

Posters

P-01: A pilot study - 24 weeks topical treatment by latanoprost 0.1% increases hair growth in androgenetic alopecia

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Latanoprost is a prostaglandin analogue used as eye drops in glaucoma treatment. Known side effects are iridial and periocular hyper-pigmentation, eyelash changes including pigmentation, increased thickness, length and number. Latanoprost has already shown efficacy in the treatment of eyelash alopecia, but knowledge on its effects on human scalp hair growth is not available. To assess efficacy on hair growth and pigmentation. Furthermore to evaluate the effect on scalp pigmentation and the treatment duration needed to affect the hair growth, hair pigmentation, and scalp pigmentation, as well as to assess the safety of latanoprost. Sixteen male with mild androgenetic alopecia were included. Latanoprost 0.1% and placebo were applied daily for 24 weeks on two minizones on the scalp. Measurements on hair growth, density, diameter, pigmentation and anagen/telogen ratio were performed throughout the study. A significantly increased hair density compared to baseline was observed on the latanoprost-treated site after 24 weeks ($P < 0.001$). Furthermore a significant difference in hair density between the investigational sites after 24 weeks could be evaluated ($P = 0.0004$). No major adverse events were recorded. Latanoprost significantly increased hair density and the amount of vellus hairs compared to baseline as well as the placebo-treated area from eight weeks on of topical treatment. Latanoprost could be useful in stimulating hair follicle activity and treating hair loss.

P-02: Reliability of the pattern hair loss classifications - Comparison of the basic and specific (basp) and norwood-hamilton (nh) classifications

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Pattern hair loss (PHL) can be classified into several subtypes. Norwood-Hamilton (NH) classification has been commonly used to describe the clinical severity of Male PHL. However, this classification has some limitations that it is too detailed and less stepwise in its description. In addition, NH classification cannot classify some specific types of baldness, such as female pattern hair loss (FPHL) in men. Recently described Basic and

specific (BASP) classification is a stepwise, systematic, and universal classification system for PHL, and can classify FPHL. Eight dermatologic specialists, 17 dermatologic residents and 15 general physicians classified 100 photographs of male heads with different degrees of PHL using BASP and NH classification for compare the reliability of BASP and NH classifications. The same procedure with the identical photographs was repeated 1 month later by all of the 30 doctors for comparing reproducibility these two classifications. The inter-group reproducibility was estimated by calculating the match rate of the group data, and the intra-group repeatability was calculated by the match rate of the individual data. Consequently, we found out that the reproducibility and repeatability differed among BASP and NH classification.

P-03: Microneedles therapy for the treatment to patients with androgenetic alopecia – Report of 3 cases

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This study aims to present the results obtained from 3 patients who were submitted to microneedles therapy as a treatment for androgenic alopecia. The patients were a 44 years old men, two women aged of 21 and 37 years. They were treated with 8 sessions of microneedles therapy every 21 days. For that we used rollers with 1.5 mm length microneedles. The patients were submitted to an infusion of local anesthetic before the procedure in order to reduce pain. During the sessions, movements in random directions were carried out with the rollers to create microchannels in the scalp. After using the roller, the treated area received a solution with growth factors to be massaged into the scalp. After the treatment, the results evaluated with TrichoScan and trough photos of the scalp showed significant improvement in the patients' clinical conditions. Therefore the microneedles therapy was proved to be an effective method in the treatment of androgenic alopecia.

P-04: Iatrogenic androgenetic alopecia in a male phenotype 46XX true hermaphrodite

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Androgenetic alopecia (AGA) is a term that describes the androgen dependent and genetically determined nature of the disease. However, although it is known that androgen replacement therapy can induce AGA, no report has been previously issued regarding the development of iatrogenic AGA in a hermaphrodite undergoing androgen therapy. Herein,

we describe a unique case of a castrated male phenotype 46XX true hermaphrodite receiving exogenous androgen supplementation who developed male-type hair loss. A 21-year-old male phenotype 46XX true hermaphrodite presented with a 3-year history of progressive hair loss. At the age of 16 years, he was diagnosed as a 46XX true hermaphrodite with bilateral ovotestis, and subsequently underwent bilateral orchiectomy and testis prosthesis insertion. In addition, he was then given testosterone replacement therapy (Jenasterone®, testosterone enanthate) for surgically-induced andropausal status, which halted the development of secondary sexual characteristics. After three years of androgen therapy, progressive hair thinning developed on the scalp. Under a diagnosis of iatrogenic androgen-induced alopecia, finasteride (1 mg daily) therapy was started. After 4 months of treatment, the hair loss stabilized and scalp hair regrowth was observed, despite the continuance of testosterone replacement therapy. This is the first case of iatrogenic AGA in a patient with true hermaphroditism, which is exceedingly rare. It is a reminder that iatrogenic AGA should be considered in these patients with testosterone replacement therapy.

P-05: Hair miniaturization evaluation before hair transplant in female pattern hair loss

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The androgenic alopecia (AGA) of the woman is defined by a diffuse thinning and a progressive reduction in the density of the hair of the frontal part of the scalp and vertex with the respect of a frontal hair-line. This evolution is done by a process of transformation of the terminal hair into vellus-like hair, called miniaturized hair, under the influence of hereditary and androgenic factors. The phenomenon of miniaturization of the hair is marked by the reduction in the diameter of the hair, the reduction of their speed of linear growth, the reduction in the total number of hair and thus of their density on the scalp at a later stage. The method of scoring by videomicroscopy of the androgenic alopecia of the woman is a simple examination procedure which is done in a single shot after shaving a small hairy zone on the donor and receipt area. It has the advantage of confirming the diagnosis of AGA by the identification of miniaturized hair and quantifying them by a report/ratio with the terminal hair by giving the Rate of miniaturization. This predictive index makes it possible to evaluate the evolutionary risk of the AGA. Before even the appearance of the first visible signs of the alopecia, it allows to specify the topographic zones reached and to follow the evolution of the alopecia.

P-06: Therapeutic effect of gelatin as a dietary supplement for female hair loss

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In early studies about the effect of gelatin, recommended high doses of gelatin from seven to fourteen grams daily had the

desired clinical effect on effective treatment of female pattern hair loss and even nails. The use of high doses of gelatin in clinical use limited the compliance of the female patients to the treatment, may be due to the bad taste of gelatin in high doses or due to vomiting and nausea and in part in the fact that it required to consume four pills a day instead of the use of gelatin power dissolved in water to reach the desired goal of seven to fourteen grams of gelatin daily over long periods. Later on Morganti *et al* and Padova *et al*, have showed similar results in their studies on female pattern hair loss with the use of gelatin from two grams but with additional combination with cysteine and/or other formulas daily. From the successful studies of Morganti *et al*, with the use of low dosages of gelatin of two grams daily with cysteine, Dr. Zeev Pam, theorized that the low doses of pure gelatin from 1.5 to 3.5 gram alone daily could be effective in treatment of female pattern hair loss. The main difference that Dr. Zeev Pam, has showed in his large clinical experience with the treatment of gelatin on many female patients, that pure gelatin alone in one-two doses was the successful component to affect the female pattern hair loss.

P-07: Defferent expression of inflammatory cytokines and nociceptive mediators influence the trichodynia in female pattern hair loss

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Many women usually complain to the doctor about their hair loss exaggeratedly and talk about trichodynia for evidence of hair loss. To evaluate the real relationship between hair loss and trichodynia, we investigated the expressional changes of several inflammatory and nociceptive mediators. Forty female pattern hair loss (FPHL) Korean patients (28-57 years) with M0F1 BASP type were enrolled. Tissue specimens were obtained by 4 mm punch skin biopsy from the suspected hair loss area. mRNA expressions of IL-1 beta, IL-2, IL-4, IL-6, TNF alpha, INF gamma, NGF, substance P and neurokinin- 1(NK-1) receptor were determined by RT-PCR. These mediators were also checked in peripheral blood leukocytes. Fifteenth scalp skin specimens were obtained from normal haired subjects during cosmetic surgery (22-53 years) as controls. The mRNA expression of substance P, NGF and NK-1 was significantly increased ($P<0.03$). Inflammatory cytokine TNF alpha and IL-6 mRNA levels were significantly higher as compared to controls ($P<0.05$). Although IL-2 mRNA was upregulated, it was no reached statistically significance. There were no mRNA expressional correlations between tissue and peripheral blood leukocytes. Trichodynia induced expressional alteration of some inflammatory cytokines and nociceptive mediators in FPHL lesional skin. Its alteration not influences the peripheral blood gene expressions. Albeit trichodynia associated hair loss is still controversial, our study proposes the possibility of its involvement in hair loss through nociceptive mediators.

P-08: Female pattern hair loss – Not always patterned!

