

Banjiro extract promotes hair growth

Many people feel that as they get older, their hair becomes finer and the area of the parting in the hair, and also of the forehead, becomes wider. As the prevalence of alopecia is increased by ageing, it should be natural to assume that the number of the people with alopecia will increase, due largely to a rapidly ageing global population.

Alopecia had, for a long time, been regarded as a problem largely affecting only older males, however, it is now seen as an issue for both men and women, which has been attributed to factors such as today's society of "stress" and also too much hair care treatment. Alopecia is also affecting younger people and it is not unusual today for cases to be seen in people who are in their 20s to 30s.

Although alopecia has no physical health implications beyond the loss of hair, the condition causes much worry and sufferers can encounter resulting problems in their day-to-day lives. So we should say that our hair is a very important part of our lives.

Hair is very delicate and sensitive and it is always reacting sensitively to "stresses" from our daily lives. During a normal hair care routine it is not easy to recognise the emergence of alopecia as it usually takes rather long time to be able to see the clear evidence. But we have to care about and deal with the symptoms like we do for the common cold, by taking a good rest and ensuring balanced nutrition.

For alopecia, many kinds of plants have been utilised for many hundreds of years in the world of Chinese medical treatment and Chinese herb treatment, and so it is well understood that healthy hair has been a major concern of human beings throughout history. And since plant extraction is a very natural process and seen as conducive to good health, many kinds of plant extracts are formulated for the latest hair growth promoters.

Fuji Sangyo has researched and developed many kinds of monomers and

ABSTRACT

Banjiro is commonly called guava. Guavas are cultivated for food in tropical countries and the fruit can be eaten raw or cooked and is often used in desserts. Its fruit, leaves, and roots are used as folk medicines for treating diabetes mellitus and for relieving diarrhoea.

The leaves contain polyphenol, which acts to reduce glucose absorption, has an antiallergic effect, and is used to make a healthy tea in Japan.

We discovered that guava leaf extract obtained by a special extraction method has growth effects for hair follicle cells and dermal papilla cell and antiandrogen effects.

We also determined that the guava leaf extract had a positive effect on hair growth in a human clinical study ($n=16$).

plants by extracting by ourselves for hair growth actives, and we have already developed and commercialised "Fuji Mulberry Root Extract" and "Fuji Banjiro Leaf Extract" which are enjoying good success.

Following the examination of the experimental and clinical hair growth efficacy of these products, we would like to introduce the very interesting test results here.

Anti-testosterone efficacy

Testosterone, the male hormone produced in the testes and the adrenal gland, is transported to the dermal papilla through the bloodstream and is transferred into dermal papilla cells. Transferred testosterone is reduced to dihydrotestosterone (DHT) by an enzyme called alpha reductase in the cells. DHT binds to a receptor in the cytoplasm

and forms a complex, moving into the nucleus and acting as a transcription factor. Thus, it recognises and binds to the DHT-specific DNA sequence (DHT-responsive element) and regulates transcription of the target gene.

As a result, the secretion of factors promoting the growth of dermal papilla cells, hair matrix cells, and hair follicle cells is inhibited, or the secretion of factors inhibiting the growth of these cells is promoted, leading to hair loss.

Methods

SC-3 cells were moved to a serum-free medium containing DHT and cultured, followed by cell growth evaluation by the thiazolyl blue tetrazolium bromide (MTT) method. The cells were also cultured in a serum-free medium not containing DHT to evaluate cytotoxicity.

SC-3 cells show marked androgen-



Figure 1: Dried guava leaves.

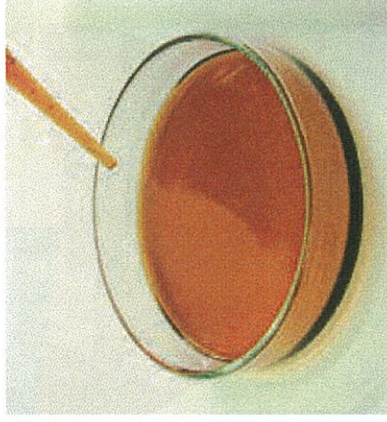


Figure 2: Fuji Banjiro Leaf Extract.

dependent growth, and the androgen-associated proliferative effect is reported to occur via the androgen receptor. In other words, SC-3 cell growth is inhibited when an agent with an androgen receptor inhibitory effect is added to the medium, and the androgen receptor inhibitory effect can be evaluated by measuring the growth rate.

