



## Literature List Veterinary & Zoology

*S.P. Loureiro Luna, A. Schoen, P. H. Esteves Trindade, P. Barreto da Rocha, Penetration Profiles of a Class IV Therapeutic Laser and a Photobiomodulation Therapy Device in Equine Skin, J Equine Vet Sci, Feb 2020*

Photobiomodulation therapy (PBMT) effects depend on the energy settings and laser penetration. We investigated the penetration time profiles of two different light therapy devices, at the dark and light skin regions in horses. Six light skin and six dark skin adult clinically healthy Arab and Quarter horses were used. A cutometer was used to measure the width of the skin fold from both sides of the cervical area, followed by three measurements of the thickness of the same skin fold by transversal and longitudinal ultrasonography (US). The depth of light penetration was compared based on the percentage of penetration versus power, between a portable PBMT device versus a class IV laser device. The laser mean power output was measured with an optical power meter system for 120 seconds after penetrating the skin. Skin width and laser penetration were compared among equipment by paired "t" test. There was no difference in the width of the skin fold between measurements acquired by the cutometer against either longitudinal or transversal US or between the US measurements at cervical versus metacarpus area. Light penetration was greater in both kinds of skins in the PBMT ( $0.01303 \pm 0.00778$ ) versus class IV laser ( $0.00122 \pm SD 0.00070$ ) ( $P < .001$ ). The PBMT device provided a greater energy penetration than the class IV laser in unclipped light and dark skin, suggesting that the former may produce a better therapeutic effect. The color of the skin changes penetration profiles of PBMT.

*M.P. Szczepanik, P.M. Wilkoł ek, Ł.R. Adamek, G. Kalisz, M. Goł yński, W. Sitkowski, I. Tazskun, Transepidermal water loss and skin hydration in healthy cats and cats with non-flea non-food hypersensitivity dermatitis (NFNFHD), Pol J Vet Sci. 2019 Jun; 22(2): p. 237-242*

Allergic skin diseases in cats are amongst the most prevalent dermatological conditions in this species. The objectives of this study were to evaluate different types of skin barrier measurements in healthy cats and cats with non-flea non-food hypersensitivity dermatitis (NFNFHD). 24 clinically healthy and 19 NFNFHD cats were included in this clinical trial. In each animal, the transepidermal water loss (TEWL) and skin hydration (SH) were assessed on six clipped body sites by VapoMeter SWL 4605 and Corneometer® CM 825, respectively. Results of TEWL measurement were, significantly higher in one of the six examined body sites, namely on the lumbar area ( $p=0.0049$ ). Furthermore, a statistically significant difference was found between the average TEWL values ( $p=0.019$ ). Statistically notable differences were measured at least in one certain body site for SH: in the groin ( $p=0.02$ ), where the values in the affected cats were lower than in the healthy individuals. These results may suggest that in NFNFHD cats transepidermal water loss is higher than in healthy cats. Skin hydration is, at least, in certain body sites, lower in atopic feline patients than in healthy individuals.

*D. Cobiella, L. Archer, M. Bohannon, D. Santoro, Pilot study using five methods to evaluate skin barrier function in healthy dogs and in dogs with atopic dermatitis, Vet. Dermatology, January 2019*

Background: Atopic dermatitis is associated with skin barrier defects. In people, noninvasive techniques are used to quantify the skin barrier functionality. In dogs, transepidermal water loss (TEWL), stratum corneum hydration and pH have been used to assess skin barrier function. However, few studies have determined their repeatability. Objective: To assess the repeatability of measurements of skin hydration, TEWL, pH, skin absorbance and erythema in healthy and atopic dogs. Animals: Fifteen healthy and 15 atopic privately owned dogs. Methods and materials: Three repeated measurements using Corneometer®, Skin-pH-Meter®, Colorimeter® and VapoMeter® were obtained from inguinal, axilla, pinna and interdigital space by three investigators. Intra- and interobserver variability (coefficient of variation, correlation coefficients and intraclass correlation coefficients) and difference between the two groups (*t*-test or Mann–Whitney U-test) were determined. Results: High repeatability and low variation were observed both intra- and interobservers for all devices except the VapoMeter®. The most repeatable device was the Skin-pH-Meter®, whereas the VapoMeter® was the device with the highest intra- and interobserver variability. Atopic dogs had a significantly increased pH (inguinal  $P = 0.03$ ; axilla  $P = 0.02$ ) and erythema (inguinal  $P = 0.01$ ; axilla  $P = 0.02$ ) compared to healthy dogs. No

differences between the two groups were detected using the Corneometer<sup>®</sup>, VapoMeter<sup>®</sup> or Colorimeter<sup>®</sup> (tartrazine absorption). Conclusion and clinical significance: The results of this pilot study support the use of Corneometer<sup>®</sup>, Skin-pH-Meter<sup>®</sup> and Colorimeter<sup>®</sup> in the assessment of skin barrier function in dogs; further investigations to optimize measurements and confirm these results are needed.

