

Who has beautiful hair?

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Derma Tronnier

Empirical evaluation of hair therapy efficacy studies

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Introduction:

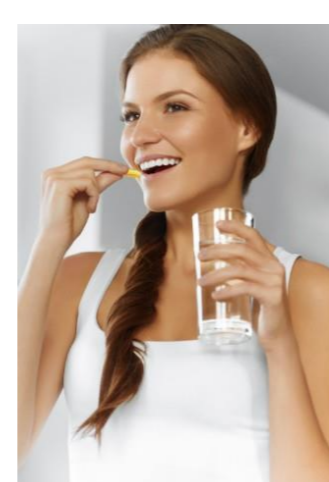
When factors that trigger diffuse hair loss occur, such as prolonged sleep deprivation or stress, a particularly large number of hairs change from the anagen phase (active growth phase) to the telogen phase (resting phase) within a short period of time. This phenomenon can be counteracted by specific natural active substances (such as polyphenols) which promote hair growth.

But which study parameters influence the effectiveness of a hair therapy product?

Thus, the aims of this correlation analysis are to figure out possible correlations between:

Improvement in hair growth

- Active ingredient
- Dosage
- Application form
- Baseline hair status
- Gender
- Intake duration



Moreover the aim of this study is to predict an optimal study design for a cosmetic hair loss treatment.

Materials & Methods:

Seven clinical hair growth studies carried out at Eurofins Derma Tronnier between 2007 and 2018 have been evaluated statistically. Here, the TrichoScale®/TrichoScan® method has been used. In the definition of this method a telogen hair is a hair that has not grown in the three days after hair clipping, whereas an anagen hair is a hair that has grown three days after hair clipping. This is a validated and non-invasive tool for quantifying hair loss/hair growth in vivo and to objectively quantify the effectiveness of a hair loss treatment.

