The PASPCR Newsletter serves as a regular means of communication for the members of our Society. The PASPCR Newsletter is distributed via e-mail, in pdf format, and is posted on the web-site of the Society. After a very long existence (started in 1990 with Drs. Richard A. King, DeWayne Townsend and Nels Granholm as Editors), the Newsletters will end in this format with the last issue to be distributed in December. Any plans on its format and transition will be communicated by the PASPCR Council during 2019 (see also page 5 – Letter from the PASPCR Secretary/Treasurer).

The preparations for the 22nd PASPCR Meeting, held in Bar Harbor, ME, and organized by Drs. Craig Ceol and Manikum Sugumaran are in full swing. More details about the meeting can be found on pages 10-12.

In this issue, we continue the “Trainee Spotlight” section with a column by Dr. Chelsey Kline, and the “Laboratory Updates” series with an article by Dr. Caroline Le Poole. We also share with our members news about the Sun Bus Project, include a Hot off the Presses article by Dr. John Pawelek and a column by Dr. John D’Orazio sharing his thoughts on her mentors and the benefits of mentorship.

We hope you enjoy this issue. We encourage you to send us your comments at our email address paspcr.newsletters@gmail.com.

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 that 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.

If you know of training courses that would be of interest to the PASPCR members, please let us know and we will add them to our Calendar of Events.

Also, keep us updated on any “Members in the News” so we can spread the word of your successes.

The PASPCR Web-Site can be found at:

http://www.paspcr.org
C/O Prashiela Manga, Ph.D.
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Deborah Lang (2018-2020)
Craig Ceol (2018-2020)

IFPCS Representatives:
Prashiela Manga (President)
Thomas Hornyak (Council Member)
John D’Orazio (Council Member)

CALENDAR OF EVENTS

2019

European Society for Pigment Cell Research
Date and place: 12-14 September, Brussels, BELGIUM
Web-site: www.espcr.org

PanAmerican Society for Pigment Cell Research
Date and place: 2-4 October, Bar Harbor, ME, USA
Web-site: www.paspcr.org

2020

IPCC
Date and place: 18-21 June, Yamagata, JAPAN
Web-site: http://ipcc2020.umin.ne.jp

Vitiligo International Symposium (VIS)
Date and place: November 2020, INDIA

The PASPCR Newsletter is published by the PanAmerican Society for Pigment Cell Research. All views are those of the authors. For further information or to submit articles, please use the e-mail address pascpr.newsletters@gmail.com.

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We thank the following organizations for their support of the 2018 Montagna Symposium on the Biology of Skin/PASPCR Annual Meeting:

**Champion ($25,000 or greater)**
Pfizer Independent Grant for Learning & Change

**Sustainer ($10,000 - 24,999)**
OHSU Department of Dermatology
Castle Biosciences, Inc.
OHSU Knight Cancer Institute Melanoma Program

**Benefactor ($5,000 - 9,999)**
Curtis T. Thompson, M.D. & Associates, LLC
Myriad Genetics, Inc.
Palvella Therapeutics
The Procter & Gamble Company

Funding for this conference was made possible (in part) by (2 R13AR009431-53) and (1 R13AR07429-01) from the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) and co-funding support provided by the National Institute on Aging (NIA) and the National Institute of Environmental Sciences (NIEHS). The views expressed in written conference materials or publications and by speakers and moderators do not necessarily reflect the official policies of the Department of Health and Human Services; nor does mention by trade names, commercial practices, or organizations imply endorsement by the U.S. Government.

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We thank the following organizations for their support of the 2019 PASPCR Annual Meeting:

L’Oreal
Colgate-Palmolive

Funding for the conference is made possible (in part) by R13 AR076230 from the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) and the National Institute of Environmental Sciences (NIEHS). The views expressed in written conference materials or publications and by speakers and moderators do not necessarily reflect the official policies of the Department of Health and Human Services; nor does mention by trade names, commercial practices, or organizations imply endorsement by the U.S. Government.

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PASPCR PRESIDENT'S CORNER

CHANGE IS IN THE AIR

I hope everyone's year is progressing well. I have been working with Craig Ceol, Prashiela Manga, and John D'Orazio to plan this year's PASPCR 2019 meeting in October at The Jackson Laboratories. Craig should be congratulated for having submitted a successful R13 meeting grant application to NIH for funding by the National Institute of Arthritis, Musculoskeletal, and Skin Diseases (NIAMS). Craig’s efforts have maintained a longstanding tradition of our Society's success in obtaining these funds to facilitate our annual scientific gatherings. Although further details about this year’s meeting will be available soon with the opening of meeting registration, I will say now that I am very much looking forward to this meeting which will enable us to gather in perhaps a more "laid-back" manner than some of our more recent meetings that have been based at hotels. Similar to last year with the Montagna Symposium, this year’s meeting also has a partnership dimension, with the American Society of Photobiology having provided input and sharing a scientific session. I hope that experimenting with new venues and alliances for our annual meetings continues to be invigorating for the membership while we maintain and enhance our traditional focus on the normal biology and chemistry of pigmentation and pigment cell function.

