• Patient name: **SmartSalem Test Patient**	• Patient ID: **123456**	• Date of birth: **03-03-1973**
• Sample code: **TRI62162AA**	• Received in laboratory: **03-07-2024**	• Genetic results date: **03-07-2024**

HAIR LOSS Solutions

Smart DNA – Hair Loss Profile

Doctor report

Smart DNA – Hair Loss Profile

Fagron Genomics, S.L.U carries out genetic tests upon request by healthcare professionals, in relation to biological samples from patients obtained by the healthcare professional. Our tests do not replace a medical consultation, nor do they make up a diagnostic or treatment, nor should they be interpreted this way. Only healthcare professionals can interpret the results of said tests, based on their knowledge of the clinical records of the patients and other relevant factors and, under their responsibility, give a diagnostic or prescribe treatment to the patient. We decline all responsibility derived from the use and interpretation of the results of our tests by the solicitant healthcare professional. Fagron Genomics, S.L.U expressly reserves any legal actions in case of an innapropiate, negligent or incorrect use or interpretation of the results of our tests. It is the responsibility of the healthcare professional who requests a test to guarantee to the patient the appropriate genetic advice as foreseen by Law 14/2007, of 3rd July, of biomedical research. As Fagron Genomics, S.L.U does not have access to the personal identifiable information about the patient from whom the sample comes, it is the responsibility of the requesting healthcare professional to comply with the applicable data protection Laws and regulations.

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I.
Patient identification data

1.
Patient identification data

Ordering physician	**SmartSalem test doctor**
Contact	**testsmartsalemdoctor@mail.com**
Patient's name	**SmartSalem Test Patient**
Gender	**Male**
Date of birth	**03-03-1973**
Sample type	**Buccal Swab**
Sample code	**TRI62162AA**
Received in laboratory	**03-07-2024**
Genetic results date	**03-07-2024**

II.
Recommendation of the most suitable drugs and supplements

2.
Recommendation of the most suitable drugs and supplements

The **genetic test** uses an automated qualitative pharmacogenetic algorithm that analyzes the patient's genetic data and combines this information with relevant patient history to recommend the most suitable active ingredients. Next, we show on a color scale which compounds the algorithm recommends the most. The transition from white to dark green indicates drugs from least recommended to most recommended. Medications blocked due to intolerances or contraindications are shown in red.

Anti-alopecic drugs

Prostaglandins	
• Minoxidil	74%
• Latanoprost Fagron	56%
• Prostaquinon TM	50%
• Cetirizine Hcl	50%

Antiandrogenic	
• Melatonin	19%
• Spironolactone	
• Dutasteride	
• 17-α Estradiol	
• Finasteride	

Anti-inflammatory	
• Hydrocortisone	
• Betamethasone dipropionate	
• Desonide	
• Fluocinolone acetonide	

Hair care supplements

Circulation	
• Caffeine	

Collagen synthesis
• Cystine

Blocked — Recommended

Vitamin, mineral and antioxidant supplements

Vitamin deficiency	
• Vitamin B12 (Cyanocobalamin)	100%
• Vitamin B9 (Folate)	67%
• Vitamin B7 (Biotin)	
• Vitamin D	

Antioxidant	
• Selenium yeast	75%

Keratolytic
• Tretinoin

Minerals	
• Zinc sulfate	100%
• Magnesium Gluconate	67%
• Iron sulfate	

Blocked — Recommended

III.
Formulas for personalized treatment

3.
Formulas for personalized treatments

The pharmacogenetic algorithm has selected a series of formulations for topical, oral use or capillary mesotherapy for the care and hygiene of your patient's scalp. These personalized formulations have been selected taking into account the genetics, the type of alopecia, and the relevant history of the patient.

Topical treatment

Formula	
Minoxidil	4 %
TrichoSol	**100ml**

Posology
Apply at night before bedtime. Leave the solution on your scalp for as long as possible. Wash your scalp the next day.

