



**Bani Anand**  
 Founder and MD  
 Hairline International

Young and dynamic Bani Anand recognized the lacuna in holistic beauty care and worked on bringing in treatment forms much before they were envisaged through Hairline International Hair and Skin Clinic. Armed with an MBA in Marketing from the United Kingdom, Bani has introduced a wide gamut of services, from in-depth medical assessment to FDA approved medication to treatments like hair bonding, taking the route of medical management to beauty care at Hairline International. Bani's pioneering work has seen Hairline International enhance its business growth manifold.



**Dr. Dinesh G Gowda**  
 Senior Dermatologist  
 Hairline International

Dr. Dinesh Gowda is a Consulting Hair Transplant Specialist, Dermatologist and Dermatologist at Hairline International, He completed his medical degree and masters from Bangalore Medical College. He has also been trained in Hair Transplant at Ramathi bodhi Hospital, Bangkok, He has considerable international exposure with his expertise and has to his credit over 3000 hair transplant surgeries, A major achievement, which has not been duplicated elsewhere is the extraction of 9000 hair in a single sitting for a Follicular Unit Transplantation (FUT) treatment & up to 14000 hair in one FUE Session, This was done with minimal scarring.



**Dr. Premalatha V**  
 Dermatologist  
 Hairline International

Dr. Premalatha V graduated from Ambedkar Medical College and secured an MD dermatology from JJM Medical College, She secured her dermato-surgery qualifications from St. Johns Medical College, Dr. Premalatha has extensive experience working with lasers for pigmentation, hair removal, scar correction and body contouring, She has today, a successful trichology practice and is a consultant with Hairline International Hair and Skin Clinic.



**Dr Kaushik Deb**  
 CEO of Merisis Therapeutics

Dr. Deb is currently working in cooperation with international labs and universities in organ tissue and cell transplantations, cell and molecular immunology, nano-biotechnology and translational medicine research, He has published over 60 peer reviewed research papers, abstracts, and book chapters, and is also an active Reviewer and Editorial Board member for about 5 international journals/ publishing houses, He has filed about 5 international and national patents so far.

## Effect of Perflurooctanoic Acid in the Blood and its Co-Relation to Hair Loss and Health

A Study by  
**Hairline International**  
 Research and Treatment Centre





## Study References

1. Epidemiologic Evidence on the Health Effects of Perfluorooctanoic Acid (PFOA) by Kyle Steenland, Tony Fletcher, and David A. Savitz published in Environment Health Perspective.
2. Thyroid disruption by perfluorooctane sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) by Coperchini F, Awwad O, Rotondi M, Santini F, Imbriani M, Chiovato L published in Journal of Endocrinological Investigation.
3. Perfluoroalkyl Acids and Related Chemistries—Toxicokinetics and Modes of Action by Melvin E. Andersen, John L. Butenhoff, Shu-Ching Chang, David G. Farrar, Gerald L. Kennedy, Jr, Christopher Lau, Geary W. Olsen, Jennifer Seed, and Kendall B. Wallace published in Toxicological Sciences, Oxford Journals.
4. Placental Transfer of Perfluoroalkyl Substances and Associations with Thyroid Hormones: Beijing Prenatal Exposure Study by Lin Yang, Jingguang Li, Jianqiang Lai, Hemi Luan, Zongwei Cai, Yibaina Wang, Yunfeng Zhao, and Yongning Wu published in Scientific Reports Journal.
5. Modeled PFOA Exposure and Coronary Artery Disease, Hypertension, and High Cholesterol in Community and Worker Cohorts by Andrea Winquist corresponding author and Kyle Steenland published in Environment Health Perspective.

## About Hairline International Research & Treatment Centre

Hairline International Hair and Skin Clinic has created a reliable reputation for itself in the field of medical management of hair and skin over the past 7 years, Aply supporting the various techniques employed by the medical professionals at Hairline International is its Research wing, Hairline International Research Centre, which has over the years tried to understand the various causes that lead to hair loss, directly or indirectly, With the increasing number of people coming in for hair and skin ailments, Hairline International Research & Treatment Centre regularly undertakes studies and attempts to find a common factor among causes of hair loss.