NIAMS has provided both scientific meeting support for PASPCR as well as crucial research funding for many of our membership. NIAMS was led for decades by Dr. Stephen Katz, a dermatologist and a mentor and friend to me, who suddenly and unexpectedly died during the last few days of 2018. I was able to attend Steve’s funeral held in Chevy Chase days after his death and express my sorrow to his family members at a subsequent shiva. The entire skin biology community has lost an important supporter with Steve’s passing. NIAMS is currently searching for a new Director and also has reorganized its extramural research structure to be under the oversight of a single Director of Extramural Research. Dr. Alexey Belkin is the new Program Director for Skin Repair, Pigmentation, and Appendages within the NIAMS extramural program, and he has promised to do his best to be supportive of the skin biology community. Let's hope that the new leaders of NIAMS will continue to be receptive to supporting research on basic melanocyte biology that has served many of us, and the field, well thus far.

I am nearly halfway through my final year as PASPCR President and it is now necessary to plan for the upcoming leadership transition to John D'Orazio as our next President and to the selection of both a new PASPCR Secretary-Treasurer, to succeed Prashiela Manga, and a new President-Elect. I encourage the membership to think carefully about the qualities desirable in future Society leadership and to let us or any other members of the PASPCR Nominating Committee know your thoughts about potential candidates (including yourselves!). It is remarkable that our Society has survived and thrived over the past 30 years since inception while remaining relatively small in number and focused in purpose. Having strong future leadership will be essential for all of us to continue to benefit from our PASPCR memberships and the relationships it helps us to maintain. I hope in the next few months to reflect more upon the contributions of our founders and early leaders and remind you of their contributions in my final Presidential Letter. For now, let's focus on getting the next generation in place as we approach our October meeting and next year's IPCC in Japan.

Tom Hornyak
PASPCR President
LETTER FROM THE PASPCR SECRETARY/TREASURER

Dear PASPCR Colleagues and Friends,

Plans are well underway for the 2019 PASPCR Annual Meeting. If you have not already done so, please renew your membership. You will receive discounted registration fees for the meeting.

Some PASPCR members will be eligible for a travel award. Please be sure to self-identify when submitting your abstracts. Awardees will be selected based on the ranking of abstracts. Please also let us know if you are eligible for the Medrano Young Investigator Award.

The criteria for receiving a travel award are:

i. Must be a member of the PASPCR
ii. Must be included as an author on an abstract submitted for the meeting
iii. Must be in one of the following three groups:
   a. Graduate Student
   b. Postdoctoral fellow
   c. Instructor or Assistant Professor who has had a faculty appointment for 3 or fewer years.
iv. Must not hold terminal doctoral degree for more than 5 years.

Candidates eligible for the Medrano Young Investigator Award are early career scientists, within twelve years of their terminal doctoral degree.

Publication of the newsletters as they are currently published will end with the last issue of 2019 to be distributed on December 1st. We are working on redesigning the PASPCR website and hope to make it an interactive space that allows us to collaborate in a more dynamic way. If anyone is interested in working on this project, please let me know.

If you have not already visited the new IFPCS website, I invite you to do so at https://www.ifpcs.org/. The link to access Pigment Cell and Melanoma Research has been restored as well. A huge thank you to Lluis Montoliu who oversaw the project as well as for his many years of service as the site’s webmaster.

I look forward to seeing you all in Maine.

Best wishes,
Prashiela Manga
Secretary/Treasurer, PASPCR

ONLINE MEMBERSHIP RENEWAL IS EASY…

To renew your membership and pay dues online, go to: http://paspcr.org/membershipform.php. If you need to update your contact information, please complete the application form that loads after you complete your payment. Please note that we now have the option of listing your lab website along with your contact details, so please use the form to provide this information.

To pay by check, please complete and mail the renewal form on page 6 together with your check to the address provided.
Contact Information (Please be sure all contact information is current and correct, including e-mail address)

Name: ______________________________________________________________
Title: ______________________________________________________________
Institution: ___________________________________________________________
Department: __________________________________________________________
Website: _____________________________________________________________
Institutional Mailing Address: ___________________________________________

City: __________________________ State: __________________________ Zip: __________
Country: ______________________
Phone: __________________________ E-mail: ____________________________

Dues (Please mark the appropriate category below)

☐ Regular Membership with electronic journal ($154/yr)
☐ Membership for members of the Society for Melanoma Research ($105/yr)
☐ Student Membership ($40/yr)
☐ Secondary Membership ($77/yr) (if IFPCS dues and subscription to the journal Pigment Cell and Melanoma Research are paid through another Pigment Cell Society)
☐ Retiree Membership ($80/yr) For retired individuals who have been PASPCR members in the year prior to retirement

Make check payable to: PanAmerican Society for Pigment Cell Research or PASPCR.