*K. Nomoto, Y. Itaya, K. Watanabe, T. Yamashita, T. Okazaki, Y. Tokudome, **Epidermal permeability barrier function and sphingolipid content in the skin of sphingomyelin synthase 2 deficient mice**, Exp Dermatol, 2018 Jan*

Sphingomyelin synthase (SMS) is an enzyme that generates sphingomyelin (SM) from ceramide (CER) and phosphatidylcholine. SM in the epidermis is a precursor of CER, an important lipid for epidermal permeability barrier function. However, the physiological role of SMS in skin is unclear. To uncover the function of SMS in skin, we investigated sphingolipid metabolism enzyme activity in skin, SM content in the epidermis, CER content in the stratum corneum (SC) and transepidermal water loss (TEWL) as an indicator of barrier function in SMS2-knockout (KO) mice. The activities of sphingolipid metabolism enzymes in skin homogenates were measured using a fluorescently labelled substrate. Enzymatic reaction products were detected by high-performance liquid chromatography (HPLC). Lipids in the epidermis or SC were extracted and quantified by high-performance thin layer chromatography (HPTLC). TEWL was measured using a Tewameter TM300. In SMS2-KO mice, SMS activity in skin homogenates, epidermal SM content and SC CER content were significantly decreased relative to wild-type (WT) mice. The TEWL of SMS2-KO mice was significantly increased compared to WT mice. Our data indicate that SMS2 generates SM in the epidermis and contributes to epidermal permeability barrier function and will support understanding of SM-related metabolic disorders.

*M.P. Szczepanik, P.M. Wilkołajek, Ł.R. Adamek\*, M. Zajaczk, M. Gołynski, W. Sitkowski, I. Taszkun, **Evaluation of the correlation between Scoring Feline Allergic Dermatitis and Feline Extent and Severity Index and skin hydration in atopic cats**, Veterinary Dermatology September 2017*

Background: Evaluation of the severity of clinical signs of cats with allergic skin diseases has used two scoring systems: Scoring Feline Allergic Dermatitis (SCORFAD) and the Feline Extent and Severity Index (FeDESI). The integrity of the cutaneous barrier can also be evaluated by measuring skin hydration. A correlation between the clinical score and skin hydration has been observed in humans and dogs with atopic dermatitis (AD). Hypothesis: To demonstrate a correlation between the clinical score and skin hydration of cats affected with presumed AD. Animals: European short hair cats (n = 18): 11 females and seven males with a confirmed diagnosis of AD. Methods: SCORFAD and FeDESI scores were calculated and the measurements of skin hydration were assessed from seven body sites using corneometry. The correlation between the SCORFAD and FeDESI systems and skin hydration of each site, and the average skin hydration was calculated. Results: There was a positive correlation between the SCORFAD score and skin hydration for the axilla, thorax and forelimb; for FeDESI and axilla and lumbar sites. There was a negative correlation between the FeDESI and skin hydration for the pinna (r = 0.47). Conclusions and clinical importance: Measurements of skin hydration could be a useful tool for the evaluation of allergic cats. There is limited evidence of any useful correlation between clinical scoring systems and measurements of hydration. The pinna may be a suitable region for the assessment of skin barrier function in normal and allergic cats.

*C.W. Bradley, D.O. Morris, S.C. Rankin, C.L. Cain, A.M. Misic, T. Houser, E.A. Mauldin, E.A. Grice, **Longitudinal evaluation of the skin microbiome and association with microenvironment and treatment in canine atopic dermatitis**, J Invest Dermatol, 2016 June; 136(6): p. 1182–1190*