Hairline International functions under the able stewardship of young and dynamic entrepreneur Ms. Bani Anand and has a panel of dermatologists, dermato-surgeons, diabetologists, gynaecologists, general physicians and nutritionists on board to tackle hair and skin issues holistically, Hairline has 6 centers in Bangalore - Indiranagar, Whitefield, Marathahalli, Jayanagar, Richmond Road and RT Nagar.

## Observation

It was seen that 401 out of the 500 cases (chosen from the urban areas) examined tested positive for PFOA in the blood, These results were primarily from the working professionals who were regular in consuming food made in non-stick cookware at least 4-6 times a week.

Out of the 200 females and 300 males, High cholesterol was seen in nearly 99 subjects, HDL was low in 350 subjects and LDL high in 325 of the subjects, 135 cases recorded high fasting blood sugar, Of the 200 females, 140 were noted as being PCOD positive cases, Hypothyroidism was observed in 195 of the cases, Hair fall was more than 100 per day in the study group.

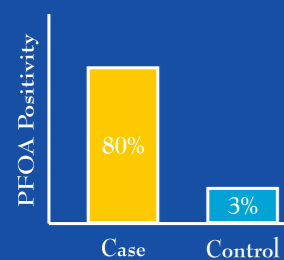
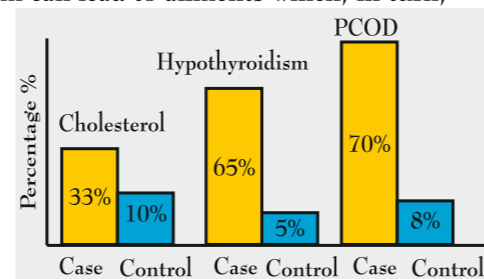
## The Control Group

The 500 controls, on the other hand, were those from lower strata of society- mostly physical and manual labourers, who used earthen pots and steel or aluminium cookware to cook or warm their food, Only 15 subjects were found to be PFOA positive, 50 cases had high cholesterol, Fasting blood sugar were high in 10 males and 12 females, 10 males and 15 females had hypothyroidism and PCOD cases were reported in 40 females, Hair fall was reported around 20 - 25 a day.

## Inference From Study

At the end of this study, the following may be inferred, based on those who participated in it, These percentages are an indication of how the increasing presence of PFOA in the human system can lead to ailments which, in turn, cause hair loss.

- High cholesterol occurred in nearly 33% of the subjects.
- HDL was low in 70% of the subjects irrespective of gender.
- LDL was high in 65% irrespective of gender.
- 27% cases, irrespective of gender, recorded high fasting blood sugar.
- 70% of the 200 women observed were PCOD-positive cases.
- 65% of the of the subjects irrespective of gender were diagnosed with Hypothyroidism.
- 80% of cases, irrespective of gender had hair fall of more than 100.



Based on the 500 cases that were part of the control group it was found that

- 3% subjects, irrespective of gender, were found to be PFOA positive.
- 10% cases, irrespective of gender had high cholesterol.
- Fasting blood sugar was high in 10 males and 12 females.
- 15 females and 10 men showed hypo-thyroid status and PCOD cases were reported in 8 % of females.
- Hair fall reported was around 20 - 25 a day.

## Conclusion

The study thus concludes that 80% of the cases visiting the clinic with hair fall are PFOA-positive, High PFOA levels leads to a higher incidence of PCOD, Hypothyroidism & High Cholesterol, altered lipid levels all of which indirectly cause hair fall, Further studies are needed to clearly identify clinically meaningful aspects of PFOA-associated hair loss, Larger studies may be required to draw definitive conclusions.

# Effect of Perfluorooctanoic Acid in the Blood and its Co-Relation to Hair Loss & Health

## A Study by Hairline International Research and Treatment Centre

### Summary of Study on Teflon Being an Indirect Cause of Hair Loss

Hairline International Research & Treatment Centre conducted an observational study across 6 centres of the organization for a period of one year (October 1, 2015 to September 30, 2016) to understand the effects of Perfluorooctanoic Acid (PFOA) in the blood and its correlation to hair loss and health.