Please send check or money order in U.S. funds drawn only on a U.S. bank. Checks drawn on a non-U.S. Bank will be returned.

PLEASE SUBMIT YOUR DUES TO:
Prashiela Manga, Ph.D., Secretary-Treasurer, PASPCR, Ronald O. Perelman Department of Dermatology, NYU Langone Medical Center, 522 First Ave, Smilow 401, New York, NY, 10016
Tel: 212-263-9086 Fax: 212.263.5819 E-mail: prashiela.manga@nyumc.org

Please return this form with your payment
Welcome to the new IFPCS list and the new IFPCS web site

Dear IFPCS members, dear colleagues and friends,

IFPCS members have been subscribed to a new list that we will use, from now on, to share information related to IFPCS or to any of its regional pigment cell societies federated: ASPCR, ESPCR, JSPCR and PASPCR.

Please update your email filters and email addresses. The new IFPCS list is: ifpcs@lists.ifpcs.org.

All members are welcome to read, post or respond a message. For safety reasons, default reply-to is set to the sender. If you want to respond to the entire list (please think twice before hitting the button) please bear in mind you will be sending a message to all IFPCS members (>450...) and edit the to: field and introduce the list address.

Messages sent through this list will be identified with the label [IFPCS] in the subject field.

I am also taking the opportunity to announce the new IFPCS web site. At the IFPCS council we decided to revamp the IFPCS web page and asked an external company (Lely Method, Brussels, Belgium) to reorganize and produce an entirely new web site and federation image/logo.

Please visit the new IFPCS web site at: https://www.ifpcs.org
Please notice this is a secure encrypted server (https://).

Please explore the page and its numerous new features, most of them self-explanatory. I will be preparing a brief set of instructions to use some of the new functionalities added.

PCMR online is not yet operative, but will be soon, as soon as Wiley delivers the new code adapted to the new IFPCS URL web address where we have been moving the new IFPCS web site. I will keep you posted.

If you find any mistake, anything not functioning as expected or something that needs to be edited and modified, please send me a message, off-list, and I will take care of it asap.

With best wishes,
Lluis Montoliu
IFPCS Secretary and IFPCS Webmaster, on behalf of the IFPCS Council
The Importance of Mentorship

By John D’Orazio, MD/PhD, PASPCR President-Elect

I’ve been thinking about what PASPCR represents and what the Society has meant to me in my journey as a pigment cell biologist. Thanks to all of you and to those who came before us, the PASPCR is a robust group of collaborative scientists united by all things “pigment.” We study melanin chemistry, melanin regulation, melanocyte development melanocyte biology, melanocyte response to environmental stressors, diseases of disordered pigmentation and, of course, melanoma. We appreciate that melanocytes and pigmentation can be excellent model systems to study general processes of cell biology. We’re a small Society, yet there is hardly a meeting I enjoy more than our annual meeting to catch up with old friends, explore new collaborations and see each other grow in our careers. But to me, the biggest gift PASPCR has given me has been the gift of mentorship.

“Our chief want in life is somebody who will make us do what we can.” - Ralph Waldo Emerson

I am a non-conventional pigment cell biologist, and came into the field by good fortune. Trained as a physician scientist, I identify first and foremost as a pediatric oncologist rather than a dermatologist or dermatopathologist. I had no idea that I would end up studying melanocytes and melanoma. But by chance, I was assigned to be the pediatric oncology fellow at Boston Children’s Hospital during the month when Dr. David Fisher was the ward attending. As you all know, David is one of the top melanocyte/melanoma biologists in the world, but when he approached me to consider his lab in which to do my fellowship research, I told him “David, thanks but melanoma really isn’t an oncologic disease of childhood; I need to be doing leukemia or brain tumor or sarcoma research.” He was ready for this.

“Yes, John, that’s true, but the UV that people get in their childhood really impacts their melanoma risk later in life. Also, melanoma is being diagnosed more and more in adolescents and young adults. And I have this really cool idea...”

He then told me about the paradox that while melanoma is diagnosed much more in fair-skinned people than in dark-skinned people, melanoma risk can’t just be all about eumelanin levels. He told me about how individuals affected by albinism hardly ever get melanoma even though they have essentially no melanin pigment in the skin yet have the same number of melanocytes and get a lot of keratinocyte UV-induced malignancies. He then told me about eumelanin and pheomelanin and how he thought that pheomelanin expression might be pro-carcinogenic. That’s about all it took. I ended up joining the Fisher lab, developed a suitable animal model to study epidermal UV responses in eumelanotic vs. pheomelanotic mice, and helped clarify the importance of the melanocortin 1 receptor (MC1R) in pigmentary and UV responses. It was a great post-doc and I will always look back on my years in David’s lab as among the most scientifically productive and important in my career.