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In females, Androgenetic alopecia (AGA) usually presents with diffuse thinning over crown (widening of the partition). Conventional Ludwig-classification underestimates early-Female pattern hair loss (FPHL). FPHL could be a diffuse process, which may present without patterning. We wanted to determine the prevalence of histo-pathological evidence of AGA in Indian females with chronic diffuse telogen hair-loss, without apparent patterned hair thinning with the aid of a triple, horizontally-sectioned scalp-biopsy procedure. 80 Indian females complaining of increased shedding of hair of >6 months duration with reduction in volume of hair but without any evidence of thinning over crown were enrolled and subjected to a triple scalp-biopsy procedure, all sectioned transversely. Diagnostic definitions were applied (Terminal hair: vellus hair ratio $\leq 4:1$ was diagnostic of FPHL; $\geq 8:1$ of chronic telogen effluvium (CTE); and ratios between 4:1-8:1 were indeterminate). After analyzing 240 biopsies from 80 women, 46/80 (57.5%) had FPHL, 26/80 (32.5%) had CTE, and 8/80 (10%) were indeterminate. Had scalp-biopsy not been offered these 80 patients, there would have been a delay in diagnosis of AGA (in >57% of women), delaying treatment. Scalp-biopsy can also help to distinguish CTE from FPHL. Though scalp-biopsy serves as a diagnostic tool for early 'non-patterned FPHL', it is currently grossly underutilized. It should be offered as a routine diagnostic procedure in women presenting with hair-loss; especially with chronic hair shedding without thinning; where a clinical diagnosis of FPHL is not possible. Indeterminate group of patients should be followed up to see whether they finally evolve into FPHL.

P-09: Evaluation of hair shaft anomalies in alopecia areata by optical coherence tomographyNatalie Garcia Bartels*, Irina Jahnke, Alexa Patzelt¹,*Heike Richter¹, Jürgen Lademann¹, Ulrike Blume-Peytavi¹ Department of Dermatology and Allergy, Clinical Research Center for Hair and Skin Science, ¹Center of Experimental and Applied Cutaneous Physiology, Charité- Universitätsmedizin Berlin, Berlin, Germany.***E-mail: Natalie.garcia-bartels@charite.de*

The caliber of hair shafts, measured with electron microscopy, can vary in patchy hair loss like alopecia areata (AA). Optical coherence tomography (OCT) however, can provide highly reproducible measurements of hair shaft thickness, diameter, cross sectionals surface area and hair shape. The advantage toward histology is that it can be done *in vivo*. This study explores whether OCT can be used as a standard method in evaluating hair shaft abnormalities in AA. Fifty hairs from the border of an alopecic area and 50 hairs from an area without hair loss were examined by OCT, taken from nine patients with AA ($n=9$). Cross-section (CS) and form factor were the previously

determined hair parameters. A fixed measuring distance from the scalp surface was set. The ratio between the maximal and minimal hair diameters constituted the form factor ($d_{\max}/d_{\min}$). In all cases the hair CS from an unaffected area were significantly higher compared to hairs of an AA patch. Hair growth disturbances were not indicated by the form factor. In active lesions of AA structural abnormalities of hair shafts are found in all cases. Areas without hair loss remain unaffected. The hair CS from clinically unaffected areas was significantly higher than the examined hairs from an AA patch. Disturbances in hair growth were not indicated by the form factor. OCT is a non invasive way to gain more insight into the pathogenesis of AA and therefore a promising technique.

P-10: Immune regulatory roles of Calcitonin Gene-Related Peptide in human hair follicleLong-Quan Pi*, Xing-Hai Jin, Han-Nah Hong, Sung-Yul Lee, Yoon-hee Lee, Sungjoo Tommy Hwang¹, Won-Soo Lee*Department of Dermatology and Institute of Hair and Cosmetic Medicine, Yonsei University Wonju College of Medicine, Wonju, Korea; ¹Dr. Hwang's Hair-Hair clinic, Seoul, Korea.***E-mail: plq0508@gmail.com*

Hair follicle is a widely available and instructive immune privilege (IP) mini organ in human body that it can be used for a model of studying the maintenance, collapse and restoration of IP. And there are various regulation factors acting on the generation, maintenance, and collapse of hair follicle IP. It is well known that neuropeptides Calcitonin Gene-Related Peptide (CGRP) are created in many organs including skin and display various immune regulation effects. The purpose of this study is to investigate the phenotypic effect of CGRP on the hair follicle's IP. First, we used a potent catagen inducer-interferon- γ to make a ectopic MHC class I expression model in cultured human hair follicles, and then, we examined the effects of CGRP on the regulation of ectopic MHC class I expression in cultured human hair follicles using Reverse Transcriptase - Polymerase Chain Reaction (RT-PCR) and immunohistochemical stain technique.

P-11: Hypersensitivity may be involved in alopecia areata incognita

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To explore the characteristics of alopecia areata incognita (AAI) and possible factors involved in its pathogenesis in Chinese patients. Clinical and laboratory data including dermoscopic and pathological findings of 17 patients with AAI were analyzed retrospectively. 27 healthy subjects were used as controls for serum IgE level while 37 cases of patchy AA (PAA) were used as control group for histological comparison. The AAI patients had mean age of 27 years and mean disease duration of 1.77 months. All of them presented in spring or summer with an

acute onset of diffuse hair loss preceded by a higher incidence of scalp pruritis as compared to PAA. Serum IgE level in the study group was higher than healthy controls but was comparable to PAA group. Histopathology of lesional scalp biopsies showed more intense mononuclear cells' and eosinophilic infiltration around hair follicles in the AAI group than in the PAA group ($P=0.018, 0.046$). However, mast cell infiltration; terminal to vellus and anagen to telogen ratios between the two groups showed no significant difference. AAI patients showed better therapeutic response to steroids at 6 months follow-up as compared to patchy AA patients ($P<0.001$). In AAI patients, onset of hair loss is in spring and summer. The condition has a fast progression and is characterized by a high serum IgE level, intense mononuclear cell and eosinophilic infiltration and a better prognosis at 6-months follow-up. Therefore, hypersensitivity may be involved in pathogenesis in AAI.

P-12: Low serum levels of dehydroepiandrosterone-sulfate (dhea-s) in patients affected by severe forms of alopecia areata

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Hormones of Hypothalamic-Pituitary-Adrenal Axis are known to operate an Immune Responses modulation and this is evident also in autoimmune diseases, such as rheumatoid arthritis, systemic lupus erythematosus, Sjogren disease and autoimmune thyroiditis. In this study we looked into the basal levels of Prolactin, ACTH, Cortisol, Dehydroepiandrosterone Sulphate, to investigate if it could be a gross hypothalamic-pituitary-adrenal axis perturbation in severe cases of Alopecia Areata (involvement >25% of scalp hair) often associated to other autoimmune diseases, especially Hashimoto's Thyroiditis. On a total of 142 patients (56 Males and 86 Females- average age 36 yrs, not in systemic steroid therapy) we did not find significant imbalance of basal level of Prolactin, ACTH and Cortisol, but DHEA-S in the majority of the patients – women especially- was significantly decreased. At the moment we cannot determine surely whether this deficit is pre-existing or subsequent to the onset of pathology, but in any case many studies have shown that DHEA has significant immunomodulating activity and could be useful in restoring immune regulation in patients with chronic autoimmune diseases. So it is mandatory to investigate if this is the case for the management of the patients affected by severe forms of alopecia areata.

P-13: Association of frontal fibrosing alopecia and triple X karyotype

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Frontal Fibrosing Alopecia (FFA) is a primary cicatricial alopecia characterized by a progressive frontotemporal hairline recession. The disease affects most often postmenopausal women.

Histologically, FFA is indistinguishable from lichen planopilaris. We report the case of FFA associates with a Triple X karyotype in its mosaic form (47 XXX, 46 XX), revealed in a context of infertility and premature menopause. This association sustains the hypothesis that hormonal changes may have an inducing role in the genesis of this cicatricial alopecia. Furthermore, it gives us insight into a possible link between hormonal climate and immunity, knowing the role of the X chromosome in the maintenance of immunocompetence.

P-14: The follicular triad is a histopathologic clue to frontal fibrosing alopecia

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Frontal Fibrosing Alopecia (FFA) is a clinically distinct form of Lichen Planopilaris (LPP) and a histopathologic variant of primary lymphocytic cicatricial alopecia. Although clinically distinctive, FFA is sometimes difficult to distinguish from alopecia areata (ophiasis pattern) and marginal cicatricial alopecia. Furthermore, histopathologic distinction from other forms of scarring alopecia could be difficult on histopathologic basis only without a relevant clinical history. We report a case of clinically suggestive FFA in which a dermoscopy guided 4 mm scalp biopsy was obtained and sectioned transversely. The histopathology showed a LPP pattern. A particular feature was the simultaneous involvement of follicles of different types (terminal and intermediate/vellus) and in a different stage of cycling (anagen and catagen/telogen). We referred to this sign as a "follicular triad". A retrospective evaluation of 10 scalp biopsies and 5 limb biopsies of FFA identified the "complete follicular triad" (anagen, catagen/telogen and vellus/intermediate follicle) or the "partial follicular triad" (anagen or catagen/telogen and vellus/intermediate follicle) in 33% of the scalp biopsies and 40% of the limb biopsies. The involvement of different follicular types (terminal, intermediate and vellus) and in a different stage of cycling (anagen, catagen and telogen) is characteristic for FFA.

