

PASPCR

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Newsletter



The **PASPCR Newsletter** is published three times a year and is intended to serve as a regular means of communication for the members of our Society. The PASPCR Newsletter is distributed via e-mail, in pdf format, on the first of April, August and December and it will continue to be posted on the web site of the society.

Be sure to check out the PASPCR Commentary page on the website, new articles are being added and if you miss it, you can find past commentaries there as well.

Preparations for the 15th Annual Meeting of the PASPCR, spear-headed by Andrzej Slominski, are progressing well. The meeting will be held in Memphis, Tennessee on September 4-7, 2009 and you can now visit the web site for more info (<http://www.paspcr2009.org>).

In our effort to improve the PASPCR Newsletters and facilitate communication among the members of the Pigment Cell Community, in this issue we introduce two new sections: “**Lab Updates**” focused on the work of Dr. Lidia Kos’ lab and “**Industry Perspectives**” by Dr. Brian Potterf of Unilever.

We hope you enjoy this issue. We encourage you to send us your comments at our email address paspcr.newsletters@gmail.com. Let us know what you would like to see in the letters, suggest sections you think would be useful to include, and recommend any changes that you would like to see. We also encourage you to let us know about meetings that you think would be of interest to members of the society. If you attend a scientific meeting at which you heard about work

which you think will be of interest to the membership of the PASPCR, please write a few paragraphs summarizing what was presented and share it with us. Also, keep us updated on any “*Members in the News*” so we can spread the word of your successes. This is **your Newsletter**, and we depend upon you to help us ensure it best serves the Society’s needs. We look forward to hearing your ideas and suggestions and to continue working together to compile the Newsletters for our society.

PASPCR Newsletter Editorial Team

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The PASPCR Web Site can be found at:
<http://www.paspcr.org>

**The PanAmerican Society for
Pigment Cell Research**

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CALENDAR OF EVENTS

2009

15th Annual Meeting of PASPCR

Date and place: September 4-7, Memphis, TN, USA

Web site: <http://www.paspcr2009.org>

2009

XVth Meeting of the ESPCR

Date and place: September 20-23, Münster, GERMANY

Web site: <http://www.espcr.org>

2009

6th International Melanoma Congress

Date and place: November 1-4, Boston, MA, USA

Web site: <http://www.societymelanomaresearch.org/>

2010

16th Annual Meeting of PASPCR

Date and place: September 22-26, Vancouver, BC, CANADA

Contact: Youwen Zhou, M.D., Ph.D.

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2010

1st Vitiligo World Congress

Date and place: September 23-25, Milano, ITALY

Contact: info@vwc2010.com

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CORPORATE SPONSORS

By Andrzej Slominski

The PASPCR would like to acknowledge and thank our Corporate Sponsors. In the past, financial gifts from our Sponsors have allowed our Society to increase benefits to the membership far out of proportion to the actual dues collected from members. Money contributed by these Sponsors will be used to support the 15th PASPCR Annual Meeting to be held in Memphis, including the meeting travel stipends, scientific program and educational activities and any additional meeting expenses, as well as funding for our Young Investigator Award program. We gratefully acknowledge the contributions as follows:

DIAMOND Corporate Patrons

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In addition, support for the 15th PanAmerican Society for Pigment Cell Research conference is provided by:

National Institutes of Health
(NIAMS/NIEHS/NCI)

Hamilton Eye Institute and Department of Pathology and Laboratory Medicine, UTHSC

Methodist Healthcare (designated this educational activity for a maximum of 26 CME credits)

Renewed/New PASPCR Members/Updated contact info

By Andrzej Slominski

Renewals

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Baylor College of Medicine
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Richard Niles

Marshall University School of Medicine
Huntington, WV

Richard Spritz

University of Colorado
Health Sciences Center
Aurora, CO

The PASPCR would like to welcome these new members to the Society:

New Members

Vitali Alexeev

Jefferson Medical College
Philadelphia, PA

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PASPCR PRESIDENT'S CORNER

One of the surprisingly fun events that occurs every couple of months is the teleconferences of the PASPCR Council. Your Council members are active and outspoken. One of the issues we have been debating the past year has been "color". Initially the thought was that we would prepare one document, but we decided, relatively early, that we would divide the topic in two, with the first article being an exposition of melanin and human skin color.

