

Hydroxysomes[®] Adenosine



novel adenosine delivery system for hair growth

Actera

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Adenosine is a cosmetic active which significantly improves hair density and thickness when applied to the scalp. Pure adenosine has known dermal penetration challenges which can impede efficacy. To overcome this and achieve superior results, adenosine is delivered inside microscopic calcium particles that penetrate into deeper layers of the scalp.

INCI: Adenosine (and) Hydroxyapatite

Applications

- Hair products designed to achieve thicker, fuller hair and reverse the effects of male or female pattern hair loss
- Recommended forms: serums, lotions, sprays, gel-creams, masks

Key Benefits

- Thickens the hair shaft and increases overall hair density
- Extends the anagen (growth) phase of the hair growth cycle
- Clinically proven to improve thinning caused by male and female pattern hair loss (androgenetic alopecia)
- Gentler on the scalp than Minoxidil with less reported adverse effects

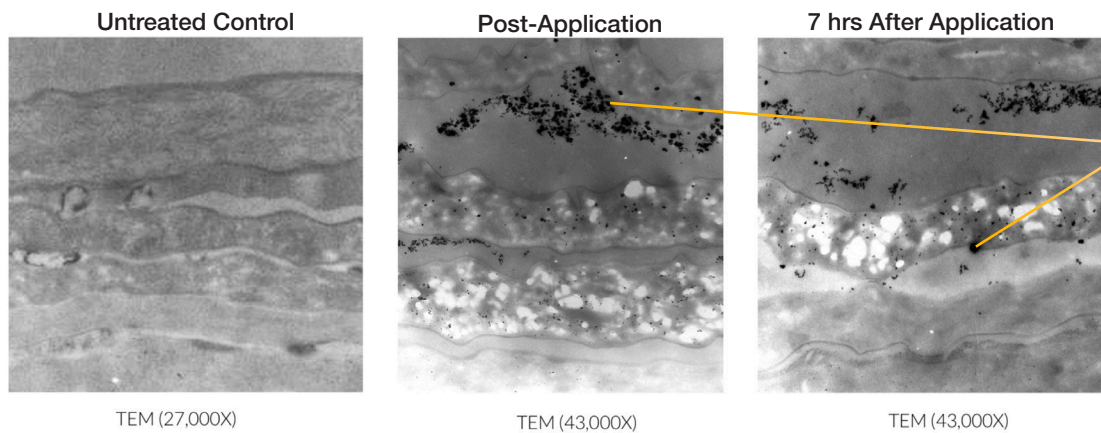
Guidelines

- Suggested use level: minimum 1.5% for best efficacy
- Add below 40°C in formulas at or above pH 5.5. Disperse solids into any system. Mix until homogenous.

Bioactive Rationale

Active ingredient delivery via calcium microparticles allows adenosine to penetrate into deeper layers of the skin. The skin's naturally acidic pH bio-erodes the microparticles, releasing active adenosine for a continuous, long lasting effect. This process simultaneously releases calcium nutrients to the scalp which help rebalance and strengthen the skin barrier.

Adenosine has been shown to stimulate the expression of fibroblast growth factor-7 (FGF-7) and keratinocyte growth factor (KGF) in cultured human dermal papilla cells.¹ These elements support an environment for growing longer, thicker hairs. Scalp treatment with adenosine helps increase the number of hair follicles that are in the growth period of the hair growth cycle, known as the anagen phase. It also inhibits the activation of the transition phase (catagen phase) where hair growth stops prior to resting and eventually falling.² The ratio of thick hairs to thin hairs is also significantly increased as more follicles produce thicker hairs and less produce thin or vellus hair.³ Vellus hair is the fine, light, short hair that is known to increase in cases of hair thinning or baldness where a global loss in longer, thicker terminal hair is observed. The above factors work synergistically to improve overall hair density and thickness, significantly improving the effects of hair thinning and hair loss in men and women.