Results

The antiandrogen effect of the banjiro leaf extract (50% ethanol eluted fraction) was 44.5% at 1 µg/mL. The cell viability was 110%. So, since the banjiro leaf extract was contained in up to 90% ethanol eluted fraction, the 50% ethanol eluted fraction has the antiandrogen effect.

Proliferative efficacy of hair follicle cells

Hair follicle cells (outer root sheath cells) are cells formed by differentiation of hair matrix cells at the upper dermal papilla. They become hair and grow by division, growth, and keratinisation. The growth of hair matrix cells and hair follicle cells decreases with the effects of the testosterone, stress, and nutrition disorders.

If their growth decreases, the hair growth rate declines and hair becomes thinner, resulting in the development and progression of alopecia. The proliferative effect of the banjiro leaf extract on hair follicle cells was confirmed.

Methods

Hair follicle cells obtained from the back of a mouse were added to a medium containing sample solid compound

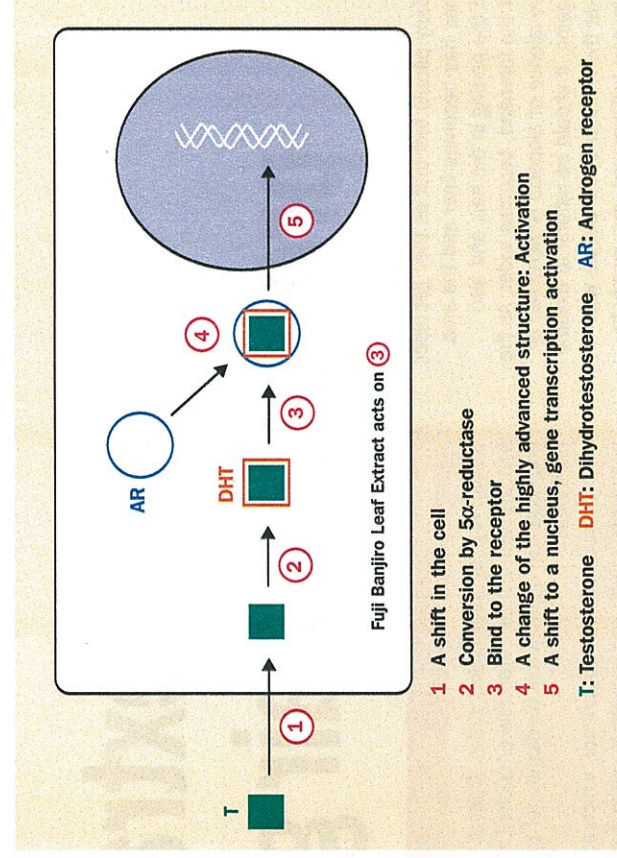


Figure 3: Mechanism of androgenic alopecia.

10 µg/mL and cultured. After culture, the cell growth was measured by MTT assay.

Results

The banjiro leaf extract promoted cell growth by 132.6% compared to the control (100%).

Proliferative efficacy of hair dermal papilla cells

The growth rate of dermal papilla cells, which constitute the dermal papilla, declines with the effect of the testosterone, and the size of the dermal papilla is decreased. This, results in thinner hair and the development and progression of alopecia. The proliferative effect of the banjiro leaf extract on dermal papilla cells was confirmed.

Methods

Human head hair dermal papilla cells were cultured in medium that was replaced every three days. After culture, the medium was changed to one containing 10 µg/mL of the sample solid compound, and the cell growth was measured by MTT assay.

Results

The banjiro leaf extract promoted cell growth by 122.1% compared to the control (100%).

Clinical efficacy of Fuji Banjiro Leaf Extract

We carried out a human clinical test on 16 people by the banjiro leaf extract.