The product of this effort "The Color of Our Skin" has been elegantly synthesized by John Pawelek for PASPCR and is published below. It will also be circulated to the membership, posted to the PASPCR website and offered to other Regional Pigment Cell Societies as well as the IFPCS.

We have been debating the contents of the second report for several months and will finalize the document after the Memphis meeting. Greg Barsh and Keith Chen have been leading this effort which deals with the issue of the biological anthropology of pigmentation, race and ethnicity and related concerns, a decidedly more controversial and complex topic than the scientific issue of color, the major topic of the first article.

On a different subject, Council members have a three year appointment. If you are interested in being considered for an appointment beginning January 1, 2010 please drop your name (and CV or biosketch) to me (flmeyske@uci.edu) by September 30. Greg Barsh and his committee will be developing a slate that will be voted on by November 1.

Frank L Meyskens, Jr
President, PASPCR

The Colors of Our Skin
Prepared for the Pan American Society for Pigment Cell Research by
John M. Pawelek, PhD, Yale University School of Medicine, August 1, 2009

The beauty and variety that we see in nature is greatly enhanced by the biological pigments - molecules that provide color to the biological kingdom (Figure 1). Most pigments absorb only a portion of the sun's light, reflecting some wavelengths back to our eyes. The reflected light accounts for the color we see, including all the colors of the rainbow and their combinations, providing a continuum of rich and varied hues.

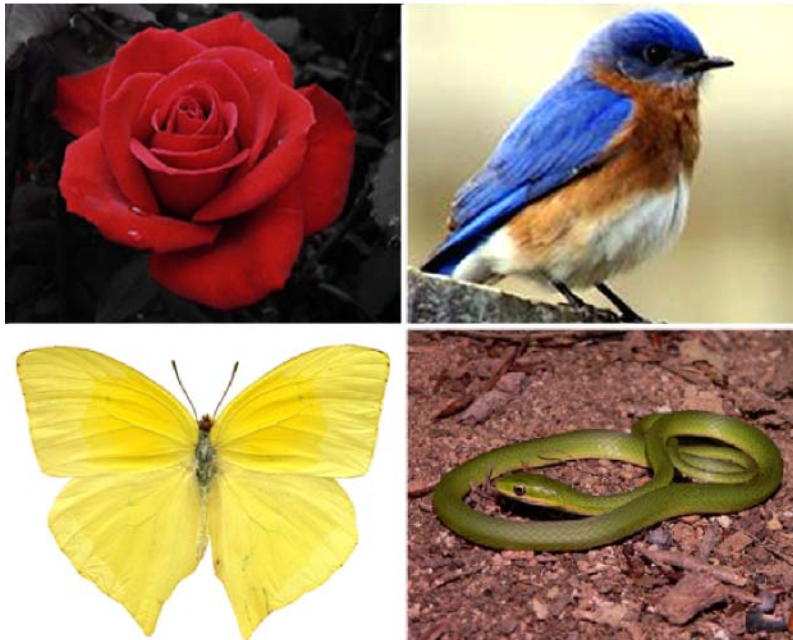


Figure 1. A rich variety of non-melanin pigments in the biological kingdom. Shown are a red rose, a bluebird with an orange breast, a yellow butterfly, and a green snake. Red, orange, yellow, green, and blue are some of the colors of a rainbow.