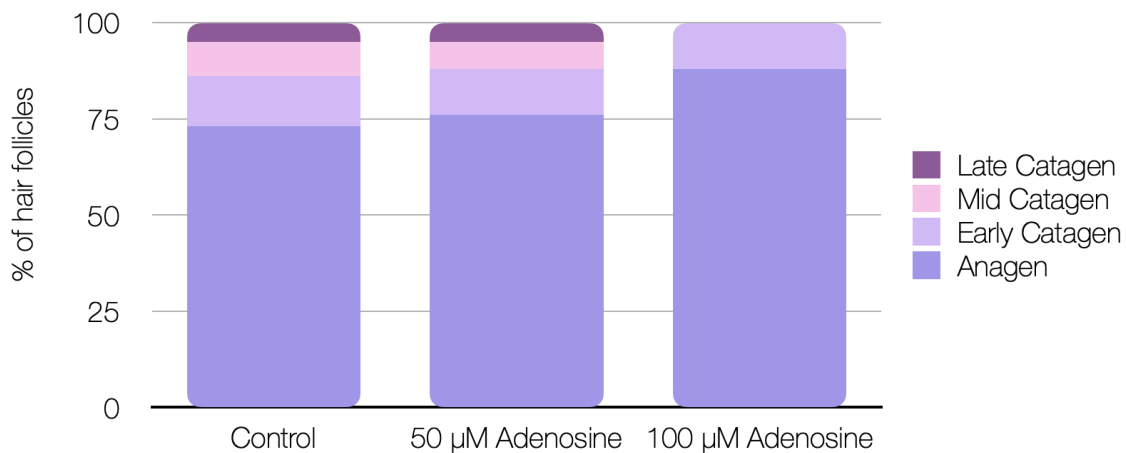


Clinical Results

Adenosine is clinically proven to increase hair thickness and density. Validated by dermatologist assessment and subject self-perception.

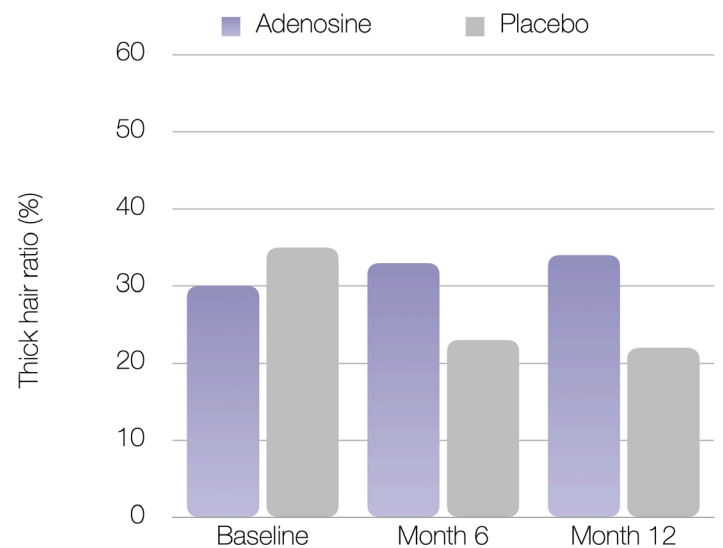
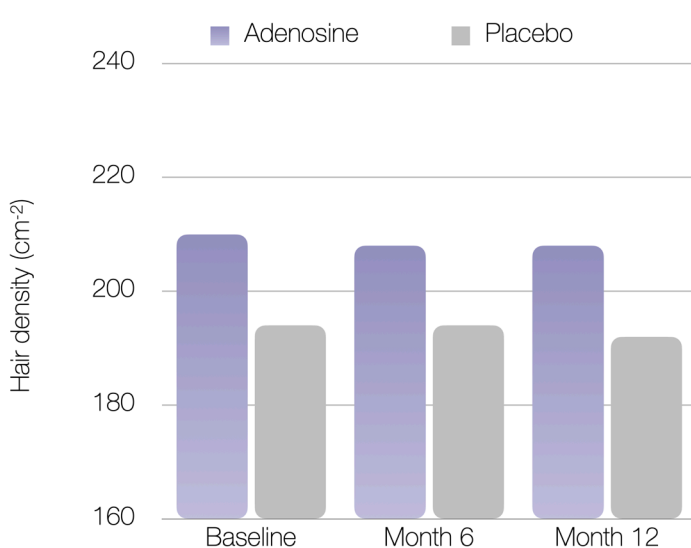
Topical adenosine increases the ratio of hairs that are actively growing.