P-15: Two Korean adolescents dissecting cellulitis cases treated successfully by with isotretinoin and surgical intervention

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Dissecting cellulitis, also known as perifolliculitis capitis abscedens et suffodiens, is an uncommon inflammatory disease. The actual etiology of dissecting cellulitis is not well known, but the condition is thought to be caused by follicular occlusion, which results in a severe inflammatory reaction. It usually presents in blacks and is rare in Caucasians and Asians. Including our 2 cases, there are just 6 cases reports in Korean in the literature. Dissecting

cellulitis is classified together with hidrenitis suppurativa and acne conglobata as the follicular occlusion triad. Treatment of this disease is very challenging, and there is no optimal treatment regimen. Many clinical trials have been conducted on potential treatments for the disease, including isotretinoin, quinolones, and even radiotherapy. Currently, isotretinoin is the first-line treatment of choice, and there are some additional recommended regimens for black patients in Western countries. There are currently no recommended treatment options for Asians. We have noted that in our patients, the side effects of isotretinoin, such as dryness of the mouth and conjunctiva, occurred more frequently and at lower doses than what is recommended in Western countries. Therefore, in the two cases that we report, we prescribed lower doses of isotretinoin than the recommended dose for black patients, along with repetitive incision and debridement with aseptic dressings. Here, we report two cases of dissecting cellulitis in Korean adolescents that improved with isotretinoin and surgical intervention, and we recommend a more suitable treatment regimen for Korean patients.

P-16: Frontal fibrosing alopecia developed after tamoxifen

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Frontal fibrosing alopecia (FFA) is a lymphocyte-mediated scarring alopecia, characterized by slowly progressive recession of the frontoparietal hairline usually, yet not exclusively, affecting postmenopausal women. The selective estrogen receptor modulator tamoxifen has been used in breast cancer treatment and prevention. It may act as a full estrogen agonist, partial agonist or antagonist depending on the dose, species, sex or target organ. There are four reports of alopecia induced by tamoxifen in the literature. Three of them developed alopecia in an androgenetic pattern; namely one in the crown area, one had alopecia of the temples and one had a female pattern alopecia with recession of the hair line. The fourth patient developed alopecia in an ophiasic pattern evolving to total scalp alopecia. We report for the first time a case of a 64-year-old woman who developed frontal fibrosing alopecia after receiving tamoxifen. Tamoxifen was used for 5 years and stopped before the patient came to our clinic, without hair regrowth after a three years follow-up. The epidemiologic predominance of FFA in postmenopausal women and its occurrence in areas of androgenetic alopecia raises the question of the role of androgens and estrogens on its pathogenesis. It is known that estrogens influence hair follicle growth and cycling by binding to locally expressed high-affinity estrogen receptors and through androgen metabolism modification by 17 β -estradiol within distinct subunits of the pilosebaceous unit. This report reinforces the importance of sexual hormones, particularly estrogen, in the etiopathogenesis of FFA.

P-17: Adult alopecia areata - A trichoscopic patterns study

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Dermoscopy of hair (Trichoscopy) allows to explore the hair at 10 to 800 magnifications and to observe precisely the types of hair, follicular openings, the peripilar signs, and to follow up the evolution of the disease or the treatment efficacy prior to naked eye clinical observation. 84 adults with 143 plaques of alopecia areata were studied by trichoscopy before and after 3 months of treatment in order to find which are the most common trichoscopic patterns and their frequency in adult alopecia areata. 71.3% of plaques had regularly distributed yellow dots-corresponding to hyperkeratotic plugs in hair follicle; 51.7% had exclamation mark hair; 46.1% had dystrophic –broken hair; 27.9% had cadaverised hairs-black dots in the hair follicles; 8.8% had short pseudo regrowing hairs- which are apparently regrowing but they are atrophic hairs and they are a sign of activity of alopecia areata. They mostly disappear at 3 months trichoscopic follow up 13.2% had corkscrew hairs; 4.8% had circle hairs; 4.1% had vellus hairs- 0,03 mm or less in thickness. 3.5% had white dots-feature of fibrosis; seen in extensive and persistent (more than three years) alopecia areata. No pseudomoniletrix hairs were found. The most frequent pattern is the presence of regular yellow dots (71.3%), the second is the presence of exclamation mark hairs (51.7%) and the third is the presence of dystrophic-broken hairs (46.1%). The presence of pseudoregrowing hairs is a sign of the activity of alopecia areata. They are thin hairs that differ from normal thick real regrowing hairs- sign of the treatment efficacy.

P-18: Lichen planopilaris; our experience on evaluation, demographic and clinical features between 2009 and 2011 at the Competence Center for Hair and Hair diseases, Charité Universitätsmedizin Berlin

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Lichen planopilaris (LPP) is a cicatricial alopecia that primarily affects the scalp, resulting in scaling, atrophy and scarring. The scarring is caused by chronic lymphocytic inflammation around the upper portion of the hair follicle. Usually the LPP is a clinically diagnosis, but also in an early stage with typically histological findings. The LPP can be subdivided into 3 groups: the classic LPP, frontal fibrosing alopecia and the Graham-Little-Picardi syndrome. In the literature the prevalence percentage of LPP in cicatricial alopecia is described with 28%. The origin of LPP remains poorly understood, despite a suspected autoimmune origin. It is often chronic and relapsing. In the

present retrospective study we aimed to assess the clinical spectrum of LPP patients at our center. We reviewed a medical record of patients with the diagnosis of LPP between 2009 and 2011 at the Competence Center for Hair and Hair diseases, Charité Universitätsmedizin Berlin. The patient demographic data, clinical features and diseases onset and duration, associated diseases and other possibly concomitant factors were evaluated. We believe that further descriptive studies on the patient population are needed to build up our understanding on the etiopathogenesis of LPP.

P-19: Primary cicatricial alopecias: Clinicopathology of Korean cases

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Cicatricial alopecias represent a diverse group of diseases characterized by permanent destruction of the hair follicle and irreversible hair loss. The varied clinical features and differences in terminology have led to difficulties in defining consistent clinicopathologic correlation. This study reviewed the epidemiology, clinical characteristics, pathology, immunohistochemistry and treatment of cicatricial alopecias in Asian population referred to a university hospital. Case records and histopathology of 25 patients with primary cicatricial alopecias, seen at the Asan Medical Center, Korea, were studied from 2006 to 2009. In addition, we reviewed the immunohistochemical studies of regulatory T-cell. The mean patient age was 38 years (range, 18–66 years), and the male to female ratio was 1.8:1. Lymphocytic cicatricial alopecias, including cutaneous lupus erythematosus, classic pseudopelade, and lichen planopilaris, were 6/25 cases. Neutrophilic and mixed cicatricial alopecias, such as folliculitis decalvans, dissecting folliculitis, and acne keloidalis, were 19/25 cases. Folliculitis decalvans was most common in this study. There was no distinct difference of clinical course between both groups. We suggest that a scalp biopsy is mandatory in all cases. Multiple biopsies may be necessary for some affected individuals to achieve a definitive diagnosis due to highly variable clinical course. An aggressive multiple modality for therapeutic approach is often necessary to prevent further irreversible follicular destruction.

P-20: Lichen planopilaris: Review of treatments and evaluation of the possible efficacy of doxycycline

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Lichen planopilaris (LPP) is the most common cause of scarring alopecia. This progressive inflammatory disease can induce a slow hair loss over many months, and a severe irreversible alopecia. The treatment is difficult and very challenging. Furthermore, when a treatment is efficient, relapse is frequent after stopping the

drug. In a first part we review the current proposed treatments: topical or systemic corticotherapy, hydroxychloroquine, thalidomide, and cyclosporine and mycophenolate mofetil. In a second part, we report the retrospective results of 40 patients treated with doxycycline (100mg/day) and ultrapotent topical corticotherapy (clobetasol propionate once daily) for LPP with a clinical assessment and a haircount survey. They were 18 patients with 6 to 12 months of hair count follow-up with the Trichoscan® software, on a selected marked area. After 6 months we observed a decrease in hair count for only 4 patients, a stable count for 5 and a slight improvement for 9 (50%). For 9 patients with a hair count follow-up available after 9 and 12 months results were still positives for 7 of them. These results are better than those observed previously with hydroxychloroquine, thalidomide or etretinate and support the possible efficacy of doxycycline in LPP. Further randomized control studies over 12 months are needed to fully evaluate this treatment and the roles of doxycycline and topical corticotherapy in those results.

P-21: Tufted hair folliculitis

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Tufted hair folliculitis is a rare folliculitis of the scalp that resolves with patches of scarring alopecia within multiple hair tufts emerge from dilated follicular orifices. Tufting of hair is caused by clustering of adjacent follicular units due to a fibrosing process and to retention of telogen hairs within a dilated follicular orifice. Various pathogenetic mechanisms have been discussed including nevroid abnormalities, recurrent infections of the follicles and retention of telogen hair in the tufts. We present a patient with tufted hair folliculitis who was effectively treated with antibacterial medications verifying an infectious nature of the disease.

P-22: A possible continuum from reversible to irreversible forms of alopecia

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Classically patients carry a well distinguished form of alopecia, cicatricial or not. It is interesting that in some cases is possible to observe a reversible alopecia moving to a permanent one. Taking a clue from 4 clinical cases the possible etiopathogenesis of the different follicular damage has to be discussed.