The melanins. But compared to the vast array of colors in other species, we mammals are rather limited because we use melanins for our pigmentation, resulting in only a few colors—black, brown, red and yellow or gold (1). So we are not as dazzling as flowering plants and other creatures that use both melanin and non-melanin pigments. While melanins may not be as colorful as other pigments, they play many roles in biology including camouflage, species and gender recognition, heat exchange, and protection from ultraviolet light. The more melanin one has in one's skin, the less sun damage the skin incurs--such as wrinkling, actinic keratosis, basal and squamous cell carcinoma, and melanoma. In mammals there are more than 150 genes that control all aspects of melanocyte biology. This large number of genes underlines the many evolutionary advantages of melanins to our well-being. There are two general categories of melanins: eumelanins that produce brown and black hues, and pheomelanins that produce yellow and red hues due to their high sulfur content. Figure 2 shows examples of these colors in a giraffe (brown/black, eumelanin), a lion (yellow/gold, pheomelanin), a young man (brown/black, eumelanin) and a young woman with her daughter (red, pheomelanin).



Figure 2. Examples of eumelanins and pheomelanins in mammals. Pheomelanins are yellow-red in color because they contain more sulfur than the brown-black eumelanins. The photographs are courtesy of Scott Holloway and John Pawelek.

Evolution of melanin pigmentation in humans. DNA analyses of modern humans (2) combined with fossil evidence (3-4) suggest that our human species arose in Africa some 100,000 to 200,000 years ago, in the region of Ethiopia. These early humans most surely had darkly pigmented skin that protected them from the equatorial sun. With some variations, as humans migrated out of Africa, those who remained close to the equator retained the dark pigmentation, while those who moved further away, where the sunlight was not as strong, acquired lighter skin (5-7). From several lines of evidence, these changes in skin color evolved through processes of natural selection, although the selective mechanisms are multifaceted and not yet fully understood (5-8).

Melanin pigmentation and social discrimination. While there are many beneficial roles for melanin, unfortunately sometimes the amount and distribution of skin melanin can cause people to be perceived as “different” from the rest of society, bringing forth negative discrimination against the individual. In societies throughout the world, people with skin that is darker than the norm of the community are more frequently at the lower portion of the socio-economic scale than lighter-skinned people. This social stratification correlates with increased health risks in darker-skinned people (9). A most distressing example is seen in the genetic disorder, albinism. Albinism is caused by inherited genetic mutations that disable one or more of the enzymes necessary for melanin formation (Figure 3). People with albinism are discriminated against in many societies, including sub-Saharan Africa where the prevalence is 1 in a 1000 in some tribes (10). Additionally, disorders of melanin pigmentation that are characterized by uneven pigmentation can also present problems. For example patchy areas of skin with excessive pigmentation in a condition known as melasma, or areas lacking pigmentation in a

condition known as vitiligo, while not severe medical problems in themselves can nonetheless cause great anxiety, stress and clinical depression (11).



Figure 3. Albinism in an African child. The total loss of pigment in the skin and hair reflects a biological impairment in the ability to produce melanin. This results in extreme sensitivity to UV radiation and a markedly increased risk of developing cutaneous squamous cell carcinomas. The photograph is courtesy of Dr. Sidney Klaus.

Thus while melanins serve numerous beneficial functions throughout the biological kingdom, misconceptions associated with skin melanin content have negative impacts on people from all cultures. It is therefore of great importance that the scientific basis of melanin pigmentation becomes better understood throughout the world. The Pan American Society for Pigment Cell Research, and our sister societies in Europe, Japan, and Asia, are dedicated to this goal.

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Letter from PASPCR Treasurer and Secretary

Dear Members of the PASPCR,

The dates for our annual XVTH PanAmerican Society for Pigment Cell Research conference (September 4-7, 2009, Memphis) are rapidly approaching. The full program with abstracts will be published in the PCMR. The updated program will also be circulated electronically and will include the abstracts submitted after the deadlines.

Here I would like to thank the Local and National Organizing Committees as well as chairs of the sessions for their enormous effort in organizing this meeting. In particular I thank the Local Committee for their continued effort and dedication to the meeting. The meeting is supported by the Departments of Ophthalmology and Pathology and Laboratory Medicine, University of Tennessee Health Science Center and will take place in the Hamilton Eye Institute. Again our Society greatly appreciates the support from their leaders and administrative staff; they joined our society.