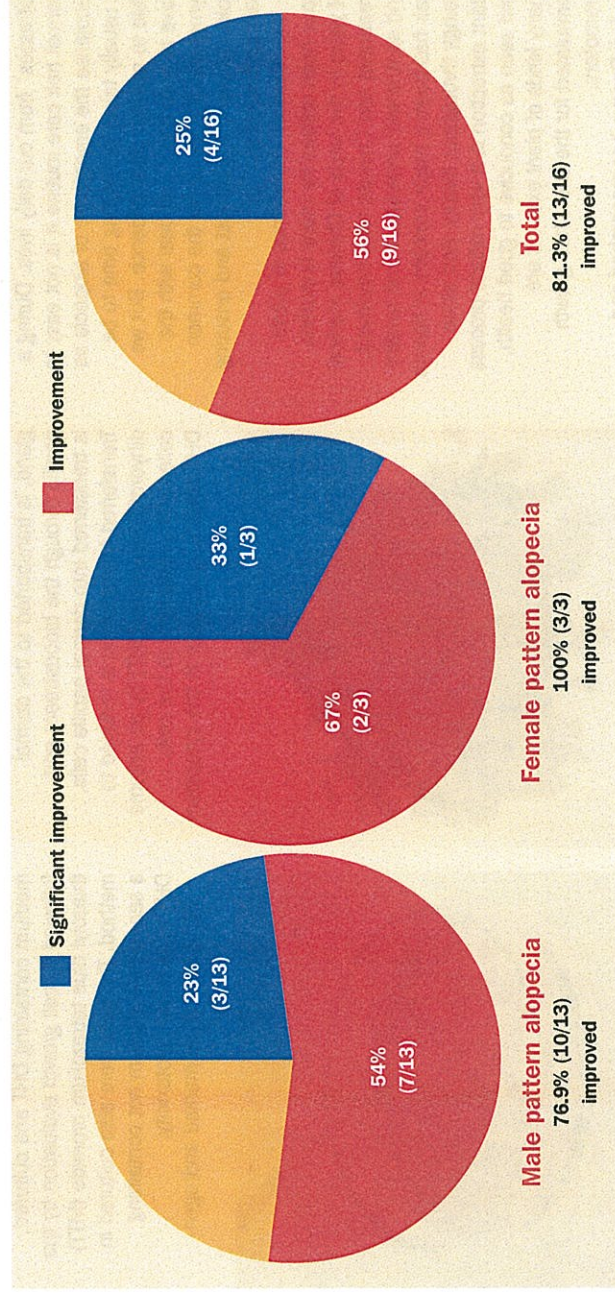


Figure 4: Result of clinical efficacy.

Methods

Hospital: Kuwana-hifuka (dermatology).
 Subject: Male and female pattern alopecia.
 Number: Male 13, female 3.
 Length: 4–10 months.
 Dose (2 mL): Twice a day.

Results

Twenty-three per cent of men display significant improvement and 54% are improved to some extent. Significant improvement is defined by more than 50% of thinning hair being improved compared with before testing.

The test results on women were better still. Thirty-three per cent are significantly improved and 67% are improved to some extent. In total, 81% are improved.

It was confirmed from this test that it effects on not only men but also women.

Conclusion

We could obtain significant and excellent results with Fuji Banjio Leaf Extract regardless of sex of the test subject. We can also confirm that Fuji Banjio Leaf Extract could be used for a final formulation of a hair growth product without any concern for the safety, with the skin patch test of 46 people (male 18, female 28). It is therefore confirmed that Fuji Banjio Leaf Extract carries a very good safety profile and excellent efficacy for a hair growth promoter.

We also have Fuji Mulberry Root Extract for hair growth promoter formulation, that is extracted by our unique original extract method. The extract is very popular and has been sold for many hair growth promoter formulations not only in Japan but also worldwide. Fuji Mulberry Root Extract has also rather good efficacy of hair growth with an unusually high number of test clinical test subjects (68 people).

The test result was clear with a hair growth improvement ratio of 60% in males (33/55) and 53.8% in females (7/13) and total improvement ratio of 58.8% (40/68). Since Fuji Mulberry Root Extract has a hair growth improvement efficacy with a high functional mechanism of hair cycle improvement, we could consider that the combination formulation of Fuji Mulberry Root Extract and Fuji Banjio Leaf Extract could make a high efficacy formulation for hair growth.