“Tell me and I forget, teach me and I may remember, involve me and I learn.” - Benjamin Franklin

David proved to be an outstanding post-doctoral mentor for me. He got me excited about my project, provided all the support I needed to make progress, met with me regularly to go over data, refine experimental plans and helped mold me into an independent scientist. Now almost 15 years after I left his lab, I know he still “has my back” and I am nothing but grateful. It was David who introduced me to PASPCR. He suggested I attend my first annual meeting back in the early 2000’s, to meet many of the
scientists whose papers I had read and whose work I was following. To be honest, I was filled with apprehension to go to the meeting. Would it be “sharky”? Would I get scooped if I shared our data? Would there be cliques like back in high school? Would I look stupid (after all, I wasn’t really a dermatology-trained scientist)? Within a few hours at the meeting, however, most of my fears were allayed. I learned that the field of pigment cell biology is big and the number of pigment cell biologists relatively small so that that the atmosphere wasn’t competitive or cut-throat. Rather, PASPCR was a group of collegial researchers who seemed to delight in getting together and talking science. Senior scientists mixed with trainees and young investigators and everyone seemed to be having a good time. Happily, this dynamic persists to this day.

“\textit{In order to be a mentor, and an effective one, one must care… care about what you know and care about the person you’re sharing with.}” – Maya Angelou

As most of you probably know, we started a formal mentorship program within PASPCR back in 2018. The germ of the idea happened the year before at the 2017 IPCC meeting in Denver. I was talking with a post-doc who shared with me the challenges s/he was facing in trying to launch into an independent position. As we chatted, I recalled the uncertainty I faced as I left David’s lab to come to the University of Kentucky to start a group of my own. It became clear to me that although his/her post-doc mentor was doing all s/he could to help his/her trainee, perhaps there was a hole that could be filled by PASPCR. After all, PASPCR colleagues had been generously helping me with career advice and opportunities for years. With the help of many colleagues and backed by the support of the Society, we designed a “PASPCR Mentorship Program” over the next many months, rolling out the program at the 2018 Montagna/PASPCR meeting in Oregon. The organizers graciously provided space, administrative support and even food and drinks to turn the Mentorship Mixer into an inviting “cocktail party” like event. About 60 people participated and it was a resounding success. Conversations flowed, introductions were made, and connections (which I hope will be lasting) were established. Twelve mentor-mentee pairs were formally identified and the Mixer had the effect of breaking down barriers between young and more seasoned investigators that lasted the rest of the meeting. The program is personalized to the needs and capacities of the specific mentorship pairs to include any or all of the following:

- Career guidance – things like strategies for funding success, advancing through the promotion/tenure process, taking advantage of networking opportunities, careers in biotech/industry/education.
- Scientific guidance – where and when to publish, grant/manuscript feedback/critiques, lab management issues.
- Networking – help the mentee get better known in the field
- Identifying speaking opportunities, publication opportunities, grant and review opportunities, etc.
- Help with moving science beyond the lab – commercialization, translational, clinical work, education.

“The greatest good you can do for another is not just to share your riches but to reveal to him his own.” - Benjamin Disraeli

A few months after the meeting, I reached out to the mentor-mentee dyads to get a sense of whether this program was being used. Happily, many of the dyads had been in communication with one another and their activities ranged from general career advice/support to manuscript and grant reviews. One mentor wrote “I really wished I had this when I was starting out, or had anyone at all.” Mentorship has been a
central part of what PASPCR has been about since I joined in the early 2000’s and I’m certain long before that. Our plan is to keep mentorship a central mission of the Society. We plan to host a second Mentorship Mixer at the 2019 annual meeting in Bar Harbor and provide further opportunities for mentor-mentee pairs to be created. Please consider coming and sharing your knowledge and experience with others. What I’ve learned about this process is that mentorship is most definitely a two-way process and that the teaching goes both ways. Now a mid-stage investigator, I remain grateful to my PASPCR colleagues who help keep science fresh and enjoyable. I hope I never will stop being mentored by my colleagues. Thank you!

“The delicate balance of mentoring someone is not creating them in your own image, but giving them the opportunity to create themselves.” - Steven Spielberg