Host-microbe interactions may play a fundamental role in the pathogenesis of atopic dermatitis (AD), a chronic relapsing inflammatory skin disorder characterized by universal colonization with *Staphylococcus*. To examine the relationship between epidermal barrier function and the cutaneous microbiota in AD, this study employed a spontaneous model of canine AD (cAD). In a cohort of 14 dogs with cAD, the skin microbiota was longitudinally evaluated with parallel assessment of skin barrier function at disease flare, during antimicrobial therapy and posttherapy. Sequencing of the bacterial 16S ribosomal RNA gene revealed decreased bacterial diversity and increased proportions of *Staphylococcus* (*S. pseudintermedius* in particular) and *Corynebacterium* in comparison to a cohort of healthy control dogs (n=16). Treatment restored bacterial diversity with decreased *Staphylococcus* proportions, concurrent with decreased cAD severity. Skin barrier function, as measured by corneometry, pH, and transepidermal water loss (TEWL) also normalized with treatment. Bacterial diversity correlated with TEWL and pH, but not corneometry. These findings provide insights into the relationship between the cutaneous microbiome and skin barrier function in AD, the impact of antimicrobial therapy on the skin microbiome, and highlight the utility of cAD as a spontaneous non-rodent model of AD.

*J.Y. Kim, O.S. Lee, S. Ha, J.H. Kim, G. Park, J.K. Kim, C.H. Oh, **In vivo assessment of the effect of taxifolin glycoside on atopic dermatitis-like skin lesions using biomedical tools in NC/Nga mice**, Clin Exp Dermatol, 2015 Jul;40(5): p. 547-555*

Background: Noninvasive methods of assessment are widely used in clinical trials. However, such methods have not been established in atopic dermatitis (AD), which is a chronic inflammatory skin disease. Aim: To demonstrate, using biomedical tools, the benefits of a new substance, taxifolin glycoside (TAX), in an AD model, the NC/Nga mouse. Methods: We evaluated the efficacy of topical TAX for AD by measuring clinical skin severity score, cytokine expression and serum IgE level, and by using biomedical measures (vapometry and corneometry). Topical TAX was applied to AD-induced NC/Nga mice for 3 weeks. The anti-inflammatory effects of this compound were demonstrated noninvasively using biomedical tools and immunological assays. Results: Our method of AD assessment using biomedical tools is more objective and accurate than visual inspection. The results obtained using the biomedical tools were identical to those obtained using immunological assays. Conclusions: In vivo biomedical tools are useful for diagnosing and monitoring treatment effects in AD.

*M. Zajac, M. Szczepanik, P. Wilkotek, Ł. Adamek, Z. Pomorski, The influence of non-specific anti-pruritus treatment with cyclosporine A on transepidermal water loss (TEWL) in natural atopic dermatitis in dogs*, Polish Journal of Veterinary Sciences Vol. 18, No. 2 (2015), p. 415–424

Atopic dermatitis is a common allergic skin disease in dogs. Monitoring the progress of treatment and the assessment of the severity of disease symptoms are crucial elements of the treatment procedure. One of the common means of assessing the severity of the clinical signs of the disease is the CADESI 03. Research studies have pointed to a possibility of assessing the severity of skin lesions by means of measuring biophysical skin parameters such as TEWL, skin hydration and erythema intensity. The aim of the study was the assessment of changes in TEWL and CADESI values measured in ten different body regions during non-specific anti-pruritus treatment. The examination was performed on ten dogs with atopic dermatitis (age from 2.5 years to 7 years, mean age 3.8 years). The measurements were performed in the following body regions: the lumbar region, the right axillary fossa, the right inguinal region, the ventral abdominal region, the right lateral thorax region, the internal surface of the auricle, interdigital region of the right forelimb, cheek, bridge of nose and the lateral site of antebrachium. A statistically significant decrease in CADESI values was reported starting from the second week of treatment. In the case of the mean TEWL values, a fall was observed after one week of treatment in the ventral abdominal region and the interdigital region, after two weeks of treatment in the axillary fossa and the inguinal region, and after three weeks in the cheek and the lateral thorax region. There was no statistically significant decrease in TEWL values in the course of treatment in four other regions.

*M. Zajac, M.P. Szczepanik, P.M. Wilkotek, Ł.R. Adamek, Z.J.H. Pomorski, W. Sitkowski, M. Gołyński, Assessment of a correlation between Canine Atopic Dermatitis Extent and Severity Index (CADESI-03) and selected biophysical skin measures (skin hydration, pH, and erythema intensity) in dogs with naturally occurring atopic dermatitis*, The Canadian Journal of Veterinary Research, 2015