P-23: A study of potential application of *rubus coreanus* miquel extract for seborrheic dermatitis treatment

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Seborrheic dermatitis is chronic relapsing inflammatory skin disorder. Bokbunja (*Rubus Coreanus* Miquel) is a wild berry to Rosaceae genus and also known to have an anti-inflammation effect. We were to determine the effect of *Rubus Coreanus* Miquel extract for seborrheic dermatitis *in vivo* and *in vitro*. Seven patients with mild seborrheic dermatitis were enrolled in this study. PCR and culture were performed to identify subtypes of six *Malassezia* species (*M. restricta*, *M. globosa*, *M. furfur*, *M. slooffiae*, *M. sympodialis*, *M. obtusa*). Topical application of *Rubus Coreanus* Miquel Extract was applied twice daily for 2 weeks. Clinical improvement and safety assessment were performed initially and 2 weeks later. Minimum inhibitory concentration (MIC) was evaluated on *Malassezia globosa* comparing with ketoconazole and itraconazole. Sebum production was also checked prior the experiment and 2 weeks later. 5 of 7 patients showed improvement. No significant adverse effects were found during the clinical trial. Mild dryness was reported in 2 patients but they resolved spontaneously without any treatment. *Rubus Coreanus* Miquel Extract didn't show antimicrobial effect to *Malassezia globosa*. However, *Rubus Coreanus* Miquel extract showed anti-inflammatory effect. In this study, we were verified that *Rubus Coreanus* Miquel Extract can be applied for seborrheic dermatitis treatment. And this action mechanism is not related with antimicrobial effect.

P-24: Synthesis of benzoxazole amides as novel antifungal agents against *malassezia furfur*

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Malassezia is a pathogenic fungus that causes skin diseases, such as tinea versicolor, atopic dermatitis and fatal sepsis. We report the synthesis of a series of benzoxazole amides and evaluation of their antifungal activity against *Malassezia furfur*. Twelve benzoxazole amides were prepared through the cyclization of the substituted 2-hydroxy aniline with *N*-(bis-methylsulfanylmethylene) amides. Among the prepared compounds, the compounds 4a, 8b, 8c and 8d showed *in vitro* antifungal activity.

P-25: Effects of arginine on human dermal papilla cells

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We wanted to study the effects of arginine on human dermal papilla cells (DPCs). Five different concentrations of arginine were incubated with human dermal papilla cells for 48 h. Then the cell proliferation was detected respectively by using MTT assay and flow cytometry. At the same time the protein synthesis of VEGF, FGF, SRD5A, androgen receptor (AR) and estrogen

receptor (ER) was investigated with RT-PCR. Arginine promoted DPC proliferation at the low concentration (0.1mmol/L), but at the high concentration (5mmol/L) it restrained DPC proliferation. The effect of hair growth promoting was in concentration dependent, with the maximum effect at the concentration of 0.5mmol/L. The mRNA expressions of VEGF, FGF and ER were significantly increased and AR, SRD5A were decreased in arginine treated group comparing with negative control group. Arginine could stimulate the proliferation of DPC, which may be attribute to the effect of stimulating the expressions of VEGF, FGF and ER and inhibiting the expression of AR and SRD5A.

P-26: The extract of *malva verticillata* seeds up-regulates Wnt pathway in dermal papilla cells

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The hair growth and cycle are regulated by signals from the dermal papilla cells located in the bottom of a hair follicle. Especially, beta-catenin pathway within the dermal papilla acts on morphogenesis and normal regeneration of hair. Deletion of *beta-catenin* in the dermal papilla reduces proliferation of hair follicle progenitor cells that generate the hair shaft and induces early onset of catagen phase. In this study, we searched for modulator of dermal papilla cell activity from oriental medicinal plants using beta-catenin-TCF/LEF reporter gene (Topflash) assay. The total extract of the *Malva verticillata* seeds increased Topflash activity in concentration-dependent manner. It also enhanced phosphorylation of beta-catenin at Ser675. Particularly, the water soluble fraction of the *Malva verticillata* seeds not only activated phosphorylation of beta-catenin at Ser675 but also increased the transcription of downstream targets such as KGF, TGFβ-2 and wnt5a. The effect of myristoleic acid was found to be mediated by akt and p38 pathways. These data altogether suggest that *Malva verticillata* seeds extract can be a good candidate for improvement of hair loss as a modulator of Wnt/beta-catenin pathway in dermal papilla cells.

P-27: Effects of dexamethasone on human dermal papilla cells *in vitro*

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Glucocorticoid is synthesized mostly in the adrenal gland and secreted in response to stressful conditions. The stress-induced increase of systemic glucocorticoid is known to be able to provoke diverse cellular damage. However, the specific effect by glucocorticoid on dermal papilla cells of hair follicles may

not be clearly known, although stress-related hair loss tends significantly to increase in recent years. The objective of this study was to determine the effect of dexamethasone (Dex), a synthetic glucocorticoid on human dermal papilla cells (DPCs) *in vitro*. We evaluated the effect of Dex on cell proliferation, survival, and the expression of growth factors from dermal papilla cells. Dex treatment (1 μ M) reduced the number of viable cells and the secretion of VEGF. The phosphorylation of ERK and AKT, which had been reported to regulate cell proliferation of DPCs, was decreased. The expression of the human Ki-67 protein, cell cycle related antigen, was reduced significantly. Moreover, the growth of hair follicles was suppressed in *ex vivo* human hair organ culture with Dex treatment compared to control. Taken these *in vitro* and *ex vivo* results together, it is concluded that Dex would hamper human hair growth through these anti-proliferative effects on human DPCs.

P-28: Hair growth promotion effects of jaceosidin on *vivo* and *in vitro*

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This study was designed to investigate the effects of jaceosidin (4',5,7-trihydroxy-3',6-dimethoxyflavone) isolated from the fraction of Chrysanthemum zawadskii extract in hair growth *in vivo* and *in vitro*. Jaceosidin was applied topically onto the back of C57BL/5 mice for 40 days once a day. Proliferation of human dermal papilla cells and cell toxicity level of Jaceosidin were determined by MTT assay. After then, we performed reverse transcription polymerase chain reaction to determine which related growth factor or inhibitory factor to the hair growth would be involved in hair growth effect of Jaceosidin. It seemed to be that Jaceosidin down-regulate the level of TGF- β m-RNA expression and no effect to the other related factors. Hair shaft elongation was measured by organ culture model of human scalp hair follicles. Also, immunohistochemical stain for TGF- β expression in the bulb region was taken to confirming that Jaceosidin lower the expression of TGF- β . As results, Jaceosidin induce the earlier conversion of telogen to anagen *in vivo*, promote proliferation of human dermal papilla cells *in vitro*. These results suggest that Jaceosidin have hair growth promoting potential through the regulation of inhibitory factors, TGF- β in dermal papilla cell and promotion of dermal papilla cell proliferation.

P-29: Significant improvement of diffuse telogen effluvium with an oral fixed combination therapy – A meta-analysis

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Diffuse telogen effluvium is a common idiopathic or symptomatic disorder of the hair cycle. The therapeutic goal is a cessation of shedding. Treatment with a fixed oral combination containing medicinal yeast, l-cystine and pantothenic acid (Pantogar[®]) has been investigated in several clinical studies. In order to test the efficacy in a large patient population, the systematic approach of a meta-analysis was chosen. A full literature search yielded 11 studies for further analysis. Three endpoints (investigator satisfaction, patient satisfaction and anagen hair rate) were analysed. In order to avoid bias of the results, all studies investigating each endpoint were included. For the endpoint investigator satisfaction, three studies with 1682 patients were included. For 84% of patients, the treatment results were evaluated as very good or good ($P < 0.0001$). For the endpoint patient satisfaction, four studies with 2047 patients were included. 83% of treated patients rated the effect as very good or good ($P < 0.0001$). For the endpoint anagen rate, four randomized, placebo-controlled studies with 180 subjects were analyzed. The anagen rate in the verum group improved by an absolute percentage of 3.83 ($P = 0.00006$) compared to placebo. The meta-analysis confirms the efficacy of the therapy with high significance. The increased anagen rate reflects a normalization of the hair cycle disturbance. Possible mechanisms of action are increased supply of nutrients, stimulation of hair matrix cells and anti-oxidant effects. A fixed combination therapy of at least 3 months with medicinal yeast, l-cystine and pantothenic acid can be recommended to patients with diffuse telogen effluvium.

P-30: Effect of the Hairmax LaserComb on post-chemotherapy-induced alopecia

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Alopecia is a distressing side effects chemotherapy for which there is no cure. The only animal model of Chemotherapy-Induced Alopecia (CIA) which has been correlated with the humans is the young rat model. The Hairmax LaserComb is used to treat androgenetic alopecia. In the current study, we have employed the young rat model of CIA using cyclophosphamide, etoposide, and a combination of cyclophosphamide and doxorubicin. Rats were randomized into three groups: one received chemotherapy; the other received treatment with the Hairmax LaserComb daily for 10 days turned off and the third was treated with the LaserComb turned on. 7 to 10 days later, alopecia ensued in all groups. The group receiving treatment with the Hairmax Lasercomb regrew the hair 5 days earlier than the untreated and sham groups. These findings were confirmed by histopathology. Thus, treatment with the Hairmax Lasercomb may provide a means of accelerating hair regrowth in CIA. One important aspect of the protective regimen in CIA is the lack of protection of the cancer cells from chemotherapy. We

therefore tested whether the Hairmax LaserComb had any effect on subcutaneously injected cancer cells. After injecting the cancer cells, treatment was started with cyclophosphamide and rats were treated with the LaserComb. Our preliminary findings indicate that there is no localized protection of the cancer cells. Our results should be extrapolated to the treatment of PCA because the Hairmax Lasercomb provides a user friendly and non-invasive approach which could be translated to increased patient compliance and improved efficacy.