MEETINGS UPDATES AND ANNOUNCEMENTS

2019 PASPCR Meeting
### PRELIMINARY PROGRAM:

**WEDNESDAY, OCTOBER 2, 2019**

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<tr>
<th>Time</th>
<th>Event</th>
<th>Organizer(s)</th>
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| 8:45 a.m. - 9:00 a.m.| Welcome and opening remarks                                           | Thomas J. Hornyak, M.D., Ph.D., University of Maryland School of Medicine; President, PASPCR  
|                     |                                                                       | Craig Ceol, Ph.D., University of Massachusetts Medical School, Lead Organizer, PASPCR 2019 |
| 9:00 a.m. - 11:30 a.m.| PLENARY SESSION 1:                                                   | Melanin photobiology and photochemistry                                         |
|                     | Invited speaker                                                      | Yu-Ying He, Ph.D., University of Chicago                                         |
|                     | Selected oral presentations from submitted abstracts                  |                                                                              |
|                     | Break                                                                 |                                                                              |
| 11:30 a.m. – 12:30 p.m.| POSTER SESSION                                                      |                                                                              |
| 12:30 p.m. – 2:00 p.m.| Lunch – Buffet lunch at Jackson Labs                                |                                                                              |
| 12:30 p.m. – 2:00 p.m.| PASPCR Council Meeting                                               |                                                                              |
| 2:00 p.m. – 4:30 p.m.| PLENARY SESSION 2:                                                   | Vitiligo and Pigmentary Disorders                                              |
| Invited speaker     | John Harris, M.D., Ph.D., University of Massachusetts Medical School |                                                                              |
|                     | Selected oral presentations from submitted abstracts                  |                                                                              |
|                     | Break                                                                 |                                                                              |
| Invited speaker     | TBD                                                                   |                                                                              |
| 4:30 p.m. – 6:00 p.m.| Welcome Reception and Mentorship Mixer                               |                                                                              |
|                     | Dinner in Bar Harbor on your own                                       |                                                                              |

**THURSDAY, OCTOBER 3, 2019**

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<th>Time</th>
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<tr>
<td>8:30 a.m. – 10:30 a.m.</td>
<td>PLENARY SESSION 3:</td>
<td>Pigment Cell Development, Differentiation and Function</td>
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<td>Keynote Address</td>
<td>Ian Jackson Ph.D., The University of Edinburgh</td>
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<td>Invited Speaker</td>
<td>Elena Oancea, Ph.D., Brown University</td>
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<td>10:30 a.m. – 12:30 p.m.</td>
<td>POSTER SESSION</td>
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<td>12:30 p.m. – 2:00 p.m.</td>
<td>Lunch – Buffet lunch at Jackson Labs</td>
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<td>12:30 p.m. – 2:00 p.m.</td>
<td>PASPCR General Meeting</td>
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<td>2:00 p.m. – 4:00 p.m.</td>
<td>PLENARY SESSION 4: Genetics and Genomics of Melanocytes and Melanoma</td>
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<td>Invited speaker</td>
<td>Mayumi Ito, Ph.D., New York University School of Medicine</td>
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<td><strong>Evening – Gala Dinner/Banquet</strong></td>
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<td><strong>Friday, October 4, 2019</strong></td>
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<td>8:30 a.m. – 12:00pm</td>
<td>PLENARY SESSION 5: Melanoma Signaling and Therapeutics</td>
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<td>Invited Speaker</td>
<td>Richard White, M.D., Ph.D., Memorial Sloan-Kettering Cancer Center (confirmed)</td>
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<td>Invited Speaker</td>
<td>Christin Burd, Ph.D., Ohio State University</td>
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<tr>
<td>Closing Remarks</td>
<td>John D’Orazio, M.D., Ph.D., University of Kentucky School of Medicine; President-Elect, PASPCR</td>
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<td>Lunch on your own</td>
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<td>Departure</td>
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2019 ESPCR Meeting

MAIN TOPICS:

- EMBRYONIC AND ADULT MELANOCYTE BIOLOGY
- FROM MELANIN SYNTHESIS TO FUNCTION
- MSH RECEPTOR
- PIGMENTATION GENETICS AND DISORDERS
- CONGENITAL NAEVI
- MELANOMA AND TELOMERS
- GENDER DIFFERENCES IN MELANOMA
- MECHANISM AND MODULATION OF THE MELANOMA PROGRAM
- NEW HORIZONS OF MELANOMA THERAPEUTICS
- NON INVASIVE IMAGING (INCLUDING DERMOSCOPY)

2019 ASPCR Meeting

SAVE THE DATE
NOVEMBER 05-07, 2019
EDSA SHANGRI-LA HOTEL
ORTIGAS CENTER, MANDALUYONG,
1635 METRO MANILA

2019 JSPCR Meeting

Date: November 23(Sat)-24(Sun), 2019
Venue: Okayama Plaza Hotel, Okayama, Japan
Organizer: Hideya Ando (Okayama University of Science)
IPCC 2020
The 24th International Pigment Cell Conference
Advancing melanocyte science and friendship in the Land of the Rising Sun

Dates: June 18 (Thu) – 21 (Sun), 2020
Venue: Yamagata Terrsa, Yamagata, JAPAN
President: Tamio Suzuki M.D., Ph.D
Yamagata University Faculty of Medicine, Department of Dermatology

http://IPCC2020.unin.ac.jp/
PIGMENTATION COMMUNITY CONNECTIONS

In this issue, we continue the “Trainee Spotlight” section with a column by Dr. Chelsey Kline, and the “Laboratory Updates” series with an article by Dr. Caroline Le Poole. We also share with our members about the Sun Bus Project and include a Hot off the Presses article by Dr. John Pawelek and a column by Dr. John D’Orazio sharing his thoughts on her mentors and the benefits of mentorship.