Atopic dermatitis is a common allergic skin disease in dogs. The aim of this study was to examine the possibility of a correlation between biophysical skin variables: skin hydration (SH), skin pH, and erythema intensity measured in 10 different body regions and both total Canine Atopic Dermatitis Extent and Severity Index (CADESI-03) and CADESI measured in a given region (CADESI L). The study was conducted using 33 dogs with atopic dermatitis. The assessment of the biophysical variables was done in 10 body regions: the lumbar region, right axillary fossa, right inguinal region, ventral abdominal region, right lateral thorax region, internal surface of the auricle, interdigital region of right forelimb, cheek, bridge of nose, and lateral site of antebrachium. Positive correlations were found between SH and CADESI L for the following regions: the inguinal region ( $r = 0.73$ ) and the interdigital region ( $r = 0.82$ ), as well as between total CADESI and SH on digital region ( $r = 0.52$ ). Also, positive correlations were reported for skin pH and CADESI L in the lumbar region ( $r = 0.57$ ), the right lateral thorax region ( $r = 0.40$ ), and the lateral antebrachium ( $r = 0.35$ ). Positive correlations were found in the interdigital region between erythema intensity and the total CADESI-03 ( $r = 0.60$ ) as well as the CADESI L ( $r = 0.7$ ). The results obtained suggest that it may be possible to use skin hydration, pH, and erythema intensity to assess the severity of skin lesion but positive correlation was only found in < 13.3% of possible correlations and usage of these measures in dogs is limited.

*G. Imokawa, K. Ishida, Biological Mechanisms Underlying the Ultraviolet Radiation-Induced Formation of Skin Wrinkling and Sagging I: Reduced Skin Elasticity, Highly Associated with Enhanced Dermal Elastase Activity, Triggers Wrinkling and Sagging*, Int. J. Mol. Sci. 2015, 16, p. 7753-7775

The repetitive exposure of skin to ultraviolet B (UVB) preferentially elicits wrinkling while ultraviolet A (UVA) predominantly elicits sagging. In chronically UVB or UVA-exposed rat skin there is a similar tortuous deformation of elastic fibers together with decreased skin elasticity, whose magnitudes are greater in UVB-exposed skin than in UVA-exposed skin. Comparison of skin elasticity with the activity of matrix metalloproteinases (MMPs) in the dermis of ovariectomized rats after UVB or UVA irradiation demonstrates that skin elasticity is more significantly decreased in ovariectomized rats than in sham-operated rats, which is accompanied by a reciprocal increase in elastase activity but not in the activities of collagenases I or IV. Clinical

studies using animal skin and human facial skin demonstrated that topical treatment with a specific inhibitor or an inhibitory extract of skin fibroblast-derived elastase distinctly attenuates UVB and sunlight-induced formation of wrinkling. Our results strongly indicated that the upregulated activity of skin fibroblast-derived elastase plays a pivotal role in wrinkling and/or sagging of the skin via the impairment of elastic fiber configuration and the subsequent loss of skin elasticity.

*A. Tuzuner, S. Akdagli, T. Sen, et al., An objective analysis of sebum, pH and moisture levels of the external ear canal skin, American Journal of Otolaryngology (2015) 424-428*

Objective: To determine sebum, pH and moisture levels of external ear canal skin, and compare the patients who complain of ear itching and the normal population for these parameters. And evaluate the improvement subjectively in the ones given dexamethasone sodium phosphate (DSP) cream or placebo-water in oil emulsion type cream, and to determine the changes in sebum, pH and moisture levels after the treatment. Methods: 32 females with the complaint of isolated external ear canal itching and 42 healthy women were included in this randomized prospective controlled study. The sebum, pH and moisture levels of ear skin of the patients and the controls were determined from baseline and following treatment. Patients used DSP in their right and the placebo in their left ears for 15 days. Subjective analysis of itching level was measured at baseline, and on 15th and 30th days using visual analog scale (VAS).

*M. Gołyński, M. Szczepanik, K. Lutnicki, Ł. Adamek, M. Gołyńska, P. Wilkótek, W. Sitkowski, Ł. Kurek, P. Dębiak, Biophysical parameters of rats' skin after the administration of methimazole, Bull Vet Inst Pulawy 58, p. 315-319, 2014*

The paper describes the influence of oral administration of methimazole on biophysical skin parameters. Wistar rats of different sex (220–260 g) were used in the experiment. Biophysical skin parameters, such as transepidermal water loss (TEWL), corneometry, and pH were examined at seven-day intervals. Significant changes in the parameters were observed on the 7th d of methimazole administration. The changes were observed in both sex but males appeared to be less sensitive in that respect. Changes in the parameters in the females showed rapid mechanisms, which normalised transepidermal water loss and skin hydration, as well as restored skin barrier functions. TEWL, skin hydration, and skin pH measurements allow an early assessment of skin barrier dysfunction after administration of this drug.