Signature of the prescribing physician	
Dr	
Physician registration No.	
Date	

Address	Signature

Oral treatment

Formula	
Magnesium Gluconate	375 mg/day
Selenium yeast	50 mcg/day

Posology
1 capsule per day, 90 capsules for 3 months

Signature of the prescribing physician	
Dr	
Physician registration No.	
Date	

Address	Signature

Scalp care and hygiene

Topical treatment

Formula	
Cetirizine Hcl	1 %
TrichoFoam	**100ml**

Posology
Apply at night before bedtime with a gentle massage on your scalp. Wash your scalp the next day.

Signature of the prescribing physician	
Dr	
Physician registration No.	
Date	

Address	**Signature**

IV.
Complete data

4.
Complete data
Data from the medical questionnaire

Patient demographics

Gender	**Male**
Age (years)	**51**
Height (cm)	**180**
Weight (kg)	**120**
BMI	**37.04**
Family history of alopecia	**Parents**

Hair loss data

Type of alopecia	**Telogen Effluvium (seasonal)**
Time elapsed since start of hair loss	**-1**
Prescription of testosterone derivatives	**Yes**

Clinical examination

Amount of hair loss	**Nothing**
Complaints associated with alopecia	**No**
Patchy alopecia	**No**
Current anti-alopecia treatment	**No**
Previous anti-alopecia treatment	**No**

4.
Complete data
Pharmacogenetic results

1. Anti-alopecic drugs

Treatment efficacy with prostaglandin inhibitors

Prostaglandin D2				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
GPR44-1	rs545659 (T>C)	C	**TT**	Genetic result: Predisposition to normal GPR44 mRNA stability. Interpretation: Prostaglandin D2 receptor 2 (GPR44 or CRTH2) variants are associated with an increased GPR44 mRNA stability leading to an increased responsiveness to prostaglandin D2 and hair follicle regression. Treatment/dosage: SNP analysis does not indicate the necessity to treat with prostaglandin D2 inhibitors.
GPR44-2	rs533116 (C>T)	T	**TT**	Genetic result: Predisposition to higher GPR44 mRNA stability. Interpretation: Prostaglandin D2 receptor 2 (GPR44 or CRTH2) variants are associated with an increased GPR44 mRNA stability leading to higher responsiveness to prostaglandin D2 and hair follicle regression. Treatment/dosage: Treatment with prostaglandin D2 inhibitors (Cetirizine and/or Prostaquinon) at high doses would be highly recommended.

Latanoprost				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
PTGFR-1	rs6686438 (T>G)	G	**GG**	Genetic result: Increased likelihood of not having a positive response to Latanoprost. Interpretation: Prostaglandin F receptor (PTGFR) variants are related with Latanoprost treatment efficacy (prostaglandin analog) . Treatment/dosage: Treatment with Latanoprost at normal doses is not recommended.
PTGFR-2	rs1328441 (C>T)	T	**CC**	Genetic result: High likelihood of having a positive response to Latanoprost. Interpretation: Prostaglandin F receptor (PTGFR) variants are related with Latanoprost treatment efficacy (prostaglandin analog) . Treatment/dosage: Treatment with latanoprost at normal doses is highly recommended.
PTGFR-3	rs10782665 (T>G)	G	**GT**	Genetic result: Increased likelihood of having a positive response to Latanoprost. Interpretation: Prostaglandin F receptor (PTGFR) variants are related with Latanoprost treatment efficacy (prostaglandin analog) . Treatment/dosage: Treatment with Latanoprost at normal doses is recommended.

Treatment efficacy with minoxidil

Minoxidil				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
PTGES2	rs13283456 (C>T)	T	**CC**	Genetic result: Predisposition to normal PGE2 levels. Interpretation: Prostaglandin E synthase 2 (PTGES2) variants are associated with lower prostaglandin E2 production (hair growth promoter). Treatment/dosage: SNP analysis does not indicate a necessity to treat with Minoxidil.
SULT1A1	rs1042028 (C>T)	T	**GG**	Genetic result: Predisposition to normal SULT1A activity. Interpretation: Minoxidil Sulfotransferase Enzyme (SULT1A1) variants predict response to minoxidil treatment. Treatment/dosage: Minoxidil at normal doses would be highly recommended.