In an in-vitro study on isolated human hair follicles, adenosine was shown to extend the anagen (growth) phase of the hair cycle and block the effects of catagen-inducing growth factors within 6 days.²



Adenosine improves the thick-to-thin hair ratio in both men and women.

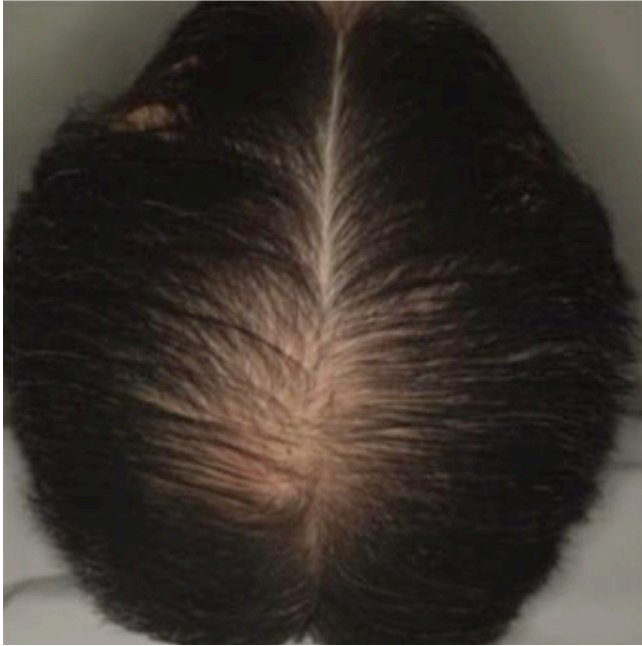
In a double blind, placebo-controlled clinical study on 30 adult women affected by female pattern hair loss, adenosine was proven to significantly increase the thick-to-thin hair ratio. The adenosine user group reported a strong positive favor for the treatment product and no adverse effects were observed.^{3,4}



Adenosine treatment improves global hair thinning.

A double-blind, randomized clinical study on 102 adult men with male pattern hair loss showed a significant improvement in global thinning as determined by clinical dermatologist grading. The treatment product was superior to placebo formula in all parameters including percentage of thick hairs and perception of hair thickness by participants' self-assessment. No causative adverse effects were reported.⁴

Baseline



Month 6



In all clinical studies, adenosine samples were reported to have no or very few adverse effects compared to Minoxidil which commonly causes contact dermatitis and irritation on the scalp and along the hairline.

References

1. Iino M, Ehama R, Nakazawa Y et al. Adenosine stimulates fibroblast growth factor-7 gene expression via adenosine A2b receptor signaling in dermal papilla cells. *J Invest Dermatol* 2007; 127: 1318–1325.
2. Lisztes E, Tóth BI, Bertolini M, Szabó IL, Zákány N, Oláh A, Szöllösi AG, Paus R, Biró T. Adenosine Promotes Human Hair Growth and Inhibits Catagen Transition In Vitro: Role of the Outer Root Sheath Keratinocytes. *J Invest Dermatol*. 2020 May;140(5):1085-1088.
3. Oura H, Iino M, Nakazawa Y, Tajima M, Ideta R, Nakaya Y, et al. Adenosine increases anagen hair growth and thick hairs in Japanese women with female pattern hair loss: a pilot, double-blind, randomized, placebo-controlled trial. *J Dermatol*. 2008; 35(12):763–7.
4. Watanabe Y, Nagashima T, Hanzawa N, Ishino A, Nakazawa Y, Ogo M, et al. Topical adenosine increases thick hair ratio in Japanese men with androgenetic alopecia. *Int J Cosmet Sci*. 2015; 37(6):579–87.

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66 Walker Lane • Newtown, PA 18940 • USA
+1 (215) 525-4564
acteraingredients.com