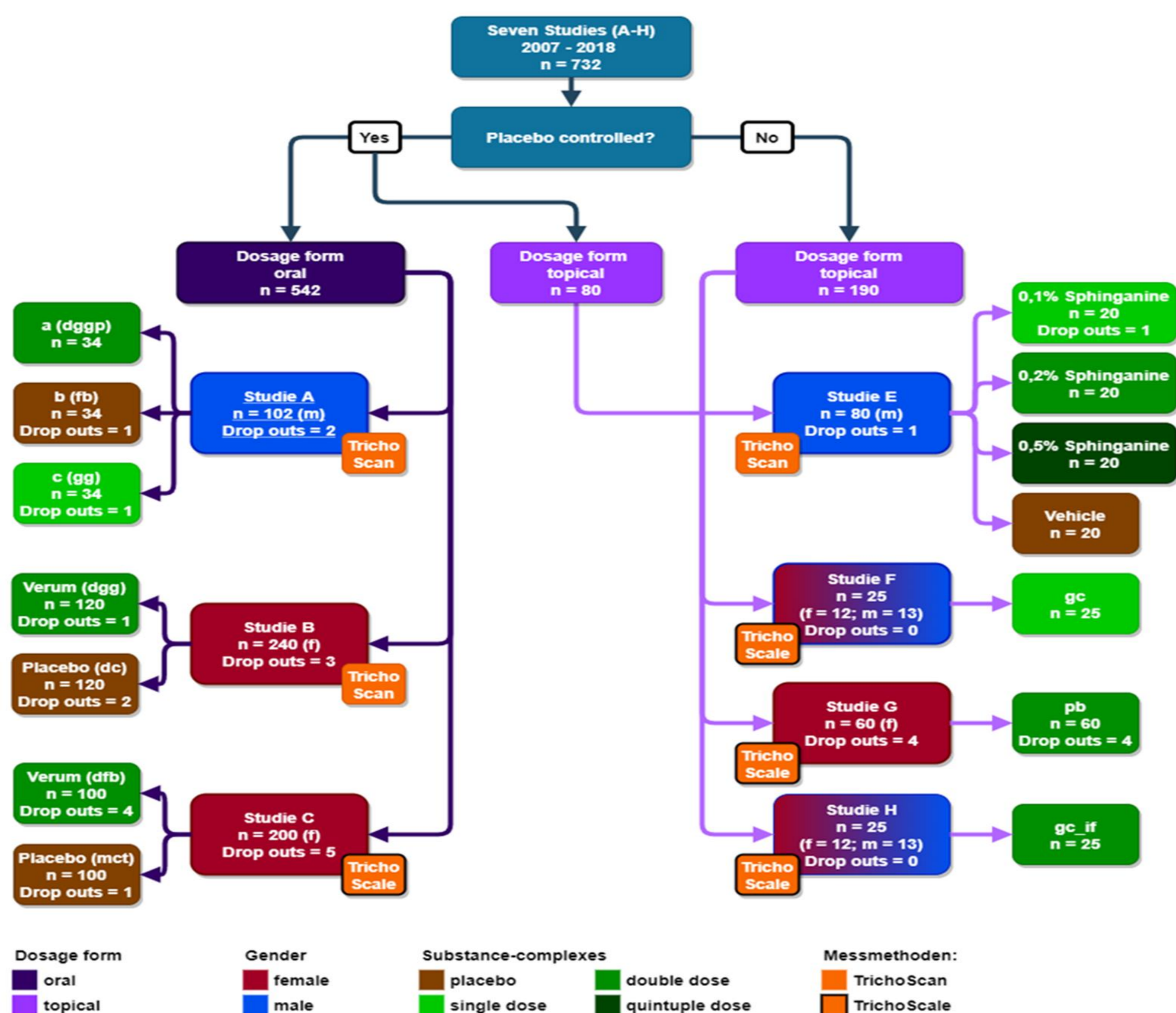


Figure 1: Shown are the seven hair efficacy studies for correlation analysis with 10 active substance complexes and four different placebos in detail.

Study	Application	Placebo controlled	Subjects [n]	Sex	0	6	8	12	16	18	24
A	oral	yes	102	m	x		x		x		
B	oral	yes	240	f	x			x			x
C	oral	yes	200	f	x			x			x
E	topical	yes	80	m	x		x		x		
F	topical	no	25	f/m	x	x		x			x
G	topical	no	60	f	x		x		x		x
H	topical	no	25	f/m	x		x		x		x

Table 1: Overview of hair study basic parameters and timeline with measurement time points in weeks.

Results & Discussion:

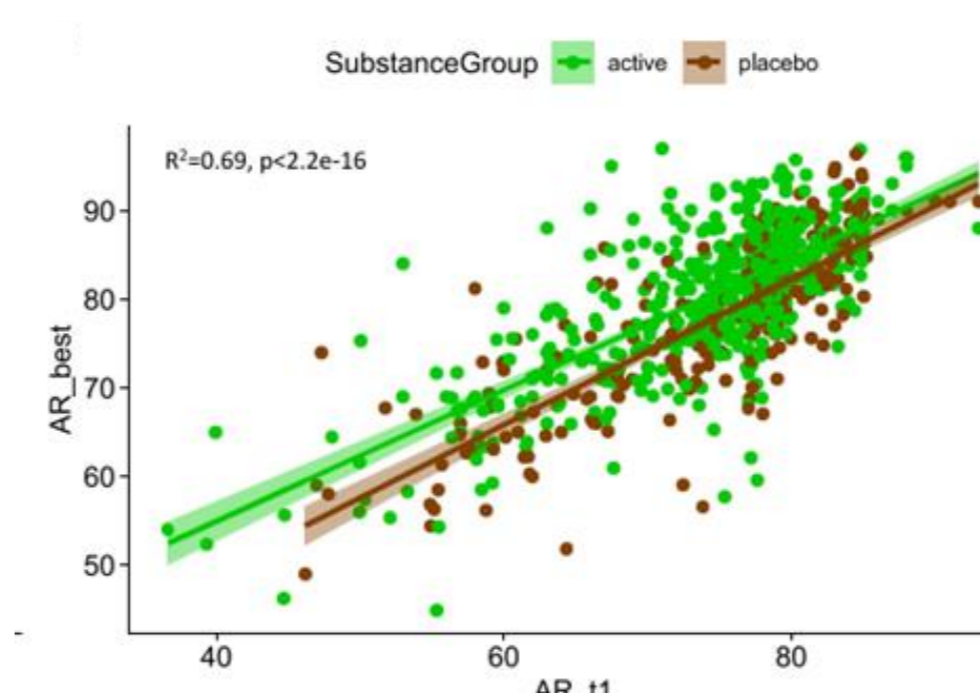


Figure 2: Scatterplot of the variables ar_t1 and ar_best for the substance group. Notes: ar_t1=baseline anagen rate, ar_best=highest measured anagen rate