Treatment efficacy with glucocorticoid anti-inflammatories

Glucocorticoides				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
GR-alpha	rs6198 (T>C)	C	**TT**	Genetic result: Predisposition to normal sensibility to glucocorticoid anti-inflammatory treatments. Interpretation: Glucocorticoid Receptor (GR or NR3C1) variants are associated with resistance or sensitivity to corticosteroids. Treatment/dosage: SNP analysis indicates that normal doses of glucocorticoids should be effective.

Treatment efficacy with antiandrogenics

17-α estradiol				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
CYP19A1	rs2470152 (G>A)	A	**GG**	Genetic result: Predisposition to normal CYP19A1 activity. Interpretation: Aromatase (CYP19A1) variants are associated to low conversion of testosterone in estrogens and to high conversion into DHT (hair growth inhibitor). Treatment/dosage: SNP analysis does not indicate a necessity to treat with 17-α Estradiol.

Dutasteride				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
SRD5A1	rs39848 (T>C)	C	**TT**	Genetic result: Predisposition to normal SRD5A1 activity. Interpretation: Steroid 5α-Reductase 1 (SRD5A1) variants are associated with reduced SRD5A1 activity leading to increased DHT levels and hair growth inhibition. Treatment/dosage: SNP analysis does not indicate a necessity to treat with dutasteride.

Finasteride				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
SRD5A2	rs523349 (C>G)	G	**CG**	Genetic result: Predisposition to increased SRD5A2 activity leading to increased levels of DHT Interpretation: Steroid 5α-Reductase 2 (SRD5A2) variants are associated with increased SRD5A2 activity leading to increased DHT levels and hair growth inhibition. Treatment/dosage: Treatment with Finasteride at normal doses is recommended.

2. Hair care supplements

Vasodilatation and blood circulation

Circulation stimulators				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
ACE	rs4343 (A>G)	G	**GG**	Genetic result: Predisposition to a strongly increased Angiotensin conversion activity. Interpretation: Angiotensin-converting enzyme (ACE) variants are associated with increased plasma levels of angiotensin 2, an extremely potent vasoconstrictor. Treatment/dosage: High doses of circulation stimulators would be recommended, such as Minoxidil, caffeine, Ginkgo biloba, Ginseng or Arginine.

Collagen synthesis

Hair strengthening supplements				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
COL1A1	rs1800012 (C>A)	A	**CC**	Genetic result: Predisposition to normal collagen stability. Interpretation: Collagen, type I, alpha 1 (COL1A1) variants are associated with collagen instability. Treatment/dosage: SNP analysis does not indicate the necessity to supplement with hair strengthening composites.

Reduction of IGF-1 levels

Hair strengthening supplements				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
IGF1R	rs2229765 (G>A)	A	**AG**	Genetic result: Predisposition to moderately reduced IGF-1 levels. Interpretation: Insulin-like growth factor-I (IGF-I) variants are associated with lower plasma IGF-1 levels leading to hair loss. Treatment/dosage: A treatment with Igrantine-F1 and TrichoXidil (IGF-1 inducers) at normal doses would be recommended.

3. Vitamin, mineral and antioxidant supplements

Vitamins

Vitamin A				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
CRABP2	rs12724719 (G>A)	A	**GG**	Genetic result: Predisposition to normal retinoic acid intracellular transport. Interpretation: Cellular retinoic acid-binding protein 2 (CRABP2) variants are associated with lower retinoic acid (vitamin A) intracellular transport. Treatment/dosage: SNP analysis does not indicate the necessity to supplement with vitamin A.

Vitamin B7				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
BTD	rs13078881 (G>C)	C	**GG**	Genetic result: Predisposition to normal biotinidase activity. Interpretation: Biotinidase (BTD) variants are associated with low biotin (vitamin B7) uptake from the diet. Treatment/dosage: SNP analysis does not indicate the necessity to supplement with vitamin B.

Vitamin C				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
SLC23A1	rs33972313 (C>T)	T	**CC**	Genetic result: Predisposition to higher vitamin C serum level. Interpretation: Solute carrier family 23 member 1 (SLC23A1) variants are associated with lower serum concentration of vitamin C. Treatment/dosage: SNP analysis does not indicate the necessity to supplement with vitamin C. Test for serum levels of vitamin C.

