



Self-medication in women with androgenetic alopecia

Pharmacy practice and scientific evidence

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Abstract: Androgenetic alopecia causes hair thinning in the vertex region, which may significantly impair quality of life. A survey of 2,579 pharmacy employees highlights the importance of self-medication for affected women. Nutritional supplements containing amino acids and vitamins demonstrate favourable study results in vitro and in vivo.

Unexplained hair loss: an issue for self-medication

Pharmacies are often the first point of contact for patients experiencing excessive hair loss. The aim of affected individuals is to prevent further thinning of their scalp hair and to optimally stimulate hair regrowth [1]. Recommending an effective preparation, along with providing advice regarding its use, expected side effects and duration of treatment, is essential for long-term adherence, which is necessary for an effective therapy. This is particularly relevant for forms of hair loss that are permanent rather than temporary, such as androgenetic alopecia (AGA).

A survey [2] highlights the importance of counselling for patients with AGA, who are engaging in self-medication. A total of 2,579 pharmacy employees participated in the survey, with 2,559 completing it (1,292 pharmacists, 1,091 pharmacy technicians, 94 pharmaceutical-commercial employees, 102 others).

Approximately half of the respondents (45.5%) reported that their pharmacy receives enquiries about a treatment option for excessive hair loss more than once a month to several times a week. According to the survey, affected women are on average over 40 years of age (36.9%) or, more specifically, aged 50 to 70 years (38.7%). Only a few (1.2%) were older. A smaller proportion (23.3%) reported that the affected women were younger than 40 years of age.

A lot of patients (85.9%) expressed a wish for advice regarding self-medication. According to the assessment of the participants, many patients had been made aware of a specific product through the media (49.9%), while many want to repurchase a tried and tested product (23.6%) or

are dissatisfied and want to try a new product (18.1%). Only a small proportion (14.1%) reported that many patients are already receiving medical treatment and are seeking a supportive therapy from the pharmacy.

Most respondents (80.7%) typically recommend a product and advise consulting a doctor if hair loss does not improve within three months. A smaller proportion recommends a product only in cases of very mild hair loss (11.1%) or always advises the patients to consult a doctor because it is possible that laboratory tests are needed (8.1%).

These figures are also reflected in the reported level of knowledge among the surveyed pharmacy staff. 40.8% of the participants reported that they are able to differentiate between the various causes of hair loss, while 28.7% stated that they could not and 30.7% did not provide a definitive response. 36.5% were aware of the evidence supporting the treatment, 28.3% were not aware of any scientific studies and 35.0% did not respond to the question. 8.0% stated that they were unfamiliar with hair loss and therefore recommended a consultation with a doctor.

The following causes were correctly attributed to AGA by the respondents (multiple responses were permitted): hormonal changes (81.6%), hereditary predisposition (75.8%), older age (39.9%). The following causes were incorrectly attributed to AGA: stress (43.1%), autoimmune reactions (30.9%), unbalanced diet (19.4%), drastic weight loss (13.3%), incorrect hair care (9.4%).

The selection of a preparation takes into account the expected efficacy, the tolerability, the cost and patient preference [1].



Fig. 1. Stages of female hair loss in androgenetic alopecia (Ludwig Scale), (modified according to [7])

A total of 46.3% of the respondents stated that scientific research on causes and treatment helps them personally in their counselling [2].

Androgenetic alopecia, the most common diagnosis for hair loss

AGA is the most common diagnosis for hair loss, although, in absolute terms, women are affected less severely than and only half as frequently as men. In younger Caucasian women under 30 years of age, studies report prevalence rates of 3–6%, increasing to 29–42% in older women aged over 70 [1]. A characteristic feature is a progressive thinning of the hair in the vertex region, which may significantly impair quality of life (**Fig. 1**). Hair density at the back of the head typically remains unchanged. Treatment options include topical and systemic pharmacological interventions as well as surgical measures. In women, the guideline's positive recommendations are limited to the use of topical minoxidil and, to a much lesser extent, hormonal anti-androgen therapy – although the latter is restricted to cases with correspondingly elevated androgen levels. With regard to hair transplantation and other therapies categorised as “miscellaneous”, people tend to be cautious, although individual studies report good outcomes with specific nutrient supplementation, some of which are supported by high levels of evidence [1, 4].

Insufficient supply to the hair follicle as a cause of hair loss

The hair cycle comprises three phases: in the anagen phase, hair grows continuously over a period of several years. The catagen phase (2–4 weeks) is a transitional stage, during which the hair follicle (**Fig. 2**) shrinks and the hair is severed from its nutrient supply. In the telogen phase (3–4 months), the hair becomes less firmly attached and may shed. The hair follicle then regenerates, initiating a new anagen phase. In AGA, terminal scalp hair follicles transform into intermediate or miniaturised follicles [3].