We are also pleased to inform our members that the IFPC will hold its Council Meeting during the Conference and that the elected officials of our International Organization will also present their important scientific work. Importantly, our program includes outstanding key-note speakers who are the leaders in corresponding fields of science. We have received and are continuously receiving outstanding abstracts. Thus, I can assure you that our conference will be an unqualified scientific success.

This has already been recognized since NIAMS, NIEHS and NCI sections of the NIH will fund our Conference Grant submitted through the University of Tennessee. Thus, our conference will be supported in part by **NIH (NIAMS, NIEHS and NCI)**. It is important to mention that that **Methodist Healthcare**, which is accredited by the ACCME to provide continuing medical education for physicians, has designated this educational activity for a maximum of 26 AMA PRA Category 1 Credits.

We are extremely grateful to our corporate sponsors: **Johnson & Johnson Consumer Companies, Amway Corporation, Unilever, Memphis Dermatology Clinic, Procter and Gamble Company, Avon Products, Baptist Memorial Health Care Corp** and to a donor who decided to be **anonymous**. I have also received a letter from **L'Oréal** informing me that they will sponsor conference as a silver patron, and we are graciously awaiting for a promised check.

Since I am receiving many questions concerning the meeting, below are the answers to the most frequent ones:

1. Yes, we are continuously accepting the abstracts till September 3. The work will be presented as posters.
2. Investigators and physicians who do not present are welcome to register and participate in the meeting.
3. There are no closing deadlines for registration; however, the registration fees will be more expensive after certain deadlines.
4. Yes you can join the PASPCR during registration and pay for registration reduced (member) fee.
5. The information on the travel awards will be sent soon and awardees will receive the awards in Memphis during conference.
6. When registering on the site, please pay by check; we will not be able to process credit cards.

I also urge you to start registrations and hotel reservations. Please also make your payment for Gala Dinner on September 6 as soon as possible. We have made a reservation at the Texas de Brasil

restaurant and we need to know how many of you want to attend. **Please let me know.** The opening Cocktail Party will take place in the Residence of Dr. Charles Handorf on September 4, 2009. There will be a surprise visitor. We will arrange transportation from the conference to the residence and after to the hotels. I left Saturday as a free evening for you so you can enjoy blues, jazz and rock on the Beale Street. I am sure that you will appreciate my decision.

Again on behalf of the organizing committees I welcome you to the PASPCR meeting in Memphis. Please register as soon as possible and you will enjoy Southern hospitality.

Andrzej Slominski, Chair and Secretary/Treasurer

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Announcement of the 1st Vitiligo World Congress, September 23-25, 2010, Milano, Italy



Milano, September 23-25, 2010



Dear Friends,

It is a great honour and pleasure for me to chair the FIRST VITILIGO WORLD CONGRESS which is to take place on September 23-24, 2010 at the San Raffaele Scientific Institute of Milano.

Why at the San Raffaele Scientific Institute? Because, using the words of its Founder and President, Don Luigi Maria Verzé, "the San Raffaele complex focuses exclusively on every aspect of man; a blend of *soma*, intellect and spirit as far as duration and quality are concerned", as well as because clinical and basic research are core activities of the San Raffaele Scientific Institute.

Why a Congress dedicated solely to vitiligo? Because in spite of it not being a rare disease, of being classified as a disease by the WHO (World Health Organisation) and of being one of the most psychologically devastating chronic skin diseases, with a major impact on both patients and their families, vitiligo is still today underrated and underestimated. Still today there are dermatologists who minimize the impact of the disease, who trivialize the condition or deceive patients' expectations, leaving them vulnerable to therapies not proven effective, therapies often found within the depths of Internet.

In view of the fact that these last ten years have witnessed a growing interest for research and an improved understanding of the mechanisms regulating the disease, of its genetic susceptibility and of the role played by autoimmunity this highly intense conference, the Faculty of which is made up by the most eminent experts in the field, sets itself the goal of becoming an ideal occasion for an innovative and in-depth analysis of vitiligo.

The Congress is going to focus on recent developments in our understanding of the disease, touching on such different research areas as genetics, endocrinology, immunology, photobiology and psychology. Old and new therapeutic approaches for vitiligo are going to be a major issue for debate.