### The Case Studies

A total of 500 case studies in the age group of 18 to 44 years were taken into consideration for the research and observed for a period of one year, The criteria for selection included that each of the cases suffered from hair loss of over 100 hair and did not have any lifestyle ailments that may cause the hair loss.

### The Control Group

To balance the study, 500 people comprised the control group, These were primarily physical and manual laborers, who used earthen pots and steel or aluminum cookware to cook or warm their food, Each of these cases were also in the age group of 18 years to 44 years.

Detailed case histories were taken from each participant to understand their lifestyles, ailments and afflictions.

### Summary Conclusion

The research revealed that 401 out of the 500 individuals in the case study group examined tested positive for PFOA in the blood, These were primarily working professionals who regularly consumed food made in non-stick cookware, The control group on the other hand comprised of only 3% subjects who were found to be PFOA positive, The study thus concludes that 80% of the cases visiting the clinic with hair fall are PFOA- positive.

### Understanding Perfluorooctanoic Acid (PFOA)

Teflon coated pans are a common occurrence in most homes, especially considering that these products are marketed for the health conscious, The lesser consumption of oil during the cooking process is what attracts a prospective customer, The problem arises with the overuse of such vessels, which then pave the way for PFOA to enter our systems leading to health hazards.

PFOA can enter the human body in three ways

1. Ingestion - This tends to happen when one uses a pan that is over heated or one that has scratches on the surface exposing a part of the metallic base and chipping off the Teflon coating, which enters the body through the food, Drinking water too Contains a Certain level of Teflon due to Teflon coated pipes and if not checked can cause PFOA to entire the body.

## Research Methodology

2. Inhalation - There are particles of PFOA that float around the air we breathe, These particles are present in stain-resistant clothing that we wear or carpets that we have in our homes, Micro dust particles containing traces of PFOA, thus enter our systems causing health issues, Being placed close to factories that manufacture PFOA too can result in excessive inhalation.

### 3. Dermal contact

Once PFOA is in the system it is metabolized by the kidneys and liver, Thereby in the longer run, affecting these larger organs significantly, Besides these organs, other organs may also get affected and manifest in the form of ailments such as Hypo-Thyroidism, Polycystic Ovarian Disease (PCOD) and high cholesterol among others, Primarily occurring Hypo-Thyroidism, which leads to hair loss as well.

With this as the basis for the research, Hairline International Research & Treatment Centre undertook a study, ably directed by Dr. Dinesh G Gowda, Dermatologist, Hairline International Hair and Skin Clinic and Dr. Premalatha V. Dermatologist, Hairline International Hair and Skin Clinic.

Hairline International Research & Treatment Centre conducted an observational study across 6 centres of the organization for a period of one year from October 1, 2015 to September 30, 2016 to understand the effects of Perfluorooctanoic Acid (PFOA) in the blood and its correlation to hair loss, 500 cases and 500 controls were taken for the study, Some of the prerequisites to be a part of the study were ,

- Persistent hair shedding for over 3 months of more than 100 hair.
- No nutritional deficiencies that may cause hair loss.
- No intake of nutritional supplements to combat hair loss.
- No systemic disorders.

A detailed history was taken each of the cases to understand their lifestyles and the number of times they use non-stick cookware in a week, This history also included a track on the number of hair fall, menstrual cycles and PCOD history, each of which were evaluated, Blood investigations like complete blood count, thyroid hormone, lipid profile and fasting blood glucose level were also conducted.