References

- 1 Kuwana R, Morioka M, Date A, Sawamura Y, Aki O, Arase S. The effect of Souhakuhi-extract on the hair cycle of New Zealand white rabbits and its topical therapy in male pattern baldness, *The Nishinohon Journal of Dermatology* 1996; 58: 619-623.
- 2 Kuwana R, Yomigaeru Kurokami, Tikuma Shuhan Sya.

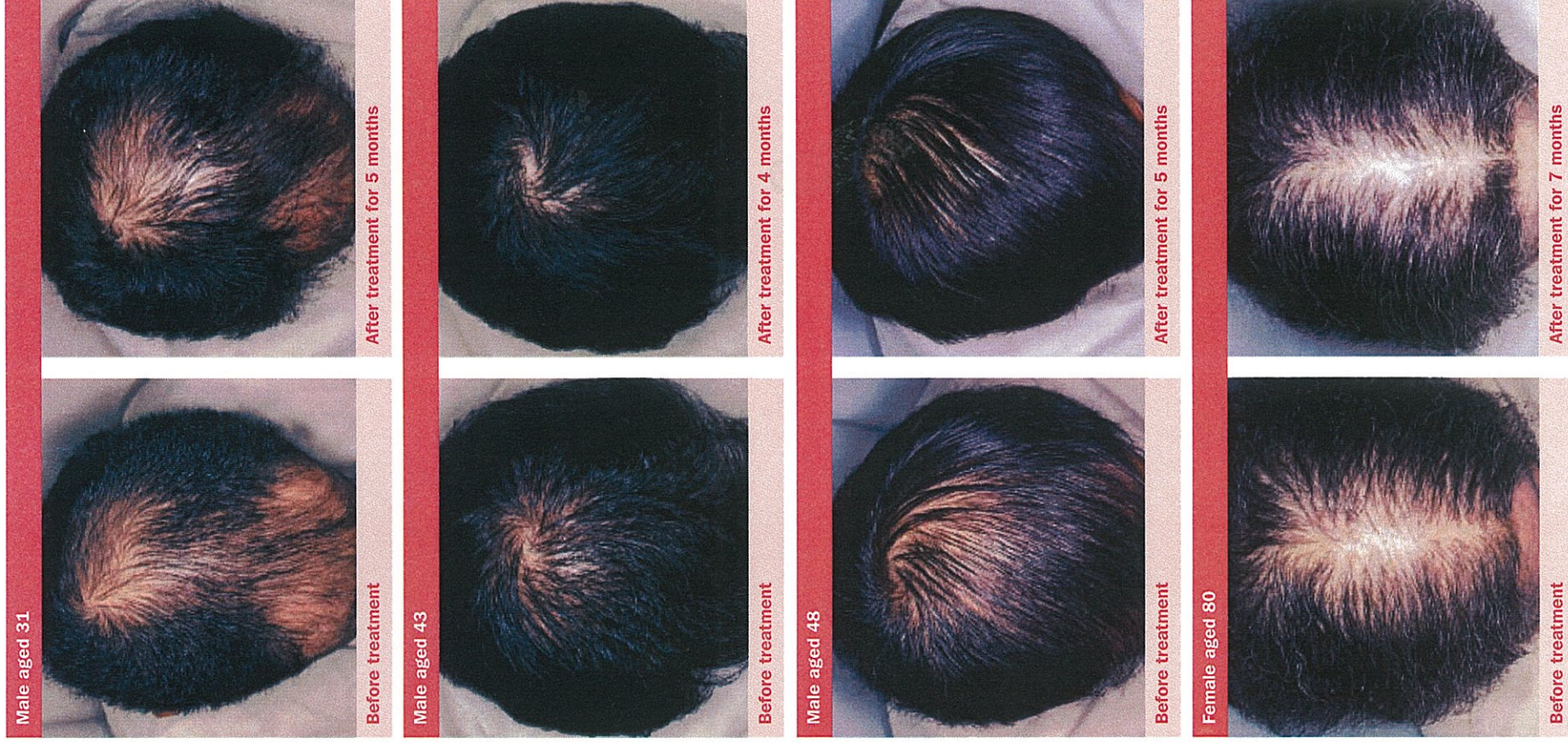


Figure 5: Prominent improvement picture.