P-31: The role of 5-hydroxytryptophan for chronic telogen effluvium treatment in women

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Chronic telogen effluvium (CTE) is common condition associated with physical and psychological causes. Among the psychological causes, anxiety and depression have been confirmed as factors in the maintenance of the CTE. Our study assessed 37 women between 21 and 49 years old, diagnosed with CTE, who presented diffuse hair loss over 2 years. The total of these women did not presented any intrinsic or extrinsic physical motivator by clinical or laboratory examinations. But as psychological symptoms they all presented severe anxiety or some level of depression. 5-hydroxytryptophan (5-HTP) is a nutrient derived from the tryptophan amino acid found in high protein foods like meat, fish and some dairy products. 5-HTP is a direct precursor of the neuropeptideserotonin that contributes to the regulation of mood states of anxiety and depression caused by their personal problems and their hair loss. The volunteers were divided into two groups. In the first group, 21 of them took 200mg/day of 5-HTP during a period of 6 months. The remaining 16 patients received placebo during the same time. The two groups of patients were evaluated with TrichoScan before the study begins and 6 months later. In the group who took 5-HTP, 2 women abandoned the study and 6 women of the placebo group dropped out. The results showed a significant reduction of hair loss observed by TrichoScan in patients who were taking 5-HTP, compared to women who used the placebo. The patients who took 5-HTP reported mood improvement as well as significant reduction in anxiety.

P-32: Temporal triangular alopecia: Successful treatment with topical minoxidil

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Temporal triangular alopecia (TTA) is a rare form of nonscarring alopecia confined to the frontotemporal area of the scalp. The pathogenesis of TTA is unknown and it usually appears in the early years of life rather than at birth. Clinically, it is usually

presented with unilateral, triangular or oval shaped alopecic patch. Histologically, there are almost no terminal hairs and the number of vellus hairs is increased. If untreated, the patch of alopecia persists for life. None of the medical treatment has been proven effective and surgical treatment is the only therapeutic alternative. We successfully treated a 2-year-old girl with temporal triangular alopecia by application of 3% topical minoxidil. The miniaturized hairs had grown up to be terminal hairs. But the hairs stopped growing when the patient no longer applied topical minoxidil. Our case suggests that TTA may be related to the dysregulation of the hair cycle.

P-33: A descriptive study of alopecia patterns and their relation to thyroid dysfunction

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It is a well established fact that dysfunction of thyroid gland is associated with alopecia. Although there are many studies relating to thyroid and hair loss they are all based on a univariate analysis. Here we have attempted to study multiple variables of alopecia with relation to thyroid disorder. Patients who attended an exclusive dermatology centre with complaints of hair loss of any part of the body were seen and classified into different sex, age and patterns of alopecia based on clinical diagnosis and their relationship thyroid disorder and associated clinical conditions was studied. They were tested for TSH and autoantibodies to thyroid peroxidase (TPOAb) by electro chemiluminescence immuno assay (ECLIA). Patients were categorised into euthyroid, hypothyroid, hyperthyroid, and subclinical according to lab results. A total of 1232 patients were seen during a period of 25 months. The main types of alopecia seen were diffuse alopecia (71.35%), alopecia areata (11.8%) and androgenetic alopecia (14.29%). A significant difference between sex and age was seen. Commonest was diffuse alopecia with significant thyroid dysfunction. Associations with alopecia and thyroid dysfunction were urticaria (62.5%), vitiligo (50%), acanthosis nigricans (43%), premature greying (25%), hirsutism (27%), psoriasis (27%), seborrheic dermatitis (25%), ichthyosis (18%). To our knowledge such a comprehensive study involving different patterns of alopecia and their relation to age, sex, thyroid dysfunction and associations does not exist and we believe this study would provide data for further studies.

P-34: Hairloss after Dengue virus infection – Report of 3 cases

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Dengue is a common disease in tropical and subtropical countries caused by an arbovirus. The virus is transmitted by the *Aedes aegypti* mosquito and can cause clinical manifestations in the infected organism for a period of approximately seven days

after the period of incubation (3 to 14 days). Dengue can affect children and adults and its most frequent clinical manifestation is high fever. Complications can occur such as hemorrhagic fever that is related with thrombocytopenia ($\leq 100,000/\text{mm}^3$) and hemorrhagic trend is evidenced by petechiae, ecchymoses, purpura and bleeding from digestive tract mucous. Plasma extravasation can occur by increased capillary permeability (identified by an increase in hematocrit of 20% compared to baseline, low hematocrit of 20% after appropriate treatment, pleural effusion, ascites and hypoproteinemia). During 2010, we evaluated and treated three adult female patients presenting severe hair loss 2 months after dengue infection. Two of them with history of dengue hemorrhagic fever. The clinical hair and scalp examination of the patients showed intense diffuse hair loss with a diagnosis compatible with acute telogen effluvium.

P-35: Non-scarring hair loss in systemic lupus erythematosus - A clinical study of 28 cases

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We wanted to study the clinical characteristics of non-scarring hair loss in systemic lupus erythematosus (SLE). Clinical, dermoscopic and laboratory data from 28 SLE patients with non-scarring hair loss complaints were collected and analyzed. Two patients with patchy alopecia and three patients with diffuse hair loss had scalp biopsy performed for histopathology. SLE activity and hair loss were evaluated using the SLE disease activity index (SLEDAI) and Olsen method respectively. Based on clinical manifestations, the types of non-scarring hair loss were divided into 4 patterns: diffuse hair loss (13/28, 46.4%), patchy alopecia (8/28, 28.6%), lupus hair (3/28, 10.7%) and combined types of hair loss (4/28, 14.3%). Scalp dermoscopic features found comprised of telangiectasia, hair shaft hypopigmentation and miniaturization of hair follicles manifesting as decrease in hair shaft diameter. Dermoscopic signs found in diffuse hair loss and patchy hair loss in the patients were different from those of telogen effluvium (TE), female pattern hair loss (FPHL) or alopecia areata (AA). Histopathology showed typical pathological changes of SLE; moreover the ratios of anagen to catagen and telogen hair follicles were significantly decreased, especially in diffuse hair loss patients. SLEDAI was found to be associated with type of hair loss and level of C4, but not with area of hair loss. Hair loss in SLE differs from TE, FPHL and AA in clinical and dermoscopic aspects implying that they may have different pathogenic process. The type of hair loss can serve as a marker to evaluate severity of the disease.

P-36: The Institute of Trichologists, London, UK

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In the United Kingdom, Trichologists see many hair and scalp

disorders that many others rarely see other than in text books. We have a very low number of Dermatologists per populous leaving them, in general, little time to keep updated with research into hair and scalp disorders, as the demands on their time are heavy dealing with life threatening, scarring and painful skin disorders and our general practitioners do not in general study the hair and scalp. There are of course a few dermatologists who do specialise in the hair and scalp. We are indeed fortunate to have one of those few as our President, Prof Andrew Messenger. Hence the high demand for those who specialise in the treatment of hair and scalp disorders. For this reason a group of our membership have come together to give statistics of the commonly classed "rare disorders" such as Frontal Fibrosing Alopecia. Is this disorder on the increase or has it been misdiagnosed in the past? Our statistics will demonstrate the sometimes frequent presentation of some of these previously considered rare disorders. It is my intention to deliver this information to you along with the percentages of more common disorders seen on a daily basis.

P-37: Clinical, microscopical and ultrastructural changes in 20 cases of trichothiodystrophy

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Trichothiodystrophy (TTD) is a rare autosomal dominant condition characterized by a Hair cystine deficiency. More than 210 cases have been reported up to now. 20 cases of TTD, 7 from Monterrey (Mexico) and the rest from our department are described. Clinical, microscopical, scanning ultrastructural studies (SEM) and X-ray microanalysis (XrMa) were performed in all of them. Genetic studies were performed in the seven Mexican cases. Clinical spectrum varied from subtle hair alterations associated to onychodystrophy to mental retardation, azoospermia, chronic neutropenia and immunoglobulin deficiency. In all cases hair was fragile and brittle. Pilotraction was positive and "tiger tail" aspect under polarized optical microscopy, with trichoschisis, flattened hair shaft with the presence of crests and cuticular changes were also seen at the SEM. All patients showed sulfur deficiency under XrMa. Genetic studies of the TTDN1 gene, did not show positive results in any of the 7 studied cases. Six patients had mental retardation, 4 ichthyoids and 2 photosensitivity, among other clinical abnormalities. TTD is today divided into photo and non photosensible (Faghri *et al.* 2008). Clinically there is a broad spectrum that ranges from very subtle forms up to extremely severe alterations that may even lead to premature death. Hair alterations are due to the lack of cystine in the hair shaft. Up to 40% of patients with TTD show photosensitivity in some series, and defects on DNA reparation are due to the mutations on the XPD, XPB or TTDA gens. TTDN1 gen has been associated to non photosensible TTD (chromosome 7p14) but it was not found in our 7 studied cases.