Vitamin B9				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
MTHFR	rs1801133 (G>A)	A	**GA**	Genetic result: Increased predisposition to folate deficiency. Interpretation: Methylene tetrahydrofolate reductase (MTHFR) variants are associated with risk of folate deficiency. Treatment/dosage: Folate supplementation should be considered. Test serum levels of folate prior to supplementation.

Vitamin D				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
GC	rs2282679 (T>G)	G	**TT**	Genetic result: Predisposition to normal vitamin D serum levels. Interpretation: Vitamin D-binding protein (GC or DBP) variants are associated with lower vitamin D serum level. Treatment/dosage: SNP analysis does not indicate the necessity to supplement with vitamin D.

Vitamin B12				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
FUT2	rs602662 (A>G)	G	**AG**	Genetic result: Predisposition to lower vitamin B12 serum level. Interpretation: Galactoside 2-alpha-L-fucosyltransferase 2 (FUT2) variants are associated lower vitamin B12 serum level. Treatment/dosage: Supplementation with vitamin B12 is recommended.

Vitamin E				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
ZPR1	rs964184 (G>C)	C	**CC**	Genetic result: Predisposition to lower vitamin E serum levels. Interpretation: Zinc Finger Protein ZPR1 variants are associated with low alpha-tocopherol (vitamin E) serum level. Treatment/dosage: Supplementation with vitamin E is highly recommended. Test serum levels of vitamin E prior to supplementation.

Antioxidants

Antioxidants				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
NQO1	rs1800566 (G>A)	A	**AG**	Genetic result: Predisposition to lower NQO1 enzyme activity. Interpretation: NAD(P)H dehydrogenase [quinone] 1 (NQQ1) variants are associated with lower NQO1 enzyme activity and may have less effective protection against oxidative stress. Treatment/dosage: Supplementation with antioxidants would be recommended. Test serum levels of selenium prior to supplementation.

Minerals

Magnesium				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
MUC1	rs4072037 (T>C)	C	CT	Genetic result: Predisposition to intermediate magnesium serum level. Interpretation: Mucin 1, cell surface associated (MUC1) variants are associated with lower magnesium serum level. Treatment/dosage: Magnesium supplementation should be considered. Test serum levels of magnesium prior to supplementation.

Zinc sulfate				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
SLC30A3	rs11126936 (T>G)	G	GG	Genetic result: Predisposition to lower serum zinc level. Interpretation: Solute carrier family 30 member 3 (SLC30A3) variants are associated with lower serum zinc level. Treatment/dosage: Supplementation with Zinc sulfate would be highly recommended. Test serum levels of zinc prior to supplementation.

Iron				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
TMPRSS6	rs855791 (G>A)	A	GG	Genetic result: Predisposition to normal serum levels of transferrin and iron. Interpretation: Transmembrane protease, serine 6 (TMPRSS6 or matriptase-2) variants are associated with decreased serum levels of transferrin and iron. Treatment/dosage: SNP analysis does not indicate the necessity to supplement with iron. Test serum levels of iron prior to supplementation.

Selenium				
Gene	**SNP (transition)**	**Activating allele**	**Patient genotype**	**Pharmacogenetic result**
DMGDH	rs921943 (T>C)	C	CT	Genetic result: Predisposition to higher selenium serum level. Interpretation: Dimethylglycine dehydrogenase (DMGDH) variants are associated with low selenium serum level. Treatment/dosage: SNP analysis does not indicate the necessity to supplement with selenium. Test serum levels of selenium prior to supplementation.