*M. Zajęc, M.P. Szczepanik, P.M. Wilkótek, Ł.R. Adamek, Z.J.H. Pomorski, W. Sitkowski, M. Gołyński, Assessment of the relationship between transepidermal water loss (TEWL) and severity of clinical signs (CADESI-03) in atopic dogs, Vet Dermatol 2014; 25: p. 503–583*

Background: Atopic dermatitis (AD) is a common allergic skin disease of dogs. Objective documentation of disease severity is important for the assessment of responses to therapeutic interventions. One common means of assessing the severity of clinical signs is the Canine Atopic Dermatitis Extent and Severity Index (CADESI)-03. In addition, studies of the biophysical parameters of the skin suggest that assessment of transepidermal water loss (TEWL) may also have value for estimation of disease severity. Hypothesis/Objectives: The aim of the present study was to verify the correlation between TEWL and CADESI-03 measured at 10 different body sites. Animals: Twenty-six dogs with AD (age range 1–7 years, median age 3 years). Methods – The assessment was performed at the following 10 body sites: the lumbar, inguinal, ventral abdominal, interdigital regions, axillary fossa, lateral thorax, lateral aspect of the antebrachium, concave surface of the auricle, cheek and bridge of the nose. Results: Positive correlations were found between TEWL and the total CADESI-03 for the auricle ( $r = 0.59$ ), bridge of nose ( $r = 0.62$ ) and interdigital skin ( $r = 0.47$ ). Positive correlations were also observed between TEWL and local CADESI-03 scores for the axillary fossa ( $r = 0.73$ ), inguinal region ( $r = 0.55$ ) and interdigital skin ( $r = 0.77$ ). Conclusions and clinical importance: The results indicate that it may be possible to use measurement of TEWL to assess the severity of skin lesions, but a positive correlation was found in only five of 10 body regions examined.

*M. Gołyński, M. Szczepanik, K. Lutnicki, Ł. Adamek, M. Gołyńska, P. Wilkótek, W. Sitkowski, Ł. Kurek, P. Dębiak, Biophysical parameters of rats' skin after the administration of methimazole, Bull Vet Inst Pulawy 58, p. 315-319, 2014*

The paper describes the influence of oral administration of methimazole on biophysical skin parameters. Wistar rats of different sex (220–260 g) were used in the experiment. Biophysical skin parameters, such as transepidermal water loss (TEWL), corneometry, and pH were examined at seven-day intervals. Significant changes in the parameters were observed on the 7th d of methimazole administration. The changes were observed in both sex but males appeared to be less sensitive in that respect. Changes in the parameters in the females showed rapid mechanisms, which normalised transepidermal water loss and skin hydration, as well as restored skin barrier functions. TEWL, skin hydration, and skin pH measurements allow an early assessment of skin barrier dysfunction after administration of this drug.



M. Wagh, **Skin Deep: Exploring the Hidden World of Dogs (and Humans)**, Bellwether Magazine, Volume 1, Number 80, Fall 2013

By current estimates, the human body contains 10 times more microbial cells than human cells. Acting in ways both beneficial and harmful, the microorganisms living on the surface of the skin, as well as in the gut and other organs, constitute a complex ecosystem known to influence digestion, allergies, and a variety of diseases.

*M.P. Szczepanik, P.M. Wilkótek, M. Pluta, Ł.R. Adamek, M. Gołyński, Z.J.H. Pomorski, W. Sitkowski*, **The examination of biophysical skin parameters (transepidermal water loss, skin hydration and pH value) in different body regions in Polish ponies**, Polish Journal of Veterinary Sciences Vol. 16, No. 4 (2013), p. 741–747

The purpose of this study was to evaluate transepidermal water loss, skin hydration and skin pH in normal Polish ponies. Twelve ponies of both sexes were examined in the study. Measurements were taken from seven different sites: the neck region, the shoulder, thorax, lumbar, inguinal, lip region and the pinna. In each of the regions transepidermal water loss (TEWL), skin hydration and skin pH were measured. For transepidermal water loss, the lowest values were observed in the pinna (10.54 g/hm<sup>2</sup>), while the highest values were observed in the lip region (30.98 g/hm<sup>2</sup>). In the case of skin hydration the lowest values were observed for the thorax region (1.96 CU), and the highest for the lip region (48.28 CU). For skin pH, the lowest results were obtained in the pinna (7.03), and the highest in the lumbar region (8.05).