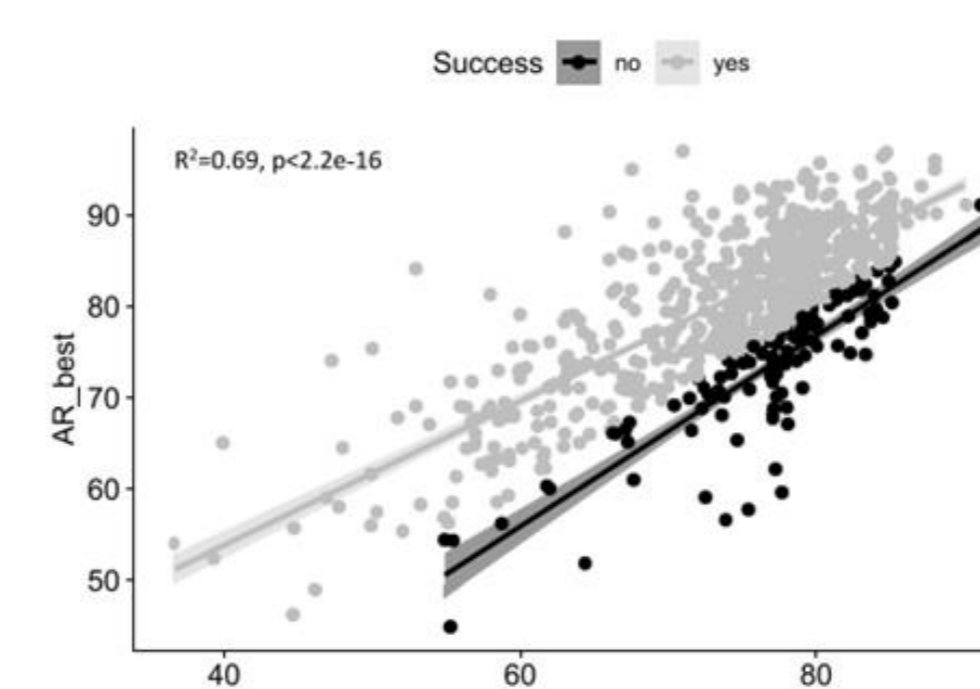


Figure 3: Scatterplot of the variables ar_t1 and ar_best for the success of the hair therapeutic intervention. Success = change in anagen rates (increase = "yes" and decrease = "no")

Table 2: Overview of the detected anagen rates, median, mean and sd.

Time points	Subjects (n)	Minimal anagen rate	Maximal anagen rate	Median	Mean	SD
t1	732	36.7	93.0	77.0	74.5	8.51
t2	723	39.9	96.9	77.8	76.2	9.56
t3	719	40.7	97.0	78.7	77.2	9.76
t4	106	49.8	95.7	81.2	79.7	9.66