We hope that you will be inspired to 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!
1. What inspired you to be a scientist?
My grandmother was my biggest inspiration for becoming a scientist. From a young age, she had taught me the importance of education, to never be afraid to ask questions, and to never give up. My grandmother was diagnosed with Parkinson’s disease in the early '90s, and the side effects she suffered exposed me to the ugly truth of the disease at a young age. Therefore, my quest toward understanding the complexity of age-related diseases, among others led me to seek expertise in a broad range of biochemical research, starting with my first undergraduate internship in an Alzheimer’s research laboratory at the Neurological Science Institute at Oregon Health & Science University (OHSU). While there, I developed a true passion for cell culture, and an eye for detail. Eager to learn more about pathogenicity and expand my scientific abilities, my second undergraduate internship allowed me to help characterize and validate a therapeutic target in deadly, Leishmania donovani parasites. After graduating early from my undergraduate program, I went on to complete a Ph.D. in a bioinorganic chemistry lab where I specialized in metallo-biochemistry.

2. What field of science do you specialize in and what got you excited to do your research in this field?
Wishing to expand my basic understanding in human health and related diseases such as Parkinson and Alzheimer’s, I became a Ph.D. student in a primarily bioinorganic chemistry research lab. I designed experiments to characterize the structure and function of copper proteins that are not only coincidentally involved in age-related neurological diseases and cancer, but also Menke’s and Wilson’s disease. I used a combination of spectroscopic and biochemical techniques to understand and characterize mutant proteins including using high powered X-rays from the Stanford Synchrotron Radiation Lightsource (SSRL) about four times a year. We would have to fine tune the X-rays to specifically probe the copper atom that then allowed us to peer into the metal center and understand the coordination of the surrounding ligands. I learned so much from this experience, including learning about how to use and work in anaerobic chambers, how to tune X-ray beam lines along with the use of other spectroscopic techniques, how to grow and purify proteins either from bacterial cultures or mammalians cultures in bioreactors, and how to generate and characterize mutant proteins. All of this work was very exciting, so much so that my Chihuahua-dachshund (chiweenie) is named Copper.

3. Can you briefly describe your research?
Considering that I wanted my next research project to be more translatable from the bench to bedside, I joined the Leachman/Cassidy laboratory in the Department of Dermatology at OHSU. My current work involves elucidating the antioxidant response in primary human melanocytes and melanoma cell lines to determine the effects of potential melanoma chemoprevention agents. However, there is still a loose connection to copper-proteins, since melanocytes produce pigment via the dicopper containing enzyme tyrosinase.

4. What was one of the most exciting result or finding that you got in your work?
In an effort to understand the role of a specific antioxidant in melanocyte biology and melanoma,
we have knocked it down and observe reduced pigmentation. Our collaborators who have knocked-down the same gene in a mouse have also have observed pigmentation defects. I have recently been exploring the mechanism that we believe is being affected by the antioxidant knockdown and hope to publish the results very soon, which is extremely exciting.

5. What do you think will be the next big breakthrough in your field of work?
Since 2011, melanoma treatment options have expanded and have helped greatly improve survival rates. However, there are still people who don’t respond to therapy. Therefore, I hope we can start to understand why these people are not responding and eventually provide them with better, effective treatment options.

6. What motivated you to join PASPCR / what are your thoughts on PASPCR?
My current mentors, Dr. Pamela Cassidy and Dr. Sancy Leachman have encouraged and motivated me to join the PASPCR. I was first introduced to PASPCR in 2015, and the very welcoming, quaint community of talented scientists dedicated to pigment biology has kept me coming back. I find that the scientists that are part of this community are always willing to speak with me about any questions I have regarding my research, provide advice, and continue to encourage and challenge me.

7. What advice would you give to aspiring students who want to work in pigment cell and melanoma research?
I would suggest that any young, aspiring student who wants to work in pigment cell and melanoma research should come to a PASPCR meeting and eventually become a part of the Society. I think that this Society is a great place for networking, collaborating, and discovery. This Society has uncovered and contributed a lot to our understanding of pigment cell biology, and I am excited to begin to contribute myself. So I encourage aspiring student to get involved, and continue to help us understand the diverse world of pigment cell biology.

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Dear Fellow pigment cell enthusiasts,

Here is a quick update from Chicago, as I’ve settled in after almost 2 years at Northwestern. Here, my lab members continue to work on the topics I’m passionate about: vitiligo, melanoma, lymphangioleiomyomatosis (LAM) and tuberous sclerosis complex (TSC). I’ve found a welcoming and enthusiastic environment that includes Kathy Green, Amy Paller, Roopal Kundu, and many others.

At this time, I’m sending out papers for review that could end up in PCMR and also preparing reviews for study section, while compiling a list of equipment we’ll need to furnish a new Core Facility, in part under the new Dermatology SBDRC (TEST IT core, which I will co-direct with Dr. Kurt Lu), and in part to support the growing tumor immunology faculty and incoming immunotherapy trials at Northwestern. The new TEST IT core will offer opportunities for in vivo skin testing of healthy subjects, and offer a range of immune assessment protocols. We’ve been setting up multispectral imaging and developed a protocol that can expand its use, and we’ve scouted out single cell prep stations and worked with the host company to run samples over the past year. We have fancy cytokine array equipment and continue to work on SOPs.

