PASPCR Newsletter

September 2003
Vol. **11** Number **3**

Introduction...

by Bill Oetting

The annual meeting of the PASPCR, held at Cape Cod, was a success! Jean Bolognia, Ruth Halaban and John Pawelek did a great job of hosting the meeting and congratulations are in order. See the letter from our President for more laudatory statements. If you missed the meeting, in this issue you will find meeting reports for the different sessions. You can also see pictures taken at the meeting on the PASPCR web site. The link is near the top of the home page.

We are sad to report that on August 16, Thomas B. Fitzpatrick, M.D., Ph.D., passed away. Dr. Fitzpatrick had a major influence on the emergence of a new field of scientific inquiry, pigment cell research and this influence continues today. On page 4 we have included a letter written by Dr. John Parrish about the life of Dr. Fitzpatrick.

The ***PASPCR Newsletter*** is published quarterly and is intended to serve as a means of communication for the members of our Society. You are invited to contribute articles, or other information you feel will be of interest to members of the **PASPCR**. If you attend a scientific meeting and have heard results 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. Any information on upcoming meetings of interest will be added to the "Calendar of Events". This is your newsletter, and we depend upon your contributions to help us make sure it best serves the Society's needs. Contributions and comments can be sent to me, preferably by E-mail, to bill@lenti.med.umn.edu.

The PASPCR Web Site can be found at:

http://www.paspcr.org

The PASPCR Web Site is the major, up-to-date source of current information for the PASPCR membership and for individuals who are interested in the PASPCR. If there is additional information that you would like to see on the Web site, or you would like to include information of past PASPCR activities, please let me know and I will add them.

The IFPCS web site can now be reached by using the domain name **ifpcs.org**. The domain name **ipcc.info** will take you to the IPCC web site, providing you the most up to date information on the International Pigment Cell Conference which will be held on September 18 - 23, 2005 at the Natcher Conference Center at the National Institutes of Health in Bethesda, MD.

There is a possibility that the URLs for the PASPCR and IFPCS will be altered, due to a potential change in the web server. I do not know what the future URLs will be, but I will keep you informed. Some individuals have bookmarks that link directly to specific pages (such as the mouse coat color gene page). These will not work once the URL is altered. Remember, the PASPCR home page will always be available through the URL **paspcr.org** and the IFPCS home page will always be available using **ifpcs.org**.

In this Issue . . . . .

The PanAmerican Society for Pigment Cell Ressarch

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Richard A. King
past-President PASPCR

Calendar of Events:

Nov. 29-30, 2003 The 17th Annual Meeting of the Japanese Society for Pigment Cell Research (JSPCR)
Seminar House of Kao Corp., Japan
Contact : Dr. Genji Imokawa, Ph.D.
E-Mail : 073733@kastanet.kao.co.jp

July 22-24, 2004 International Skin Cancer Conference, Zurich, CH
President: Günter Burg
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Web : www.skincancer.ch

2004 XIIth Meeting of the PanAmerican Society for Pigment Cell Research, to be held in Irvine, California.
Contact: Frank Myskins.
E-mail: flmeyske@uci.edu

2004 XIIth Meeting of the European Society for Pigment Cell Research, to be held in Paris, France.
Contact: Dr. Lionel LaRue
E-mail: Lionel.Larue@curie.fr

2005 XIVth International Pigment Cell Conference (IPCC), to be held in Bethesda, MD, USA.
Contact: Dr. Vince. Hearing
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The *PASPCR Newsletter* is published quarterly by the PanAmerican Society for Pigment Cell Research. All views are those of the authors. For further information or to submit articles, please contact members of the Publications Committee.

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Corporate Sponsors
by Raymond E. Boissy

The PASPCR would like to acknowledge and thank our Corporate Sponsors; the list below reflects contributions over the past 2 years. Financial gifts from these sponsors have allowed our Society to increase benefits to the membership far out of proportion to the actual dues collected from members. Monies contributed by these sponsors have been used over the years to support various PASPCR functions including our Young Investigator Award program, meeting travel stipends, annual meeting expenses and this Newsletter.

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Letter from the President

Our eleventh annual meeting in Cape Cod was met with enormous success thanks to the superb organization and the high caliber of the scientific presentations. Special thanks go to Jean Bolognia, John Pawelek, Ruth Halaban and their staff who made this meeting such a success. The highlight of the meeting was the most gracious reception hosted by Aaron and Millie Lerner. It was indeed a pleasure to see them, and we thank them for their tremendous hospitality. Interesting, this memorable reception coincided with the first PASPCR/Aaron B. Lerner lecture that was given (appropriately so) by Ruth Halaban in recognition of her outstanding contributions to pigment cell research. Congratulations to Ruth.