The hair cycle is influenced by growth factors, hormones and nutrients. Micronutrients, such as vitamins and trace elements, are among the treatment options, although their exact mode of action remains unclear. An *ex vivo* study examined isolated hair follicles from 13 patients with AGA and six healthy volunteers with regard to the density of the supplying blood vessels, the levels of certain factors such as vascular endothelial growth factor (VEGF), the nutrient supply to the hair follicles and their metabolic activity. The

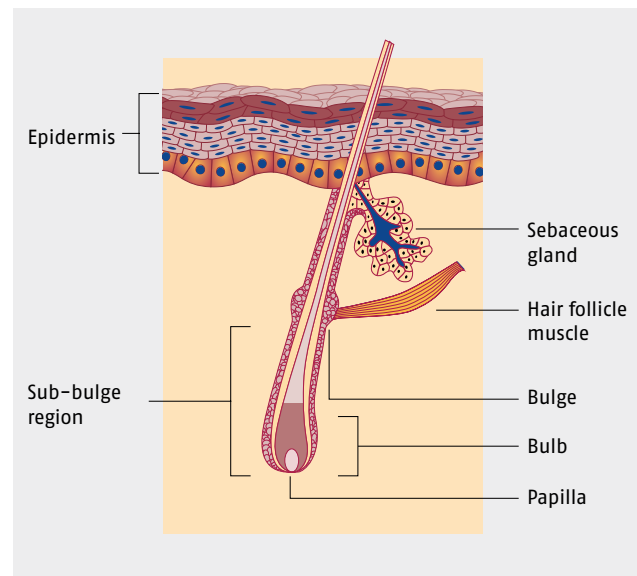


Fig. 2. Hair follicle (schematic)

hair follicles were obtained from the vertex region (parietal), the predilection site for AGA in women, and from the area at the back of the head (occipital).

Results relating to blood supply

In patients with AGA, vascular endothelial growth factor (VEGF) concentrations are significantly reduced across all regions of intermediate/miniaturised hair follicles (**Fig. 3**). Interestingly, the study authors had also already observed a reduced perifollicular vascularisation in the terminal parietal hair follicles compared to the occipital hair follicles.

Results relating to nutrient supply

The relative abundance of nutrients and metabolites differed between terminal and intermediate hair follicles in patients with AGA, suggesting a nutrient deficiency. For example, levels of pantothenic acid (vitamin B5), L-tryptophan, L-carnitine and L-valine were decreased in the intermediate hair follicles of the patients compared to terminal follicles at both extraction sites. In contrast, L-cystine and L-alanine were decreased only in the hair follicles of the parietal region. *Ex vivo*, the intrafollicular nutrient supply could be increased by supplementing extracted intermediate hair follicles with compounds such as L-cystine, pantothenic acid and biotin, suggesting that these hair follicles retain the capacity to absorb nutrients and that deficiencies are therefore correctable.