Saturday, September 25, is going to be dedicated to patients: "Vitiligo, where are we now? Interaction among patients, clinicians and scientists". Goal of this event is to allow patients to play an active role in the field of research and to provide them with more information on existing therapies.

With the hope that each one of You may make their contribution to this Congress I send you my best regards,

Santo Raffaele Mercuri

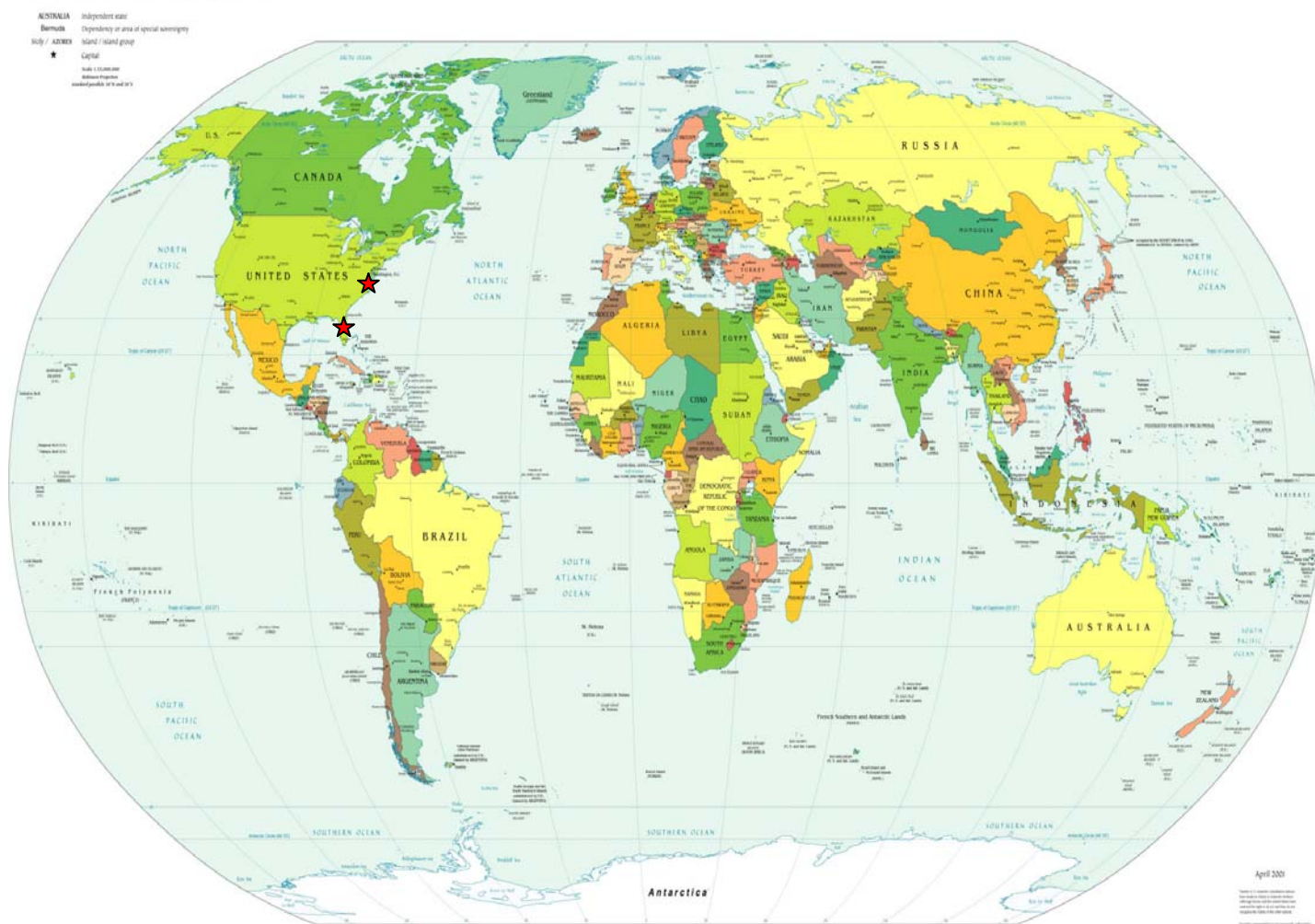
LAB UPDATES. INDUSTRY PERSPECTIVES.