### Sample Case Sheet - Case Group

Sl.	PATIENT CODE	AGE	SEX	WEIGHT	HAIR LOSS DAIGNOSIS	COOKING UTENSILS	TSH	PCOD	BP	FBS	CHOLESTROL	HDL	LDL	PFOA Concentration
1	LA_001	27	F	52	FEMALE PATTERN ALOPECIA	NON STICK	NORMAL	+	No	77	NORMAL	NORMAL	HIGH	POSITIVE
2	CA_002	25	F	55	FEMALE PATTERN ALOPECIA	NON STICK	ALTERED	+	No	80	NORMAL	LOW	NORMAL	POSITIVE
3	S_U_003	32	M	66	MALE PATTERN ALOPECIA	NON STICK	ALTERED	+	No	67	NORMAL	LOW	HIGH	POSITIVE
4	AV_004	27	M	62.5	MALE PATTERN ALOPECIA	NON STICK	ALTERED	+	No	90	NORMAL	NORMAL	HIGH	NEGATIVE
5	SS_005	21	M	45	TELOGEN EFFLUVIUM	NON STICK	ALTERED	-	No	74	NORMAL	LOW	NORMAL	POSITIVE
6	C_I_006	23	F	55.5	FEMALE PATTERN ALOPECIA	NON STICK	ALTERED	-	No	76	NORMAL	LOW	NORMAL	POSITIVE
7	R_E_007	22	M	83	MALE PATTERN ALOPECIA	NON STICK	NORMAL	-	No	84	NORMAL	LOW	NORMAL	POSITIVE
8	S_N_008	27	M	74	MALE PATTERN ALOPECIA	NON STICK	ALTERED	-	No	91	NORMAL	NORMAL	HIGH	POSITIVE
9	RI_009	28	F	48	FEMALE PATTERN ALOPECIA	NON STICK	NORMAL	+	No	86	NORMAL	NORMAL	HIGH	NEGATIVE
10	G_P_010	30	M	69	MALE PATTERN ALOPECIA	NON STICK	ALTERED	-	No	78	HIGH	NORMAL	HIGH	POSITIVE

11	AN_011	31	M	68	MALE PATTERN ALOPECIA	NON STICK	NORMAL	-	No	90	NORMAL	LOW	HIGH	POSITIVE
12	S_R_012	28	M	70	MALE PATTERN ALOPECIA	NON STICK	ALTERED	-	No	94	NORMAL	NORMAL	HIGH	POSITIVE
13	UR_013	32	M	70	MALE PATTERN ALOPECIA	NON STICK	ALTERED	-	No	140	NORMAL	LOW	HIGH	NEGATIVE
14	SH_014	26	M	75	MALE PATTERN ALOPECIA	NON STICK	NORMAL	-	No	74	NORMAL	LOW	NORMAL	POSITIVE
15	V_A_015	21	F	45	FEMALE PATTERN ALOPECIA	NON STICK	NORMAL	-	No	76	NORMAL	LOW	NORMAL	POSITIVE
16	P_U_016	31	F	71.5	TELOGEN EFFLUVIUM	NON STICK	NORMAL	+	No	67	NORMAL	LOW	HIGH	POSITIVE
17	S_R_I_017	27	M	76	MALE PATTERN ALOPECIA	NON STICK	NORMAL	+	No	86	NORMAL	NORMAL	HIGH	NEGATIVE
18	MA_018	26	F	48	FEMALE PATTERN ALOPECIA	NON STICK	ALTERED	+	No	77	NORMAL	LOW	NORMAL	POSITIVE
19	SI_019	37	M	81	TELOGEN EFFLUVIUM	NON STICK	ALTERED	+	No	70	NORMAL	LOW	HIGH	POSITIVE
20	A_R_020	18	M	73	MALE PATTERN ALOPECIA	NON STICK	ALTERED	+	No	77	NORMAL	LOW	NORMAL	NEGATIVE
21	B_G_021	36	M	75	MALE PATTERN ALOPECIA	NON STICK	ALTERED	+	No	140	HIGH	LOW	HIGH	POSITIVE
22	SA_022	38	F	67	FEMALE PATTERN ALOPECIA	NON STICK	NORMAL	+	No	144	HIGH	LOW	HIGH	POSITIVE
23	VU_023	39	M	74	MALE PATTERN ALOPECIA	NON STICK	NORMAL	+	No	124	HIGH	LOW	HIGH	POSITIVE
24	TF_024	29	M	64	MALE PATTERN ALOPECIA	NON STICK	ALTERED	+	No	72	NORMAL	LOW	HIGH	POSITIVE
25	V_K_025	24	M	63	MALE PATTERN ALOPECIA	NON STICK	NORMAL	+	No	64	NORMAL	LOW	NORMAL	POSITIVE