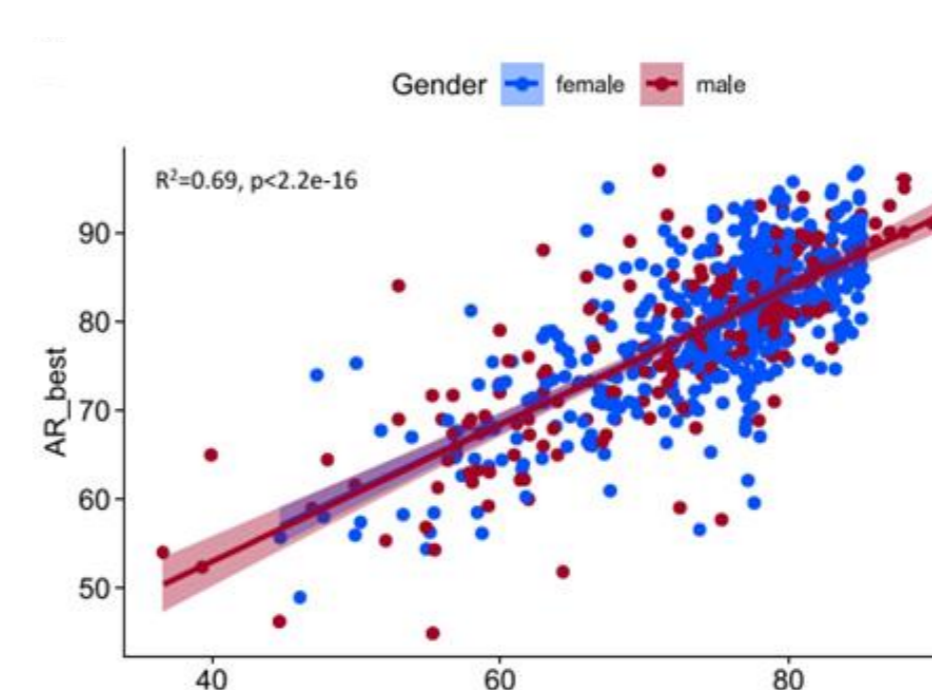


Figure 4: Scatterplot of the variables ar_t1 and ar_best for the gender

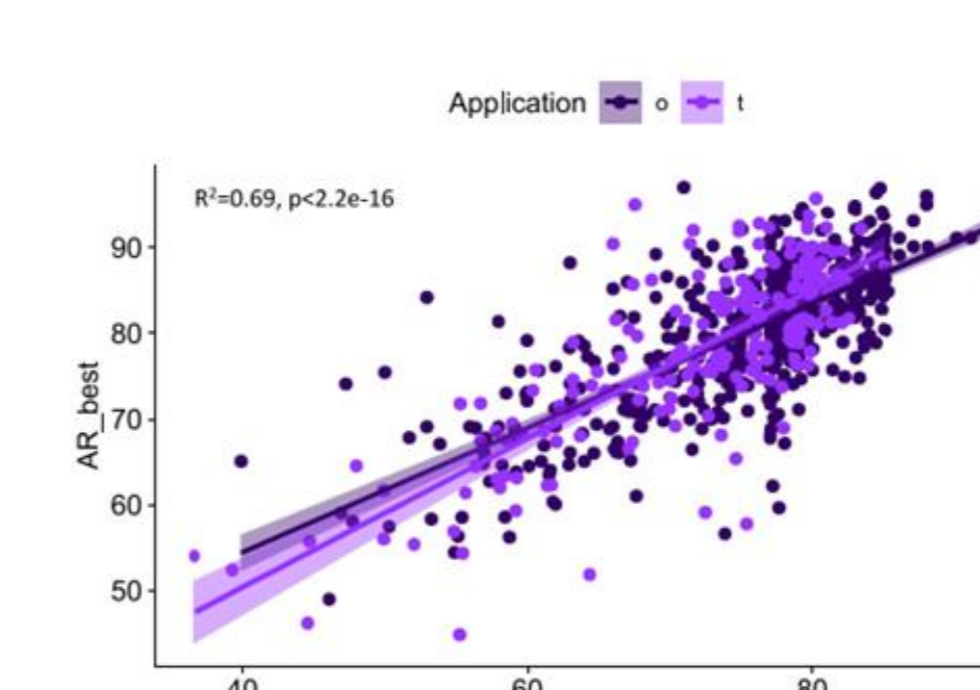


Figure 5: Scatterplot of the variables ar_t1 and ar_best for the application form (o=oral, t=topical)

• First of all, all active substance complexes differed significantly from the placebos.

• Subjects with a higher baseline anagen rate achieved a higher anagen rate change during the observation period (positive correlation of variables for both oral and topical application form).

• Considering the time factor, the anagen rate increases consistently over time and shows the greatest increase at the last measurement time point according to the study duration (Table 2).

• Additionally, it has been shown that there is a minimal difference between men and women. There is a tendency for men (3.88%) to show a higher percentage change in anagen rate than women (3%), but these differences are not significant.

• All test subjects exhibited a slightly higher percentage change in anagen rate with topical application (4.45%) compared to oral application (3.52%).

Conclusions:

Best study design for hair loss proof-of-concept trials

Major impact

- Baseline status
- Intake duration
- Active ingredient
- Dosage (n.s.)

Minor impact

- Gender
- Application form (oral / topical)

- **Importantly:** subjects with less diffuse hair loss → reacted better to the treatment
- Best possible effect from a hair therapy product → counteract hair loss at an early stage
- If hair loss is more severe → the effectiveness of dietary supplements or topical active ingredients is less pronounced

References:

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