*M.P. Szczepanik, P.M. Wilkótek, Ł.R. Adamek, Z.J.H. Pomorski*, **The examination of biophysical parameters of skin (transepidermal water loss, skin hydration and pH value) in different body regions of normal cats of both sexes**, Journal of Feline Medicine and Surgery (2011) 13, p. 224-230

The purpose of this study was to evaluate transepidermal water loss (TEWL), skin hydration and skin pH in normal cats. Twenty shorthaired European cats of both sexes were examined in the study. Measurements were taken from five different sites: the lumbar region, the axillary fossa, the inguinal region, the ventral abdominal region and the left thoracic region. In each of the regions, TEWL, skin hydration and skin pH were measured. The highest TEWL value was observed in the axillary fossa (18.22 g/h/m<sup>2</sup>) and the lowest in the lumbar region (10.53 g/h/m<sup>2</sup>). The highest skin hydration was found in the inguinal region (18.29 CU) and the lowest in the lumbar region (4.62 CU). The highest skin pH was observed in the inguinal region (6.64) and the lowest in the lumbar region (6.39). Statistically significant differences in TEWL were observed between the lumbar region and the left side of the thorax region ( $P = 0.016$ ), the axillary fossa ( $P = 0.0004$ ), the ventral region ( $P = 0.005$ ), and the inguinal region ( $P = 0.009$ ). There were significant differences in skin hydration between the lumbar region and the left thorax ( $P = 0.000003$ ), the axillary fossa ( $P = 0.002$ ), the ventral abdomen ( $P = 0.03$ ), and the inguinal region ( $P = 0.0003$ ) as well as between the thorax and the ventral abdomen ( $P = 0.005$ ). TEWL was higher in females (15 g/h/m<sup>2</sup>) than in males (4.57 g/h/m<sup>2</sup>). Skin hydration was higher in females (13.89 CU) than in males (12.28 CU). Significant differences were not found between males and females for TEWL and skin hydration. Skin pH was higher in males (6.94) than in females (6.54), which was significant ( $P = 0.004$ ).

*G. Fahrgruber*, **Biophysical Characterization of Lesions of Acute and Subchronic Allergic Contact Dermatitis in Domestic Pigs**, Dissertation at the University of Veterinary Medicine of Vienna, Austria, May, 2010

Allergic contact dermatitis (ACD) or contact hypersensitivity is a common eczematous skin reaction in sensitized individuals (WEEDON and STRUTTON, 2002; BAKER(a), 2006; NOSBAUM et al., 2009). Very familiar are contact allergic reactions to nickel sulfate containing jewelry or occupational diseases of hair dressers, health care persons or construction workers who experience cutaneous hypersensitivity reactions after repeated contact with particular ingredients of hair dyes or chemicals in latex gloves or in building materials (MOWARD and MARKS, 2003; GERAUT et al., 2009). Urushiol is a very potent allergen in leaves of genus Toxicodendron, a plant native in North America. Farmers, workers in forestry or hikers suffer from ACD after incidental repeated contacts with these plants (GLADMAN, 2006). They are, therefore, named poison ivy, poison oak or poison sumac.

*J. K. Kim, J. H. Cho*, **Change of external auditory canal pH in acute otitis externa**, Annals of Otolaryngology & Laryngology 118 (11); 769-772, 2009

**Abstract:** Objectives: We investigated (1) the correlation between the degree of acute otitis externa (AOE) and a change of pH and (2) the recovery of pH after acidification compared to an antibiotic otic solution in AOE. A change of pH in the external auditory canal (EAC) is very important for the pathogenesis of otitis externa. Therefore, not only an antibiotic otic solution, but also acidification, is known to be a good treatment for AOE. However, pH has only been investigated in chronic otitis externa, and not in AOE. Methods: This was a prospective randomized control study. Forty adult patients (56 ears) with AOE and 40 normal control subjects (80 ears) participated in this study. The severity of disease was graded as mild, moderate, or severe. The pH

of each EAC was then measured. The patients were randomly assigned into 2 groups: one for vinegar irrigation and the other for topical antibiotics. The pH of the diseased ears was measured at 1 and 2 weeks after the treatment.

**P. Benz , A. Tichy , B. Nell, Review of the measuring precision of the new Meibometer MB 550 through repeated measurements in dogs,** *Vet Ophthalmol.* 2008 Nov-Dec;11(6): p. 368-74

A meibometer is a device to measure the delivery rate of lipids on the eyelid margin. The aim of this study is to determine the measuring precision of the new Meibometer MB550 (Courage-Khazaka electronic GmbH, 50829, Cologne, Germany), linked to a computer, by means of repeated measurements in dogs by different examiners. PROCEDURE: Two investigators measured the lipid rate on the eyelid margin in 10 healthy dogs for 10 days. One examiner measured the right eye (OD) and the other measured the left eye (OS) for 5 days. After 5 days, the eyes to be measured were switched between the examiners. The new device was able to record all measurement values as charts and curves in comparison to the previous Meibometer, which displayed only one value.

