, Htn; DHEA rarely causes arrhythmias	Determine chronic and acute dose and duration of self-administration; palpitations	HR	Preop ECG for chronic or excessive use, may show ventricular hypertrophy
GI	Anabolic steroids assoc with hepatitis, cholestatic jaundice			
HEME	Inhibits plt aggregation in vivo Antiglucocorticoid actions		Ecchymoses	Bleeding time, preop glucose for diabetics
DERM	Increased acneiform dermatitis			
GU	Hypogonadism with anabolic steroids, prostate tumor growth	Prostate exam		PSA
CNS	Anabolic steroids may cause aggressiveness; DHEA binds to NMDA, sigma, GABA receptors	Increased pituitary tumor growth		ACTH

**Key References:** Nair KS, Rizza RA, O'Brien P, et al.: DHEA in elderly women and DHEA or testosterone in elderly men, *N Engl J Med* 355(16):1647–1659, 2006; Labrie F, Archer D, Bouchard C, et al.: Intravaginal dehydroepiandrosterone (Prasterone), a physiological and highly efficient treatment of vaginal atrophy, *Menopause* 16(5):907–922, 2009.

**Perioperative Implications**

**Preoperative Concerns**

- Insulin resistance; check preop glucose.
- Synergism with corticosteroids.

**Induction/Maintenance**

- Unknown effects of inhibition of steroid synthesis if combined with etomidate or immunosuppressives for transplantation.

**Postoperative Concerns**

- Unknown effects on stress response

**Anticipated Problems/Concerns**

- Unpredictable CV effects

**Echinacea** (American Coneflower, Purple Coneflower, *E. Angustifolia*,

*E. Purpurea*, *E. Pallida*)

Kirk Lalwani

**Uses**

- Purported immunostimulation and prevention and treatment of respiratory tract infections.
- Adjuvant in the treatment of other bacterial, viral, or fungal infections of the urinary and respiratory tract.
- Anti-inflammatory when used topically for conditions such as eczema, psoriasis, and herpes simplex.
- Promotes wound healing when used topically (i.e., in leg ulcers and burns).
- Adjuvant for cancer therapy and in the treatment of chronic fatigue syndrome.

**Perioperative Risks**

- No known drug interactions or toxicities
- No known sedative, CV, or coagulation effects relevant to anesthesia

**Worry About**

- Immunostimulation may counteract the effect of steroids and immunosuppressant drugs in transplant recipients and pts with autoimmune disease.

**Overview**

- Most common side effects are GI symptoms, allergic reactions, and rashes.
- Allergic reactions are more common in atopic individuals and individuals with a Hx of sensitivity to the Asteraceae-Compositae family of plants (e.g., ragweed, chrysanthemums, marigolds, daisies) and can be serious.
- Echinacea may exacerbate autoimmune diseases such as MS, SLE, rheumatoid arthritis, AIDS, tuberculosis, and pemphigus vulgaris.
- Echinacea may inhibit cytochrome P450 (CYP 1A2, 3A4) enzymes, altering levels of drugs metabolized by these enzymes.
- Tachyphylaxis may occur with prolonged, uninterrupted use.

**Drug Class/Mechanism of Action/Usual Dose**

- Increases phagocytosis and lymphocyte activity, possibly by release of TNE, IL-1, and interferon.

- Anti-inflammatory activity by inhibition of cyclooxygenase and 5-lipogenase.
- Promotes wound healing by protecting type 3 collagen from free radical damage and inhibiting bacterial hyaluronidase.
- Concentration of active ingredients varies widely according to species and preparation used.
  - 1–3 mL of the fluid extract or cold-pressed juice of plant (or root) 3 times daily.
  - 1 g of powdered root 3 times daily (capsules, tablets)
- Echinacea appears to modestly inhibit cytochrome P450 1A2 (CYP1A2), and to induce hepatic cytochrome P450 3A4 (CYP3A4), but inhibit intestinal CYP3A4 (opposing effects).