KEEPING THE PIGMENTATION COMMUNITY CONNECTED

In this issue, we bring back an old favorite with “*Lab Updates*”. This column will provide a forum for PIs and their post-doctoral fellows to let us know what they are working on and tell us about new avenues of research the lab is focusing on. To find out what is new with our colleagues in industry, we will have “*Industry Perspectives*”. We hope that you will take the opportunity to fill us in on what is happening in your lab or company. Volunteers would be greatly appreciated, just email us at paspcr.newsletters@gmail.com.

This initiative is part of our effort to keep the pigmentation community connected and to emphasize the importance of collaboration and communication between groups. We will keep adding stars on our world map below each time you contribute a column about your newest research projects. So, let’s go on a global research adventure!

Political Map of the World, April 2001



Courtesy: <http://www.mygeo.info/karten/802784.jpg>

LAB UPDATES

Kos Lab Update

When we think about melanocytes, those that are present in the skin, eyes or ears are the ones that immediately come to mind. Our lab has become interested in a different population of melanocytes that is found in the murine adult heart. These melanocytes are neural-crest derived and originate from the same region as the neural crest cells that contribute to the remodeling of the arch arteries and the heart outflow tract (cardiac neural crest). This is especially interesting because there is still an intense debate on the exact contribution of neural crest cells to parts of the heart other than the outflow tract.

The precursors of the cardiac melanocytes migrate initially with those that are destined to the skin and subsequently make a turn towards the heart, entering the AV endocardial cushion (anlagen of the AV valves) via the proximal outflow tract. They reach the outflow tract a couple of days later than the cardiac crest and populate the AV endocardial cushion exclusively at the time when it is undergoing remodeling to form the AV valves. They persist into adulthood, mostly on the atrial side of the AV valve leaflets, the region that is in direct contact with blood flow and subjected to shear stress (Brito and Kos, 2008).

The proper functioning of the heart valves depends mostly on the highly organized and compartmentalized extracellular matrix (ECM) composition that is achieved during the process of remodeling. The timing of arrival and localization of melanoblasts in the heart suggested that these cells might be involved in the organization of the leaflets' ECM. We have found that melanocytes co-localize with versican and elastin, and are absent in collagen rich regions of the adult AV valve leaflets. We are currently evaluating whether the AV leaflets' ECM pattern is affected by the absence

of melanocytes (in the valves of *Kit* and *Ednrb* mouse mutants).

The leaflets' ECM pattern and interstitial cells confer the required biomechanical properties and maintain the homeostasis of the valves. These functions have not previously been attributed to melanocytes in other tissues but it seemed reasonable to speculate that this might be the case in the valve leaflets. The leaflets of murine valves are very small and their mechanical properties cannot be assessed with the macroscale tests normally applied to human or porcine valves. While searching for an appropriate way to measure the mechanical properties of the murine leaflets, we were lucky to find an expert in nanomechanics analysis in our own Department of Mechanical and Materials Engineering. Dr. Arvind Agarwal uses the technique of nanoindentation to evaluate the mechanical properties of materials such as carbon nanotube composites and coatings that are used for hip replacement prosthetic implants. Together, we were able to adapt the use of nanoindentation to the murine valves and have been the first ones to provide measurements of stiffness and elasticity for the leaflets. Even more exciting is our finding that those regions of the leaflets that are populated by melanocytes (as evidenced by the presence of pigmentation) are considerably stiffer than those where melanocytes are absent.

Thus, the presence of melanocytes and/or melanin affects the biomechanical properties of the tissue where they are found (Balani et al., 2009). It would be interesting to find out if melanocytes/melanin affect the stiffness and elasticity of the skin, stria vascularis and retinal pigment epithelium.