P-38: Loose anagen hair syndrome: Clinical and histopathological features

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Loose anagen hair syndrome is an autosomal dominant disorder seen commonly in young females characterized by easily pluckable anagen hair. Trichogram shows 70%-100% anagen hair with floppy sock appearance. Histopathology reveals clefting within the inner root sheath, between inner and outer root sheath, between outer root sheath and fibrous sheath. Most cases resolve spontaneously. 5% minoxidil lotion may be tried but is not of clear value. Nine year old girl presented with easily pluckable hair since childhood and no hair growth. Examination revealed dry, brittle, lusterless hair, patchy hair loss over the frontal and vertex region. Hair pull test was strongly positive. Trichogram showed 100% anagen hair with ruffled cuticle, giving a floppy sock appearance. Transverse H and E section showed numerous fractures and clefting within the inner and outer root sheath. On treatment with 2% minoxidil lotion, marked clinical improvement was seen at 3 months with negative hair pull test. Trichogram continued to show 100% anagen hair and floppy sock appearance. Clefting was seen within the inner and outer root sheath. Clinical response to minoxidil does not change the underlying pathology of loose anagen hair syndrome.

P-39: Dyschromatosis universalis hereditaria in association with trichorrhexis invaginata and May-Hegglin phenomenon

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Dyschromatosis universalis hereditaria (DUH) is a rare genodermatosis reported initially and mainly in Japan. The disease presents with asymptomatic mottled pigmentation over the trunk and limbs that usually appear in the first years of life. Physical examination shows numerous, generalized, hyperpigmented macules interspersed with spotty depigmented macules. Histology examination reveals diffuse lichenoid dermatitis with vacuolar degeneration, alternating areas of hyper- and hypo-melanosis, and prominent pigment incontinence in the papillary dermis with plenty of melanophages. Diagnostic verification is based on the specific physical and histology features. Recently, a new locus for autosomal-recessive DUH on chromosome 12q21-q23 in an Arab family has been identified. We present a 6-year-old boy with characteristic skin changes, which appear abruptly and progressed quickly to involve the total body surface area within 6 months. Palms and soles were also affected. Clinical and histology features were specific for DUH. No family members were affected. Furthermore, the patient had a history of atopic asthma during infancy. Physical examination

revealed hair defect characterized as trichorrhexis invaginata. Interestingly, the presence of small rods (around 3 micrometers) known as Dohle bodies were seen in the leucocytes of the patient. His thrombocytes were all normal sized. This phenomenon, called May-Hegglin anomaly, should correspond to recently found mutations in the genes encoding for nonmuscle myosin heavy chain IIA (MYH9). We present a unique case of DUH in association with hair and blood cell defects that may represent a new dysplasia syndrome encoded by specific mutations. Further clinical evaluation and genetic investigations are needed to unveil the obscure nature of the disease.

P-40: Protein disulphide isomerase-assisted functionalization of hair keratin

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In living systems, protein disulphide isomerase (PDI, EC 5.3.4.1) regulates the formation of new disulphide bonds in proteins (oxidase activity) and catalyzes the rearrangement of non-native disulphide bonds (isomerase activity), leading proteins towards their native configuration. In this study, PDI was used to attach cysteine-containing compounds (CCCs) onto hair to enhance compound migration within hair fibre and to trigger protein release. A fluorescent (5(6)-TAMRA)-labeled keratin peptide was incorporated into hair by using PDI. Similarly, PDI promoted the grafting of a cysteine-functionalized dye onto wool, as suggested by matrix-assisted laser desorption and ionization time-of-flight results. These reactions were thought to involve oxidation of disulphide bonds between CCCs and wool or hair cysteine residues, catalyzed by the oxidized PDI active site. On the other hand, PDI was demonstrated to enhance the migration of a disulphide bond-functionalized dye within the keratin matrix and trigger the release of RNase A from wool fibres' surface. These observations may indicate that an isomerisation reaction occurred, catalyzed by the reduced PDI active site, to achieve the thiol-disulphide exchange, i.e. the rearrangement of disulphide bonds between CCCs and keratin. The present communication aims to highlight promising biotechnological applications of PDI, derived from its almost unique properties within the isomerase family.

P-41: Keratosis pilaris atrophicans faciei and Keratosis follicularis spinulosa Decalvans – occurring in two siblings of a family – is it time to rename or regroup KPAF

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Keratosis pilaris atrophicans faciei (KPAF) and keratosis follicularis spinulosa decalvans (KFSD) occurring in family members within families have been individually described in literature. We are reporting a 22yr old man with KPAF and a 17yr

old boy with KFSD occurring in a family of 4 siblings with parents and other two siblings being normal phenotypically. The patient with KFSD had ulerythema oophryogenes, face lesions, marginal scarring alopecia of occiput and temporal regions and frontal margins with extension towards the centre of the scalp sparing the parietal scalp associated with extensive horny papules with loss of hair all over the trunk and also the limbs. The sibling with KPAF had predominant involvement of scalp (scarring alopecia) and eyebrows (lateral third) with mild Keratosis pilaris like lesions without atrophy over the abdomen, back and upper limbs. Biopsy done from the scalp region and horny lesions from trunk showed perifollicular dense inflammation with lymphocytes, plasma cells and macrophages involving superficial and deep follicles with many follicles being replaced by inflammatory cells and early fibrosis. Scalp biopsy also showed focal polymorphs in upper dermis, reported by pathologist as Folliculitis decalvans for both morphologies. Patient 1 responded better to oral antibiotics and Isotretinoin given for 3 months while, patient 2 responded poorly, particularly trunk lesions. Based on the clinopathological findings and occurrence of the similar phenotypic but variable extent and severity of the disease, I suggest that KPAF be regrouped under KFSD and may be renamed KFSD faciei or cephalii.

P-42: A three-dimensional hair follicle model with melanocytes to investigate pigmentation modulating effects *in-vitro*

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The human hair follicle is a highly specialized skin appendage continuously renewing itself and thus the whole machinery of the pigment producing unit to create the visible, highly pigmented hair shaft. However, during aging this machinery loses some of its characteristic functions, amongst others the ability to provide enough melanin for a naturally coloured hair fibre. Thus, greying is the most obvious sign of aged hair. However, the complex biological mechanisms controlling the pigmentation and also the greying process are still poorly understood. In order to evaluate the principles of the underlying mechanisms it is essential to provide a standardized test system as close to nature as possible. Therefore we included outer root sheath melanocytes in our established three-dimensional *in vitro* model, which allows different hair follicle cells in an *in-vivo* like spatial orientation to interact concordantly to their natural environment, the human hair follicle. In this *in vitro* model we integrated reconstructed dermal papillae with melanocytes into a pseudo dermis with dermal fibroblasts, covered by a layer of ORS keratinocytes. Herewith we showed the stimulating effect of alpha-melanocyte-stimulating hormone, a known modulator of pigmentation, on melanin content and melanogenesis associated gene expression. With this test system we set up a powerful tool to study hair follicle melanogenesis and the molecular events in the follicular pigmentary unit thus disclosing new possibilities to elucidate the mechanisms controlling melanogenesis and greying.

P-43: Hair cycles of transplanted human hairs in nude mice

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The hair follicle (HF) is a finely regulated organ whose cyclic changes from phases of rapid growth (anagen), via apoptosis-driven regression (catagen) to relative quiescence (telogen). What controls HF cycling is main question for community of physicians and hair biologists. After hair transplant, hairs are rapidly entering into the catagen phase and lots of hairs are shed within a month. After 2-3 months later, transplanted hairs are entering new hair cycle. However, there is not so much information for the detailed explanation during those periods. It is important for the hair biologists to have pictures of the exact changes after hair transplantation. The aim of this study is to know the cyclical changes after hair transplant. To understand those facts, we transplanted human scalp hairs in immune-compromised nude mice and analyzed the histological changes with time. We could have clear pictures of the histological finding as time goes by after hair transplantation. The HF grows 0.5cm/month averagely but there is lots of the variation. In first week they enter the catagen which is characterized as corrugated epithelium and onion shaped dermal papilla. During 2-3 weeks, the epithelium enters apoptosis and dermal papillae get smaller than the anagen ones. After 4-5 weeks later, some HFs are entering the anagen and the others are still in the catagen and the telogen. In 6-7 weeks, most of HFs are in the anagen III to IV. After 8 weeks every follicles are similar with *in vivo* HF except some follicle had corrugated epithelium.