**J.W. Fluhr, K.R. Feingold, P.M. Elias, Transepidermal water loss reflects permeability barrier status: validation in human and rodent in vivo and ex vivo models,** *Experimental Dermatology* 2006, p 483 – 492

Permeability barrier function is measured with instruments that assess transepidermal water loss (TEWL), either with closed- or open-loop-systems. Yet, the validity of TEWL as a measure of barrier status has been questioned recently.

**R. Ofri, K. Orgad, P.H. Kass, S. Dikstein, Canine meibometry: Establishing baseline values for meibomian gland secretions in dogs,** *The Veterinary Journal* (2006)

Meibomian lipid secretions are essential in preventing tear evaporation. Disorders of the meibomian glands may therefore play an important role in the pathogenesis of some forms of keratoconjunctivitis sicca (KCS). Until now, meibomian lipid secretions have never been quantitatively evaluated in dogs.

und soll in dieser Studie mit dem NLS-Test weiter untersucht werden.

**M. Schunck, C. Neumann, E. Proksch, Artificial Barrier Repair in Wounds by Semi-Occlusive Foils Reduced Wound Contraction and Enhanced Cell Migration and Reepithelization in Mouse Skin,** *J Invest Dermatol* 125: p. 1063 –1071, 2005

The repair of the permeability barrier to prevent the entry of harmful substances into the body is a goal in wound healing. Semi-occlusive foils, which provide an artificial barrier, are commonly used for the treatment of wounds. We examined the effects of foils on wound contraction, cell migration, and reepithelization. Full-thickness skin wounds in mice were covered with occlusive latex foils or semi-occlusive water vapor-permeable hydrocolloid foils for either the entire, the first half, or the second half of the wound-healing period. We found that application of foils for the entire healing period initially reduced wound healing during the first week of treatment, whereas healing was enhanced during the second week. Foils were found to reduce wound contraction, but enhanced reepithelization during the second week of wound healing because of increased proliferation and migration of keratinocytes. These effects were also noted when the hydrocolloid foils were applied for the second part of the healing period, only. The fully occlusive latex foil led to irritation of the skin, whereas less irritation occurred under semi-occlusive conditions. In summary, we found that artificial barrier repair with semi-occlusive foils in wounds reduced wound contraction and enhanced cell migration and reepithelization without irritation.

**K. Matsumoto, K. Mizukoshi, M. Oyobikawa, H. Ohshima, H. Tagami, Establishment of an atopic dermatitis-like skin model in a hairless mouse by repeated elicitation of contact hypersensitivity that enables to conduct functional analyses of the stratum corneum with various non-invasive biophysical instruments,** *Skin Research and Technology* 2004, 10, p. 122-129

Pathogenesis of atopic dermatitis (AD) has been studied in animal models such as the NC/Nga mouse strain or Balb/C mice that are repeatedly treated with 2,4,6-trinitro-1-chlorobenzene (TNCB). These mice exhibit features of chronic contact dermatitis, including an intensified early type skin reaction, increased number of mast cells and elevated serum IgE levels with a shift of cutaneous cytokine expression from a type 1 to type 2 profile.

**S.L. Hester, C.A. Rees, R.A. Kennis, D.L. Zoran, K.E. Bigley, A.S. Wright, N.A. Kirby, J.E. Bauer, Evaluation of Corneometry (Skin Hydration) and Transepidermal Water-Loss Measurements in two Canine Breeds,** *The American Society for Nutritional Sciences J. Nutr.* 134:2110S, August 2004

Mammalian skin is a highly dynamic organ that is constantly adapting to changes in its environment. It provides structural, sensory, immunologic, and physiologic functions and contributes an essential barrier function against potential environmental insults.

S. Kim, B. Young Kang, S. Yong Cho, D. Suk Sung, **20-O-β-D-Glucopyranosyl-20 (S)-Protopanaxadiol (Compound K) Induces Expression of Hyaluronan Synthase 2 Gene in Transformed Human Keratinocytes and Fibroblasts and Increases Hyaluronan in Hairless Mouse Skin**, IFSCC Magazine, Vol. 7, No. 3, 2004

Ginsenosides, the major active ingredients of ginseng, show a variety of biomedical efficacies such as anti-aging, anti-oxidation and anti-inflammatory activities. To understand the effects of 20-O-β-D-glucopyranosyl-20 (S)-protopanaxadiol (compound K) – one of the major metabolites of ginsenosides – on the skin, we assessed the expression level of approximately 100 transcripts in compound K-treated HaCaT cells using cDNA microarray analysis.