In order to differentiate between the role played by the melanocytes themselves or the melanin content, we are analyzing the biomechanical properties of the valve leaflets of albino, *Ednrb* and *Kit* mutants (no melanocytes), and transgenic mice that have large numbers of cardiac melanocytes. We have also started to investigate the mechanical properties of the

melanocytes at a cellular level. We are trying to establish if these properties vary in different parts of the cell (body x dendrite), when they adhere to different substrates, are exposed to different factors, and have become tumorigenic.

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INDUSTRY PERSPECTIVES

Brian Potterf - Unilever

This is the first of a series of invited articles related to the industrial perspective of pigmentation research. I am pleased to contribute as a scientist working in the cosmetic industry with experience in biochemistry, cell biology, developmental biology and genetics. My earliest exposure to pigmentation research occurred in Vince Hearing's laboratory at NCI where we derived *in vitro* mechanistic insights into mammalian pigmentation. More recently as a post-doc in Bill Pavan's laboratory at NHGRI we investigated the basic mechanisms that underlie human Waardenburg-Shah syndrome, a disease resulting in sensory neural deafness, aganglionic megacolon, and pigmentary abnormalities. But now in the cosmetics industry my focus is development of basic

knowledge of skin structures related to pigmentation to ensure our cosmetic products are safe and achieve their intended effect on the appearance of skin. It is a big difference on the surface; however the link between the two is a common need to understand the science and to develop the appropriate means for treatment.

Industrial research aims to discover ways to provide best solutions for consumers with concerns to maintain and improve the appearance of their skin. It is necessary to understand not only product performance, but therapeutics and medical devices prescribed in tandem. This field is rich with scientists from many disciplines who seek insights from basic research that translate into practical solutions to address unmet consumer needs.

There are several considerations for development of cosmetic products to address consumers' concerns about evenness of skin tone. These include testing to ensure that the final products are extremely safe, that any effect is reversible when product use is discontinued, and that use of products is sensorially a positive experience (fragrance, texture, color, after feel, etc). All of these factors play a role in ensuring the final product meets a consumer's everyday needs. Additionally consumer expectations of effectiveness for topical product need to address not only hyperpigmentation but also provide the right balance of moisture, anti-aging benefits, and sun protection.

A focus for our research is to characterize differences in the clinical manifestations and consumer perception of skin pigmentation characteristics across populations embracing all the ethnic variations of skin pigmentation. The differences between skin types impact consumer perceptions and concerns. For example in North East Asians regions such as Japan and China, age-related hyperpigmentation (e.g., solar lentigines) is more prevalent than more diffuse patchy hyperpigmentation present in South Asian (e.g., Indian) skin types. Darker toned populations have significantly more post-inflammatory hyperpigmentation (PIH). Melasma may arise

from non-UV triggering events. Protective effects of melanin, genetic influences, geography, and habits and attitudes toward sun exposure and face care regimens may account for some of these differences. Interestingly, many women living in generally sun-avoidance cultures in Asia have significant accumulation of solar lentigines in their 20s and 30s, which contrasts with the later age accumulation (generally > 40 yrs) in sun-seeking Caucasian populations - is this a behavioral difference or skin biology difference?

Pigmentation research is broad ranging and covers constitutive and facultative pigmentation, morphologic and genetic factors, acquired age-related pigmentation, health, dietary, lifestyle and socioeconomic conditions. Consequently a multimodal approach to addressing pigmentation concerns is necessitated to take into account the multiple routes to develop hyperpigmentation which stem from events in the different layers of the skin contributing to normal and aberrant pigmentation. For example inflammation, UVR, visible light, and IR all have consequences for pigmentation at different layers of the skin. One needs an ever broadening appreciation of the expanding concept of the epidermal melanin unit; indeed, we have now come to realize the important impact of the dermis on normal and aberrant pigmentation. Consequently, study of normal and abnormal pigmentation within the context of the entire skin is necessary to help develop cosmetics that are safe and that enable different types of consumers – who have different skin types – to achieve improved appearance of the skin. Potential cosmetic mechanisms of action addressed in the cosmetic industry for improving the appearance of pigmentation include use of anti-oxidants, botanicals, vitamins, anti-inflammatories, sunscreens, optical modifiers, among others. Recently industry pigmentation research has focused on an improved ability to understand how skin interacts with its environment, including evaluation of those described above and next-generation technologies.