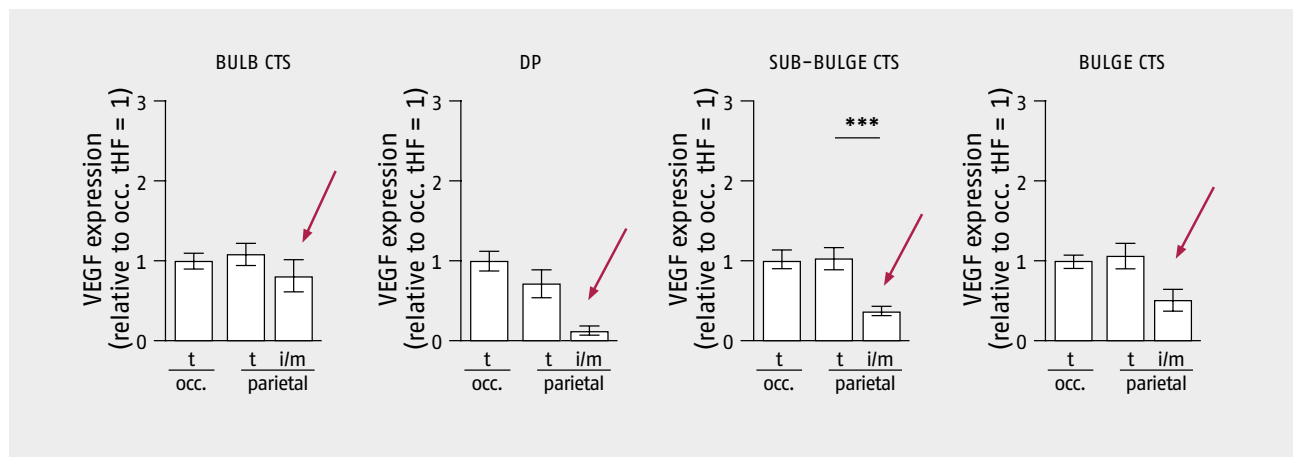


Fig. 3. Intermediate (i/m) hair follicles from the vertex region (parietal) of patients with androgenetic alopecia (AGA), or here female pattern hair loss (FPHL), exhibit lower VEGF concentrations in all four follicular zones compared with terminal (t) follicles. BULB: bulb region; BULGE: bulge region; CTS: connective tissue sheath; DP: dermal papilla; occ.: occipital; tHF: terminal hair follicle; *** $p < 0.001$ (modified from [3])

Results relating to metabolic activity

The results indicate that the intermediate hair follicles of patients exhibit reduced glycolysis and glutaminolysis, reflecting a resting metabolic profile of intermediate hair follicles compared to terminal hair follicles, although apparently without any impairment in the capacity to absorb nutrients.

Clinical evidence of Priorin®

In clinical practice, hair growth is assessed individually, whereas in clinical studies it is based on objective measures such as hair count, hair density assessments and standardised photographs [4, 5]. A placebo-controlled, randomised, double-blind study [5] employed a phototrichogram to monitor hair growth. This non-invasive procedure was conducted at baseline and again at three and six months

respectively. Hair was shaved off to a length of 1 mm from a circular area of scalp measuring 1.5 cm in diameter and the number of hairs counted with the aid of a digital phototrichogram. Three days after shaving the test area, the anagen hairs could be identified by means of their active growth. The ratio of anagen hairs (AH) to total hairs was defined as the anagen hair ratio.

The study product, Priorin® capsules, contains millet extract, L-cystine and calcium pantothenate. Millet contains miliacin, fatty acids, silica, minerals, amino acids and the B vitamins B1, B6 as well as niacinamide. The active formulation ($n = 21$) and placebo ($n = 20$) were administered at standard doses for six months. After just three months, the active formulation group demonstrated a significant advantage (active formulation: $87.01 \pm 6.26\%$ AH, placebo: $82.85 \pm 6.5\%$ AH; $p = 0.0191$), which was even more pronounced after six months (active formulation: $87.58 \pm 6.5\%$ AH, placebo: $82.96 \pm 6.58\%$ AH; $p = 0.0225$) (Fig. 4).

Summary

An early diagnosis of AGA and prompt initiation of treatment are important, as current therapies primarily prevent hair loss and follicular miniaturisation rather than promoting the regrowth of lost hair [3].

Nutrient supplementation increased the intrafollicular concentration of selected nutrients in isolated hair roots [3]. This indicates that the uptake mechanisms of hair follicles are not impaired and that supplementation with nutrients such as amino acids (e.g. L-cystine) or vitamins (e.g. pantothenic acid) may be beneficial in women with AGA.

Previous findings from a controlled clinical trial confirmed that a fixed nutrient combination can produce a statistically significant clinical increase in the anagen hair rate in women with AGA. The study product was Priorin® capsules, a dietary supplement for special medical purposes, the benefits of which are supported by scientific evidence. In an observational study, 75% of patients (104 of 139) rated

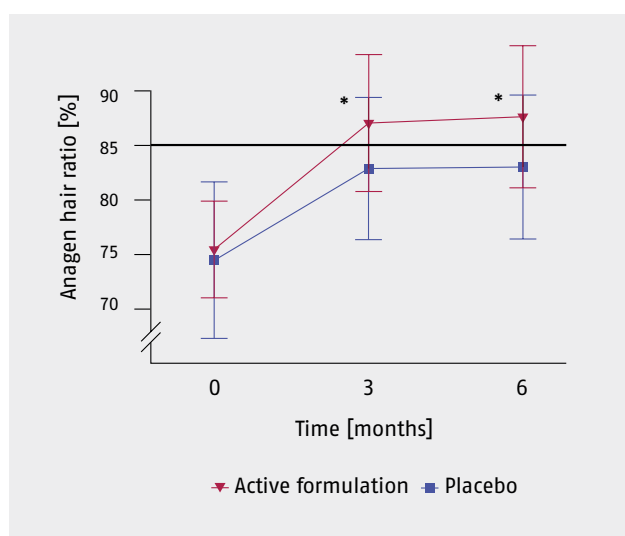


Fig. 4. Progression of the anagen hair ratio in patients with androgenetic alopecia following treatment. The combination of millet extract, calcium pantothenate and L-cystine restored the anagen hair rate to the normal range within three months. The investigations commenced in late autumn and concluded in summer. * $p < 0.05$ vs placebo [5]

the preparation positively and it was shown to be very well tolerated [6].

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