### Sample Case Sheet - Control Group

Sl.	PATIENT CODE	AGE	SEX	WEIGHT	HAIR LOSS DAIGNOSIS	COOKING UTENSILS	TSH	PCOD	BP	FBS	CHOLESTROL	HDL	LDL	PFOA Concentration
1	YH_001	27	M	67	TELOGEN EFFLUVIUM	EARTHEN	NORMAL	-	No	103	NORMAL	NORMAL	NORMAL	NEGATIVE
2	MA_002	25	F	60	TELOGEN EFFLUVIUM	EARTHEN	NORMAL	-	No	103	NORMAL	NORMAL	NORMAL	NEGATIVE
3	A_R_003	33	M	74	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	89	NORMAL	NORMAL	NORMAL	NEGATIVE
4	SA_004	29	F	42	TELOGEN EFFLUVIUM	EARTHEN	ALTERED	-	No	99	NORMAL	NORMAL	NORMAL	NEGATIVE
5	PK_005	25	M	88	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	97	NORMAL	NORMAL	NORMAL	NEGATIVE
6	SI_006	23	M	49	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	90	NORMAL	NORMAL	NORMAL	NEGATIVE
7	AY_007	26	F	76	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	Yes	92	NORMAL	NORMAL	NORMAL	NEGATIVE
8	MN_008	22	M	67	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	70	NORMAL	NORMAL	NORMAL	NEGATIVE
9	S_A_009	35	M	70	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	154	NORMAL	NORMAL	NORMAL	NEGATIVE
10	R_H_010	25	F	59	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	77	NORMAL	NORMAL	NORMAL	NEGATIVE
11	D_S_011	22	M	62	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	78	NORMAL	NORMAL	NORMAL	NEGATIVE
12	R_S_N_012	27	F	54	TELOGEN EFFLUVIUM	EARTHEN	NORMAL	-	No	76	NORMAL	NORMAL	NORMAL	NEGATIVE
13	P_T_R_013	24	F	50	TELOGEN EFFLUVIUM	EARTHEN	NORMAL	-	No	65	NORMAL	NORMAL	NORMAL	NEGATIVE
14	S_R_014	23	M	73	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	87	NORMAL	NORMAL	NORMAL	NEGATIVE
15	P_K_015	26	M	85	FEMALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	86	NORMAL	NORMAL	NORMAL	NEGATIVE
16	VH_016	30	M	78	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	144	NORMAL	NORMAL	NORMAL	NEGATIVE
17	C_S_017	23	M	49	TELOGEN EFFLUVIUM	EARTHEN	NORMAL	-	No	84	NORMAL	NORMAL	NORMAL	NEGATIVE
18	SA_018	31	F	63	FEMALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	78	NORMAL	NORMAL	NORMAL	NEGATIVE
19	A_E_019	37	F	64	TELOGEN EFFLUVIUM	EARTHEN	NORMAL	-	No	67	HIGH	HIGH	LOW	NEGATIVE
20	S_R_020	26	M	72	MALE PATTERN ALOPECIA	EARTHEN	NORMAL	-	No	87	NORMAL	NORMAL	NORMAL	NEGATIVE
21	SA_021	29	F	58	TELOGEN EFFLUVIUM	EARTHEN	NORMAL	-	No	75	NORMAL	NORMAL	NORMAL	NEGATIVE
22	VA_022	26	F	72	TELOGEN EFFLUVIUM	EARTHEN	NORMAL	-	No	79	NORMAL	NORMAL	NORMAL	NEGATIVE
23	D_J_023	29	M	54	TELOGEN EFFLUVIUM	EARTHEN	NORMAL	-	No	65	NORMAL	NORMAL	NORMAL	NEGATIVE
24	A_E_024	36	F	54	TELOGEN EFFLUVIUM	EARTHEN	NORMAL	-	No	65	HIGH	HIGH	LOW	NEGATIVE
25	N_A_025	25	M	65	MALE PATTERN ALOPECIA	EARTHEN	ALTERED	-	No	76	NORMAL	NORMAL	NORMAL	NEGATIVE