We’ve continued our microbiome analysis, now open to vitiligo patients on clinicaltrials.gov and we’re excited about our data in preclinical models. Lab manager Emi Dellacecca is the main person behind this project. Besides this, our work on modified HSP70 continues through a grant subcontract and through NCI support with the objective of fending off side effects of immunotherapy. Dinesh Jaishankar is a postdoc focused on the anti-tumor effects of HSP70 and its modified counterpart, with fascinating findings. After exciting data in advanced disease models published in JID this year, we established a company to accelerate a path to the clinic by means of our newly established company (Temprian Therapeutics) that made me a CSO. This has taken us to competitive pitching opportunities such as ScienceToStartup in Boston, as we look for investors. The serendipitous findings that underlie the modified HSP70 application are fascinating, and call for in depth investigations to help us understand the immunosuppressive effects observed, the repigmentation that follows, and the consequences for comorbidities that often develop in vitiligo patients. We’re ready to investigate when given the opportunity. At this time technician Rafael Alejo is carrying our research in this area.
My passion lies in revealing mechanisms with immunotherapeutic potential. Over the first month at Northwestern, we built and submitted a project now supported by the DoD to develop CAR therapy for benign tumors in TSC, built on our findings that there is overexpression of a melanoma associated antigen in affected sites. From my time in Cincinnati, I’ve inherited a passion to understand TSC and sporadic LAM and its many connections to the physiology of our favorite cell type, the melanocyte. Understanding immunosuppression and expanding CAR therapy for TSC is work performed by postdoc Ancy Thomas. This summer she will guide an undergraduate for a side project related to her work.

Another subject that has taken on new life is that of Treg mediated immunosuppression. Visiting graduate student Jussip Mukhatayev from Kazakhstan is generating transgenic cells tested in vitro for further use in vitiligo models, and was very honored to receive a travel award to attend the Montagna/ PASPCR meeting in Oregon to discuss his work. He has provided great support for our early time in the new lab and I’m sure he’s off to a strong finish of his research. The strength of Treg is truly remarkable.

Our work on T cell receptors continues with the help of Cormac Cosgrove, senior postdoc in the lab who came to us from industry on the East Coast to join his wife during her residency program. He helped us understand that T cell receptors not only drive antigen recognition but also influence the physiology of the host cell, with fascinating findings that told us to look at factors other than mere IFNgamma secretion when looking for a highly functional T cells. Given our interest in checkpoint inhibitors to boost immune responses in different settings, Cormac then worked with Medical school graduate Cory Kosche to better understand skin rash in a collaborative study with Dr Jennifer Choi.

I’ve moved to Bucktown and finally moved in with my husband. As the neighboring house is being torn down today, I hope our house still stands when I come home tonight. It’s a lovely place to live with caring neighbors, lovely restaurants and people on foot. I’ve even walked home from work though that is only doable on days with too much time. I look forward to it on a sunny day (with sunscreen) once my reviews are in and the next grant written.

Wishing you research success and personal happiness. I hope to see you at the next PASPCR meeting.

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C&O Canal National Historical Park, Maryland
**SUN BUS PROJECT**

The Colorado Melanoma Foundation was started by PASPCR member Neil Box in 2013 to promote education, support patient networks, encourage early detection and screening, and maintain current information on treatment options, sun protective behaviors, and recent developments in our global understanding on melanoma.

Their latest project is called The Sun Bus Initiative which provides free skin screenings at various locations and events throughout Colorado in a mobile unit. Learn more about the foundation and the Sun Bus at [https://www.comelanoma.org](https://www.comelanoma.org) and [https://www.thesunbus.org](https://www.thesunbus.org).

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**HOT OFF THE PRESSES**

*by Dr. John Pawelek*

**Leucocyte-cancer cell fusion and melanoma metastasis: Update: 2019**

More than 25 years ago the late Prof. Lynn Margulis at the University of Massachusetts, Amherst sent me a 1911 article by German pathologist Otto Aichel who proposed that metastasis might be initiated by hybridization between macrophages and cancer cells, with the daughter cells “thrown out of the path of the mother cells resulting in an entirely new cell having the characteristics of both mother cells to form what has come to be known as a malignant cell.” That is, at least some of the hybrids would acquire motility from the macrophage along with the de-regulated cell division of the cancer cell, hence the emergence of a metastatic cancer cell. Margulis had devoted much of her career to the role of “endosymbiosis” in evolution and she recognized that the two situations were analogous. Lynn and I were friends but I never knew why she sent the article since I was studying skin color at the time. However I, along with my colleagues have been working on the concept ever since and I am eternally grateful to Lynn for this. Below is a brief update of the field. All the citations can be found in reference (1).