P-44: Correlation between hair physical properties and perception of "thicker, fuller, hair"

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Hair fall is a potentially large unmet consumer need. The hair growth cycle of anagen, catagen and telogen is terminated by what is often termed exogen, hair shedding. The rate of hair fall varies significantly between consumers and can range between 100 and 600 hairs per day. Hair fall at the higher rates can often be quite distressing and may lead to female consumers developing a fear that they may lose their hair. Although such rates of hair fall are within the realms of the normal population distribution, in the extreme they can result in a perceived decrease in the thickness of hair on the head and loss of ability to generate and maintain their preferred hair style. We have carried out a study to evaluate the impact of shampoo and conditioner systems on the perception of hair thickness and developed a series of objective protocols to assess the physical properties of hair switches that impact on perception of thicker fuller hair. We have found that increasing the lubrication properties of a shampoo/conditioner system resulted in a reduction in hair detangling energy from 12 Joules to

2 Joules. This was accompanied by a significant reduction in the number of broken hairs via an *in vitro* combing technique from 65 to 2. We have also demonstrated that subjects can assess circular hair switches for the attribute “thickness” and that this correlates well with actual switch thickness. Shampoo/conditioner systems with low conditioning properties led to an increased perception of thickness. A balance of lubrication is required to reduce fibre breaking but maintain perception of thicker hair.

P-45: The development and validation of a method to measure hair fall *in vivo*

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Hair fall is a major problem for consumers globally. Although guidelines on the assessment of hair fall and alopecia have been published, there were no robust and reproducible methods for the assessment of hair fall during clinical studies. Therefore, the aim of this research was to develop and validate an appropriate protocol for the collection and enumeration of exogen hairs during studies. A method to collect hair was developed which incorporated a controlled self-collection of hairs by subjects, and a controlled hair collection process at the test centre. Two studies were carried out to validate this methodology, which was found to yield robust and reproducible data. Using this clinical technique, we found that subjects who have clinical hair loss (2-4 on the Savin Scale (Sinclair modification)) lose more hair than subjects in the normal population, when hair loss was adjusted for hair density. However, on an individual subject level there was no correlation between hair fall and hair density. Finally, we showed that over 78% of hairs collected from subjects were naturally shed, rather than lost due to breakage.

P-46: A novel androgen-responsive human hair follicle model system

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Androgens, major regulators of human hair growth, stimulate tiny vellus follicles to enlarge forming bigger, terminal hairs in many areas, e.g. beard, at puberty; they have no effect on eyelashes, but may inhibit scalp follicles, causing alopecia. Androgen-stimulated hair disorders are widespread but poorly controlled. Our understanding of androgen regulation is hampered by the lack of an androgen-sensitive model system, as most mammalian hair growth is not androgen-dependent. This study was designed to see if our recently established organ culture model based on human intermediate hair follicles (Miranda *et al* (2010) Br J Dermatol 163:287-95) could respond to androgens. Matched terminal and intermediate follicles were microdissected from healthy female

pre-auricular skin and observed, measured and photographed daily over 9 days of organ culture $\pm$ 10nM testosterone and/or the antiandrogen, cyproterone acetate (CPA; 1 μ M) ($n=6$). Androgen receptor gene expression was investigated using PCR methods. Terminal follicles grew more than intermediate follicles ($P<0.001$), but were unaffected by testosterone. Testosterone increased intermediate follicle growth ($P<0.001$) by about 31%. CPA blocked this stimulation, indicating a receptor-mediated effect. RT-PCR detected androgen receptor gene expression in both follicle types ($n=5$); quantitative real-time PCR confirmed that intermediate follicles expressed higher levels ($\times 3.5$) ($n=6$; $P=0.04$). Thus, smaller facial intermediate follicles show marked differences to their matched terminal follicles *in vitro* and *in vivo*. They responded, via functional androgen receptors, in a biologically relevant way (synthesising more keratin) to physiologically-relevant levels of androgens in organ culture. These hair follicles offer an exciting, unique system for studying androgen action.

P-47: Trichogram on clinical practice - Pros and cons

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The trichogram is a semi-invasive method of hair analysis that involves plucking 60 to 80 hairs from different parts of the scalp, sticking them to a slide, and examining them under a microscope. This method is based on the hair cycle and determines hair follicles in their different phases of the hair growth cycle and also provides examination of the form and structure of the individual hair roots. The semi-invasive nature of the technique generally makes it unsuitable as a method for the diagnosis of hair disorder and for the regular follow-up of patients. Although the procedure is quite short and the pain associated with plucking does not last long, in fact, the concept that the hair for examination is plucked out and requirement of 5 days without shampoo according to the method can be uncomfortable for patients. As more microscopic techniques such as automated phototrichogram were developed today for clinical studies and research purposes it is becoming less popular within dermatologists. However, when correctly performed by an experienced hand the trichogram technique is a helpful tool in the diagnosis for selected cases and has value when the evaluation of the hair root is necessary. Are there significant disadvantages of this procedure? Is it really necessary for routine use? We've included highlights from both sides and will report on a German-Turkish perspective.

P-48: Is trichoscopy a reliable tool to diagnose early female pattern hair loss ?

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female pattern hair loss (FPHL) usually diagnosed clinically in women presenting with widening of hair parting; is difficult to diagnose clinically in early stages. In a study (Sinclair *et al.*), 56% biopsy proven FPHL cases presented without apparent scalp hair-thinning/widening. We aimed to assess utility of 'hair diameter diversity (HDD) scale' on Trichoscopy and compare with 'triple scalp-biopsy, horizontally sectioned', in diagnosing FPHL in women with non-patterned hairloss(grade-I hairloss). Twenty-one women with grade-I hairloss, twenty-nine with grade-II hairloss and forty age-matched healthy controls subjected to trichoscopy (20X magnification) from midscalp and occiput; classified as FPHL when trichoscopy shows >20% HDD. Triple scalp-biopsy performed in grade-I hair loss group. Terminal-to-vellus-like hair ratio (T:V) at the mid-isthmus level used to diagnose FPHL (T:V ≤ 4:1), Chronic telogen effluvium (CTE) (T:V ≥ 8:1), or indeterminate (T:V > 4:1 or < 8:1). Scalp-biopsy and trichoscopy diagnoses were compared. On scalp-biopsy, 13/21 had FPHL and 8/21 CTE. >20% HDD seen at midscalp and occiput respectively, in 11/13 (85%) and 12/13 (92%) biopsy proven FPHL, in 27/29 (93%) and 28/29 (97%) grade-II FPHL, in 15/40 (40%) and 16/40 (43%) healthy controls. Thus, trichoscopy has high sensitivity of 90% and 95%, with a low specificity of 60% and 56% at the midscalp and occiput respectively, in grade-I FPHL. > 20% HDD usually indicates underlying AGA. However, it may also be seen in normal population. Normal trichoscopy doesn't rule out underlying early FPHL, for which triple scalp-biopsy remains gold standard. Occipital midline is also significantly involved in FPHL, suggesting AGA in females is a diffuse process. Trichoscopy is an excellent tool for preliminary evaluation of females presenting with diffuse hairloss.

P-49: Particle-based hair follicle targeting and antigen delivery to skin cells for transcutaneous vaccination

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Topically applied particulate materials accumulate preferentially in hair follicles allowing the targeting of drugs to antigen presenting cells (APCs) which are abundant in the perifollicular tissue. In previous studies with barrier-disrupted human skin explants and mouse skin models, we have shown that skin APCs selectively internalize different types of particulate carriers, e.g. polystyrene particles (PS) and modified vaccinia Ankara (MVA). The aim of this study was to explore the transcutaneous vaccination route using biodegradable polylactic acid (PLA) particles as well as virus-like particles (VLPs) in order to target hair follicles and deliver HIV-1 antigens to skin APCs. After topical application on barrier-disrupted human skin explants, PLA particles preferentially accumulated in hair follicles and released the adsorbed p24 peptide to the perifollicular skin. On the other

hand, small amounts of topically applied VLPs translocated to the viable skin layers and were detected in DCs. The treatment of skin explants with p24-PLA particles and VLPs resulted in a modulation of the expression of DCs maturation markers. Thus, both particle types allowed for delivery of HIV-1 antigens and the modulation of the skin immune system. Both mechanisms, i.e. particle-based delivery of antigens and skin penetration of VLPs, may open interesting new strategies for the transcutaneous vaccination.

P-50: Enhanced iontophoretic delivery of magnesium ascorbyl 2-phosphate in hairy and hairless mice skin

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We have recently reported that L-Ascorbic acid 2-phosphate (A2P) stimulates the growth of human dermal papilla cells, induces secretion of IGF-1 from the DP cells to promote elongation of hair shafts in cultured human hair follicle, and triggers early conversion from a telogen phase to an anagen phase in mice. Since magnesium salt of A2P is a highly hydrophilic ionic molecule, it is not easy to deliver into skin or hair follicles. In order to enhance the penetration of A2P, non-invasive iontophoretic method was introduced with or without the combination of sonophoresis. The application of iontophoresis with (-) polarity enhanced the *ex vivo* skin delivery of free A2P through the mice dorsal skin. It was highly depending on the conditions such as electric currents, application time, drug concentration, and kinds of solution. When comparing the solution for iontophoresis, PBS (pH7.4) showed higher penetration than water or saline achieved. Among the applied electric currents, 0.4 mA showed the best results. Iontophoretic enhancement of A2P was significantly (1.5~2.5 times) increased in hairy mice skin than in the hairless mice skin. This result was also demonstrated that the iontophoretic movement of sodium fluorescein was occurred dominantly by the transfollicular route. Finally, combination of sonophoresis and iontophoresis rather inhibited the skin penetration of A2P established by the iontophoresis only.