An exciting area of cosmetics industry pigmentation research is the use of non-topical solutions to manage skin care problems. This includes oral nutraceutical delivery of pigmentation benefits, cosmetic lasers, IPL and others. However, the latter non-topical therapies are not always widely available due to cost, potential complications or side effects, incomplete data, size of equipment, etc. Additionally many pigmentary conditions may not rise to the level of severity where the trade-off between costs and potential side effects vs. efficacy merits the use of cosmetic lasers over traditional topical routes, and as such they are not realistic solutions to most pigmentary problems. For the most severe conditions an optimal approach includes laser therapeutic treatments followed by compatible topicals to maintain outcomes, prevent recurrence and prevent further damage.

In closing I would like to thank PASPCR for the opportunity to write the first column of this type: *Industry Perspectives*. I look forward to reading future columns as we continue to increase our understanding and therefore development of the best treatment regimens for our consumers.

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Other news

PCMR Journal Impact Factor

The newest Impact Factor of the scientific journal **Pigment Cell & Melanoma Research**, the official journal of the **International Federation of Pigment Cell Societies** and of the **Society for Melanoma Research**, is **4.634**.

New mutant – Bill Pavan’s Lab

Recently, Bill Pavan’s lab launched a contest called “Name our mutant” and scientists from the NIH Pigment Cell Interest Group were invited to suggest names for a new spotting mutant. After much deliberation, it was decided that the new mutant will be called “Thriller”, based on the winning entry submitted by Vince Hearing. For more info on the mutant, please contact Dawn Watkins-Chow (dchow@mail.nih.gov).



Courtesy: <http://music-rapid.com/2008/12/18/michael-jackson-black-or-white.html>



Courtesy: Pavan’s Lab

Positions Wanted / Available

Postings for **Positions Wanted** will be open only to members of the PanAmerican Society for Pigment Cell Research or its sister societies (ASPCR, JSPCR and ESPCR). Postings for **Positions Available** will be open to all individuals and institutions so long as the position is related to pigment cell research. Please send postings to Bill Oetting at oetti001@umn.edu.

The postings will remain on the **Positions Wanted and Available** section of the PASPCR Newsletter and on the web page for 1 year, unless other arrangements are made. Please provide an expiration date for any submitted posting if less than 1 year. Final decisions will be made by the Publications Committee of the PASPCR.

Positions Available

Post-Doctoral Position

Appointment: University of Tennessee Health Science Center Department of Pathology and Laboratory Medicine, 930 Madison Avenue; Memphis, TN 38163

Project summary: A postdoctoral position is available starting September, 2009. The area of study is described in Slominski A, Wortsman J, Paus, R, Elias PM, Tobin DJ, Feingold K (2008) Skin as an endocrine organ: implications for its function. Drug Discovery Today: Dis Mech 5: e137-e144; Slominski A (2007) A nervous breakdown in the skin: Stress and the epidermal barrier. J Clin Invest 117, 3166-3169; Slominski A, Wortsman J, RC Tuckey, Paus R (2007) Differential expression of HPA axis homolog in the skin. Mol Cell Endocrinol 265-266, 143-149.

Minimum requirements: experience with mice model, skin, endocrinology and histopathology to work on the project supported by National Science Foundation entitled "UV-light regulation of skin endocrine functions: POMC system". If interested, please contact

Andrzej Slominski, MD, PhD
Professor of Pathology

Director, Dermatopathology Training Program
E-mail: aslominski@utmem.edu
Tel: 901-448 3741

Posted: 07/09

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Memphis Meeting - announcement

A board will be available during the meeting for communication regarding job openings. Please contact the organizers if you are interested to find a job or to post an opening.