In his prescient statement Aichel not only provided an explanation for metastasis but he also predicted the science of cancer epigenetics. That is, a new hybrid cell with characteristics of both mother cells in today’s terminology would refer to gene expression patterns from both fusion partners in the same cell. For example,
at least some hybrids would express the leukocyte traits of motility, chemotaxis, and homing while at the same time have the uncontrolled cell division of the cancer cell. To investigate this concept, our group has been studying cancer patients who had previously received an allogeneic bone marrow transplant (BMT), usually for leukemia or lymphoma, and then later developed a solid tumor. By analyzing tumor cells for both donor and patient DNA, we reasoned that such cells were likely to be leukocyte-tumor cell hybrids.

In our first case, we studied a primary renal cell carcinoma from a female patient who, two years prior to detection of the tumor, had received a BMT from her son. Due to the male donor–female recipient nature of the BMT, FISH could be used to search for putative BMT-tumor hybrids. Karyotyping revealed that the tumor cells contained a clonal trisomy 17. Using dual-label FISH, the donor Y and three or more copies of chromosome 17 were visualized together in individual nuclei of carcinoma cells, providing direct genetic and morphological evidence for BMT-tumor hybrids (Fig. 1). Panel A shows a cell with three copies of chromosome 17 (green) but no Y chromosome, indicating that this cell was likely not a hybrid, while Panel B shows a trisomy 17 (green) plus the Y chromosome (red), indicating that the cell was a hybrid between a patient and the male donor cell. Such cells were in abundance in an area covering about 10% of the tumor, suggesting a clonal origin of the hybrids.

![Figure 1: FISH analysis of formalin-fixed sections of a primary renal cell carcinoma described herein.](image)

The first genomic evidence for leukocyte-cancer cell hybrids in a human came from our study of a patient who had received an allogeneic BMT for lymphoma and later developed a melanoma brain metastasis. Tumor DNA was analyzed through forensic genetics for donor and patient alleles at 14 loci. Eight of these loci were informative and indicated the presence of donor-patient hybrids throughout the tumor. The second such evidence came from a man who, eight years following an allogeneic BMT from his brother for treatment of chronic myelogenous leukemia, developed a malignant melanoma on the back with spread to an axillary lymph node. The primary tumor and the nodal metastasis each exhibited alleles with donor and patient DNA at all loci.

In addition to direct genomic evidence for a relationship between leukocyte-cancer fusion and metastasis is the large number of macrophage-like traits expressed by metastatic cancer cells. For example, Shabo et al. showed that macrophage traits in cancer cells are induced by macrophage-cancer cell fusion and cannot be explained simply by cellular interactions. They showed that tumor cell expression of the macrophage marker CD163 is related to poor prognosis in patients with breast cancer, colorectal cancer, and urinary bladder cancer. Pawelek et al. showed that following macrophage-cancer cell fusion, the resultant hybrid cells acquired new abilities to promote angiogenesis, matrix alterations, motility, chemotaxis, and immune signaling pathways. Macrophage-tumor cell fusion could explain the aneuploidy, plasticity, and heterogeneity of malignant melanoma and it could also account for epidermal-mesenchymal transition in tumor progression since macrophages are of mesodermal origin. Several other laboratories have since reported such findings.
Conclusions

There is considerable evidence that fusion and hybridization of phagocytes such as macrophages with cancer cells creates metastatic cells. Our group has demonstrated this in three patients with melanoma and two with renal cell carcinoma. In addition, several labs have made immunological observations that metastatic cancer cells exhibit macrophage traits. Thus it seems safe to say that this is at least one mechanism for metastasis. This confirms the century-old proposal of Prof. Otto Aichel that in retrospect was prescient indeed, especially considering that he had only a microscope with which to work.

For the first time we can glimpse an engine that drives metastasis (Fig 2). This information opens many potential targets for the development of new therapies, for example: a) inhibition of the fusion process itself regarding events such as membrane attachment and heterokaryon formation; b) inhibition of the hybridization processes involving integration of parental fusion partner genes into hybrid genomes; and c) prevention of post-hybridization events involving activation of genes that control cell migration, chemotaxis, intravasation, extravasation, and migration to lymph nodes and distant metastases.

**Figure 2.** The BMDC-cancer cell fusion hypothesis. A motile BMDC (red), such as a macrophage or stem cell, is drawn to a cancer cell (blue). The outer cell membranes of the two cells become attached. Fusion occurs with the formation of a binucleated heterokaryon having a nucleus from each of the fusion partners. The heterokaryon goes through genomic hybridization creating a melanoma–BMDC hybrid with two gene expression patterns conferring deregulated cell division and metastatic competence to the hybrid.¹

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Dear PASPCR Members,

Thank you for supporting our Society and paying your dues in time!

Prashiela Manga

The PASPCR Membership List is published in the April number of the PASPCR Newsletter. However, the membership is updated continuously and the names and addresses of new members and any changes in members’ contacts are published during the year in the remaining two issues. Therefore, please inform the Secretary/Treasurer of any changes in your contact info that happen during the year so we could communicate them to the members through the Newsletter.

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