P-51: Clinical approach to focal hairless patches with dermoscopy

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Many diseases are presented with focal hairless patch. Dermoscopy could be a useful, easy tool for making a correct diagnosis. The aim of this study is to investigate clinical usefulness of dermoscopy for diseases with focal hairless patch. Dermoscopic examination was performed for 116 patients with focal hairless patch using DermLite® II pro. The numbers of diseases investigated in the

study were as below: alopecia areata ($n=81$), trichotillomania ($n=16$), traction alopecia areata ($n=2$), tinea capitis ($n=8$), discoid lupus erythematosus ($n=3$), lichen planopilaris ($n=5$), and pseudopelade of Brocq ($n=1$). The sensitivity and specificity of dermoscopic findings for each disease were evaluated. Characteristic dermoscopic findings of alopecia areata were tapering hairs and yellow dots. Those of trichotillomania and traction alopecia showed broken hairs. Discoid lupus erythematosus and lichen planopilaris were characterized by dermoscopic findings of reduced follicular ostia. Furthermore, keratin plugs were frequently seen in discoid lupus erythematosus whereas perifollicular hyperkeratosis and erythema were frequently seen in lichen planopilaris. Dermoscopic findings of tinea capitis included bent hairs, perifollicular white macules and greasy scales. Dermoscopic examination for focal hairless patch showed characteristic findings for each disease. Herein, we propose dermoscopic algorithm for focal hairless patch.

P-52: A survey of the awareness, knowledge, and behavior of hair dye use

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Gray hair naturally developed in the process of human aging. Many people with gray hair tend to dye their hair periodically. Hair dyeing products are widely used and can cause adverse effects. Therefore, user's knowledge and recognition about hair dyeing and related side effect are needed. The goal of this study was to get basic materials to lay the foundation for understanding, prevention and treatment of side effect caused by hair coloring products. In advance, we are to lead awareness and cognitive change of the people using hair dye. We conducted a questionnaire survey for adult male and female aged over 20 who had gray hair regardless of the use of hair coloring products. Total 500 subjects were included in this study and statistical analysis was performed. Most of the people who had experience in hair dye (362 people, 72.4%) did not know about the hair dye product that they were using. Despite the occurrences of side effects due to lack of knowledge on hair dyeing products, indiscriminate development, and users with many usage, it seems like they are not realizing the seriousness or the need of treatment. It is advisable to introduce indication system that enables users to become aware of ingredients and side effects about hair coloring products and give plenty of opportunities for users to become aware of side effect of hair coloring through education, publicity and publication of related booklet so that people can use hair coloring products appropriately.

P-53: Maintenance of melanin content in the hair follicle

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Hair graying is a major concern for men and women today and is often associated with rapidly progressing old age, excessive stress, and ill health. Characterized by the loss of pigment in the hair shaft, the aim of the present study was to investigate the modulation of key markers of the melanogenesis pathway. Normal human epidermal melanocytes (NHEM) and *ex vivo* human scalp skin biopsies, containing hair follicles were treated with a biofunctional, previously selected by its potential to modulate melanin synthesis. After 48h treatment, the following markers were examined by immunostaining: MITF, tyrosinase, TRP-1 and Pmel17, and finally the receptor of stem cell factor, c-kit. Melanin content in the hair follicle was studied using Fontana-Masson staining. Our results showed that the main proteins of the melanogenic pathway were increased following application of the biofunctional. MITF expression was increased both in the cytoplasm and in the nucleus of treated cells. Treated cells also showed a higher level of c-kit, whose enhancement has been related to the level of hair pigmentation. Moreover, treated hair follicles showed an increased level in melanin content. In conclusion, our results introduce an interesting way to maintain melanin content in the hair follicle.

P-54: Sensorial and instrumental evaluation of the scalp oiliness reduction with 0.2% menthol shampoo

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Formulations with menthol when topically applied, can cause a sensation of coolness on the skin. This feeling is a result of the stimulation of the cold receptors by inhibition of calcium current in neuronal membrane and this is often confused by patients with cleaning or oiliness removal. This study aims to evaluate 0.2% menthol shampoo formulations by comparing it with another shampoo without menthol by means of biophysical methods for assessing the *in vivo* reduction in the scalp oiliness. We studied 21 volunteers between 18 and 65 years old, men and women, with healthy scalp. They were asked to not wash their scalp for at least 36 hours before the test. Each side of the scalp was washed with one of the shampoos. The right side of the scalp was washed with 0.2% menthol shampoo and the left side was washed with the shampoo without menthol. The washing procedure was performed twice to ensure a good cleaning. The scalp oiliness degree was measured with the Sebumeter equipment before and 30 minutes after washing. The decrease of the scalp oiliness measured by Sebumeter was similar in both sides of the scalp. Despite of this, patients reported less oiliness as much as cleanness feeling in the scalp washed with 0.2% menthol shampoo.

P-55: UV radiation mediated alterations in the hair lipid composition

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Ultraviolet (UV) light induced hair photoaging is difficult to avoid during daily life. Lipids play an essential role in hair morphogenesis, cycling and lipid envelope. On the hair surface, cells are covered with a thin lipid layer covalently bonded to hair proteins. This integral hair lipid is different from sebaceous lipid. Integral hair lipid has major significance in determining the structural properties of hair. We performed this study to observe the UV radiation mediated alterations in the hair lipid composition. We observed that UV irradiation caused changes of lipids contents. The expressions of genes related to lipid synthesis, including acetyl-CoA carboxylase (ACC), fatty acid synthase (FAS), stearoyl-CoA desaturase (SCD), and sterol regulatory element binding proteins (SREBPs) were also markedly decreased. Our results suggest that hair lipid may play important roles in photoaging of human hair follicle.

P-56: The relationship between integral hair lipid and intrinsic hair aging

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Internal lipids of the hair are composed of ceramides, cholesterol, free fatty acid, cholesterol sulfate, fatty alcohol and phytosphingosine. We hypothesized that intrinsic hair aging might affect integral hair lipid. In this study, we investigated the amount of internal hair lipids contents in different age groups. Hair samples were collected from Korean male volunteers, age from 20s to 80s. To determine the amount of integral lipid, HPTLC and LC-Mass was performed. There were some noticeable differences between age groups. We suggest that differences of lipids contents might be related to the aging of hair.

P-57: Cellular origins of Basal Cell Carcinoma

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The origin of Basal Cell Carcinomas (BCC), the most common skin cancer, has been the topic of a long-standing dispute. Using lineage tracing of Lgr5+ Hair follicle (HF) stem cells in a mouse model conditionally expressing GLI1 in the epidermis we

show that HF-associated BCC-like lesions are derived from the Lgr5+ progeny whereas those associated with the interfollicular epidermis have a different cell of origin. We propose that the similarities between BCCs and HF cells are due to the obligatory adoption of a hair follicle progenitor cell phenotype marked by a specific pattern of Lgr5/cytokeratin 6 expression in the early stages of BCC development even when the cell of origin is an non-Lgr5-expressing cell. Homozygous inactivation of Ptch1 in Lgr5+ cells, located in the bulge and secondary hair germ in telogen, leads to formation of BCC-like proliferations defining Lgr5+ HF stem cells as a cellular origin for Basal Cell Carcinoma.

P-58: Polyamine metabolism changes in basal cell carcinomas with follicular differentiation. Comparative analysis to benign keratinocytic proliferations

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The occurrence of multiple follicular neoplasms accumulates evidence that basaloid tumors often encompass a morphological spectrum of follicular differentiation, especially expressed in syndromic patients. They usually follow a benign course and do not give metastases. This phenomenon is often explained by the strong tumor-stroma interaction. To evaluate this hypothesis, 8 cases of basal cell carcinomas with follicular differentiation (fBCC) evolving in a patient with nevroid basal cell carcinoma syndrome characterized by palisading of cells at the periphery of aggregations, germinative cells, follicular germs in the absence of a follicular papilla, crowding of cells, individual necrotic neoplastic cells, fibromucinous stroma, and clefts between cell aggregations and stroma were studied. Biochemical analysis of putrescine, spermidine and spermine levels in samples of fBCC was performed and compared to the levels of corresponding polyamines of non-lesional control samples. Simultaneously, a group of 8 patients with psoriasis, referred to as a model of benign keratinocytic proliferation, was also evaluated. The results proved significant ($P < 0.05$). Spermine was found in highest concentration in all investigated groups, and twice elevated in lesional compared to non-lesional skin in both fBCC and psoriasis. The proliferative rate did not correlate with spermidine:spermine ratio. Putrescine was twice lower than spermidine in all investigated groups, not proving a positive ornithine decarboxylase enhancement in neoplastic proliferations. We concluded that fBCC are characterized by the same changes in polyamine metabolism as seen in benign keratinocytic proliferation. Perhaps, this could be explained the strong tumor-stroma interaction that exist in fBCC correlating with the benign course of the disease.