V.
Methodology

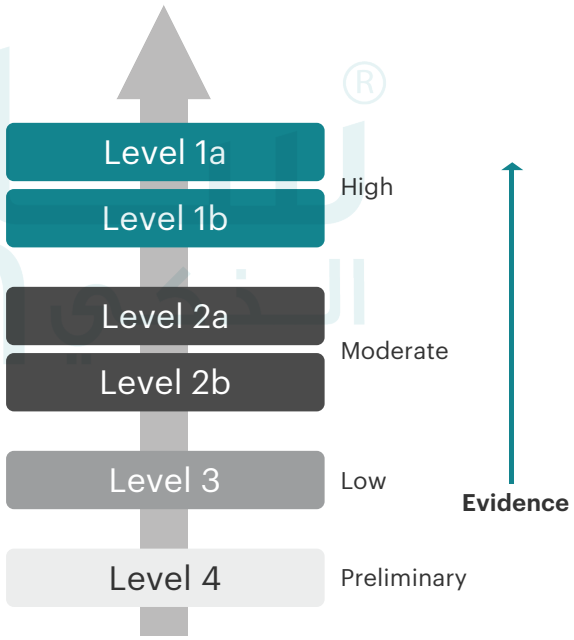
5. Methodology

How were the genetic variants studied selected and evaluated?

The **genetic test** was developed by a multidisciplinary team of medical doctors, pharmacists, geneticists, and programmers, following the highest quality standards. In particular, an expert team specialized in the curation of genetic variants reviewed each variant to ensure that selection, interpretation and impact of variants in the algorithms are based on the highest scientific evidence. Relevant patient's anamnesis (intolerances, diseases, medication, blood pressure, among others) that can affect recommendations was taken into account through medical questionnaires elaborated by health professionals.

- **Level 1A:** Annotation for a variant in medical society-endorsed or implemented in a major health system.
- **Level 1B:** Annotation for a variant where the preponderance of evidence shows an association. The association must be replicated in more than one cohort with significant p-values, and preferably will have a strong effect size.
- **Level 2A:** Annotation for a variant that qualifies for level 2B where the variant is within a Very Important known gene, so functional significance is more likely.
- **Level 2B:** Annotation for a variant with moderate evidence of an association. The association must be replicated but there may be some studies that do not show statistical significance, and/or the effect size may be small.
- **Level 3:** Annotation for a variant based on a single significant (not yet replicated) study or annotation for a variant evaluated in multiple studies but lacking clear evidence of an association.
- **Level 4:** Annotation based on a case report, non-significant study or in vitro, molecular or functional assay evidence only.

Only variants from level 1a to 2b were selected.



How was this test performed?

DNA was extracted from the buccal swab sample provided and was analyzed by our clinical analysis laboratory. DNA was extracted using the KingFisher Flex® robotic extraction system (Thermo Fisher Scientific). The study of the genetic variants was carried out using a custom-designed microfluidic card to measure for the chemiluminescent detection of each of them using TaqMan® technology. TaqMan® technology for genotyping testing is proven and widely used in clinical and research settings. The sensitivity (detection limit) of this study is 99%.

Genetic test algoritm

The **genetic test** qualitative pharmacogenetic algorithm analyzes single nucleotide polymorphisms (SNPs) associated with metabolic pathways involved in alopecia predisposition and treatment and combines this data with relevant patient history to predict treatment responses and recommends the most appropriate active ingredients.

What are the limits of this report?

Each genetic marker tested is just one factor that predicts the likelihood of a particular outcome. However, the lifestyle, diet, and environment to which the patient is exposed may impact the expected outcomes. These external factors cannot be taken into account in this report.

The information in this report is not used to diagnose genetic diseases or abnormalities, as it does not predict the risk and likelihood of certain genetic outcomes. It is also not intended to diagnose or cure any disease. The **genetic test** is intended to assist health professionals in making patient-specific care decisions regarding the treatment or prevention of androgenetic alopecia, areata alopecia, and telogen effluvium.

Our clinical laboratory has standard and effective procedures to protect against technical and operational problems. However, problems may occur in the shipment to the laboratory or in the handling of the sample, including, but not limited to, damage to the sample, mislabeling, and loss or delay in receiving the sample. In such cases, the medical laboratory may need to request a new sample.

As with all medical laboratory tests, there is a small chance that the laboratory may provide inaccurate information.

It is the responsibility of the professional who requests a test from us to guarantee the interested party appropriate genetic counseling in accordance with Law 14/2007, of July 3, on Biomedical Research.

VI.
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