L.A. Young, J.C. Dodge, K.J. Guest, J.L. Cline, W.W. Kerr, **Age, Breed, Sex and Period Effects on Skin Biophysical Parameters for Dogs Fed Canned Dog Food**, American Society for Nutritional Sciences, J. Nutr. 132: 1695S–1697S, 2002

Noninvasive skin biophysical methods have been used in clinical and experimental dermatology for humans (1). The application of some of these methods has also been investigated for companion animals (2–9). Skin biophysical measurements have been reported to be affected by age, breed, sex, site of measurement, animal excitement, evaluation (time) period or season, gonadal status and even coat color (9). The objective of this study was to look at the effect of age, breed, sex and time period on skin biophysical parameters for dogs fed a nutritionally complete and balanced canned food for adult dogs.

T.-H. Oh, J.-H. Jeong, K.-H. Jang, **The Comparison of Shampoos for Skin Hydration by Measurement of Epidermal Capacitance in Normal Canine Skin**, *J Vet Clin* 18(3): p. 206-210, (2001)

Various commercial shampoos were frequently prescribed for dermatologic therapy in small animal practice. Skin hydration affected by the shampoos, however, was not evaluated routinely. In order to evaluate the skin hydration for the exact prescription of shampoos method to measure skin hydration of shampoos are needed. This study was undertaken to evaluate the skin hydration effect of shampoo on canine skin using Comeometer. Five healthy dogs were applied with 7 commercial shampoos: Humilac, Sebocalm, Sebolytics, Etiderm, Benzoyl peroxide, HyLyt and Zn-7 Derm. Skin hydrations were evaluated by measurement of electrical capacitance by Comeometer. A statistically significant increase in skin hydration was found 17 ( $p < 0.05$ ) and 77 minutes ( $p < 0.01$ ) after application of Humilac indicating a humidifying effect of this product. A statistically significant decrease in skin hydration was found for the Benzoyl peroxide after 77 minutes ( $p < 0.05$ ). No statistically significant differences between the other shampoos were found. None of the products tested had any negative effect on the skin barrier function. The Comeometer was found useful for detecting skin hydration to shampoos and considered as a simple and useful tool for prescription of various shampoos routine practice.

T. Ajito, K. Suzuki, J. Okumura, N. Hatano, **Skin pH of Domestic Animals** (study in Japanese), *Jpn J. Large Anim. Clinics* 24(1): p. 9-12, 2001

Skin pH was examined using skin sebumeter, corneometer and pH-meter...

F.L. Ruedisueli, N.J. Eastwood, N.K. Gunn, T.G.D. Watson, **Skin pH in Dogs of Different Breeds**, *Skin Research and Technology*, Vol. 2, No. 1, February 1996

Normal skin pH in humans ranges from pH 5.4-5.9, but can vary between anatomical sites. No such pH data are known for dogs. In this study skin pH was measured in dogs of different breeds, demonstrating variation between measuring sites, breeds, sex, and coat colour. All animals were fed the same commercial dry dog food. Skin pH was measured with a flat membrane skin pH meter (Courage and Khazaka, Germany) on the head, pinna, flank, axillar and inguinal region. All sites were clipped except head and pinna. The mean pH for 12 Labradors, measured over 5 days, for flank, head, and pinna were (mean  $\pm$  SE)  $7.48 \pm 0.04$ ,  $8.10 \pm 0.06$  and  $6.11 \pm 0.03$ , respectively. Inguinal and axillar measurements showed day-to-day variability. For interbreed comparison skin, pH on the flank was measured on three male and three female Miniature schnauzers  $7.25 \pm 0.17$ , Springer spaniels  $6.65 \pm 0.08$ , Yorkshire terriers  $7.71 \pm 0.13$ , and Labrador retrievers  $7.13 \pm 0.10$ . The overall data showed effects of site ( $p < 0.001$ ), sex ( $p < 0.001$ ; males > females < 9, neutering ( $p < 0.01$ ; neutered > entire), colour ( $p < 0.01$ ; black > yellow) and breed ( $p < 0.01$ ) and a sex effect within breeds. These findings demonstrate that skin pH measurements are possible in dogs and that the variability due to site, sex, breed, and coat may be important in the aetiology and management of dermatological disorders in relation to susceptibility, hypersensitivity, and treatment response.