Of course, no meeting is successful without the attendees. It was great to see all the usual friendly faces, and even more delightful to meet new participants that we welcome warmly to our society. A very gratifying feeling is that many of the new participants expressed how much they enjoyed the scientific and social interactions and vowed to become regular attendants of our future annual meetings. Personally, I look so much forward to our annual PASPCR meeting, not only to learn about the new breakthroughs in pigment cell research, but also because the meeting is a reunion for our growing family of PASPCR members. We are thrilled that our membership this year has grown significantly in number. Increasing our membership is a major goal that the officers and council members have set. I thank in particular our Secretary-Treasurer Raymond Boissy who put a tremendous effort to make the membership campaign so successful.

As a society, we pride ourselves for supporting young investigators. This year, we continued with the tradition of providing travel awards to young investigators who are members of PASPCR and presented at the meeting. Also, as in previous years, we awarded three young investigators awards to Prashiela Manga, Ph.D., a junior faculty member, Catherine Van Raamsdonk, a postdoctoral fellow, and to Yari Marin, graduate student. We also acknowledge and appreciate established scientists that have made a great impact on pigment cell research by providing them with honorary membership to PASPCR. This year, this award has a special meaning since it was given to one of the founders of our society and the first editor of PCR, Dr. Joseph Bagnara. Our most distinguished award is the Career Achievement Award, which was given this year to Dr. Richard King in recognition of his tremendous contributions to the understanding of the genetics of human pigmentary disorders, mainly oculocutaneous albinism.

What is remarkable is that after each annual meeting, we speak of the meeting as the best we ever had. This is an indication of the continued strive of our society to achieve excellence in science. It is most gratifying that our specialty is receiving the recognition it deserves from various disciplines of scientific research. The success of PASPCR is only achieved and will only continue through the success and contribution of its members. I urge you to support our society by participating in its various functions and activities, such as serving on its various committees, contributing to the newsletter, recruiting new members, and participating in its annual meetings. I look forward to seeing you in June, 2004 in Irvine, California. Until then, my best wishes to you for continued success and productivity.

Sincerely,
Your President Zalfa Abdel-Malek

Thomas B. Fitzpatrick, M.D., Ph.D. 1919-2003

Thomas B. Fitzpatrick, M.D., Ph.D., often proclaimed as one of the world's leading dermatologist, died on August 16 at his home at the age of 83. He was the Professor and Chairman of the Department of Dermatology at Harvard Medical School and Chief of the Massachusetts General Hospital Dermatology Service from 1959 to 1987. During 40 years at Harvard, Fitzpatrick trained many of today's top dermatologists in academia, industry and practices and is considered a father of modern academic dermatology.

Fitzpatrick graduated from the University of Wisconsin (AB), Harvard Medical School (M.D.) and University of Minnesota (Ph.D.). During World War II he served in The Army Chemical Center, where he met Aaron B. Lerner M.D., Ph.D. and began a historical collaboration to explain pigmentation of skin. Fitzpatrick was Professor and Head of Dermatology at the University of Oregon from 1952 to 1958 before being recruited to Harvard Medical School at age 39 as its youngest Professor and Chairman.

In 1971 Fitzpatrick published the first multiauthor dermatology textbook in the USA and served as organizer and senior editor for four subsequent editions of this seminal book about skin and skin disease for dermatologists and non-dermatologist physicians. He also organized a Color Atlas of Dermatology, a book on skin for lay persons, and ten other scientific books about specific aspects of Dermatology.

For over 50 years, Fitzpatrick was a major influence in basic and clinical research. His work resulted in over 250 original scientific publications. His fundamental observations and creative applications of knowledge markedly advanced the understanding of pigmentation, aging and disorders of the skin. Fitzpatrick described cutaneous markers of certain neurological disorders and many other markers and skin signs of systematic illness. He was one of the first to apply the electron microscopy to the study of the skin, and with colleagues discovered and named the melanosome, the basic subcellular organelle of pigmentation. He helped in defining and profiling the clinical and microscopic characteristics of early melanoma and advanced the cause of widespread screening to detect curable lesions. He and his colleagues invented oral psoralen photochemotherapy (PUVA) a treatment of psoriasis which is now used worldwide to control a variety of disabling skin diseases. He organized scientific quantitative studies of sunscreens and championed their widespread use throughout the USA and Europe.

Fitzpatrick never removed himself from the front lines of patient care. He consulted and taught in both inpatient and outpatient settings and had an unrestricted, busy, non-super-specialized practice of general dermatology. Until weeks before his death, Dr. Fitzpatrick treated difficult problem cases referred from dermatologists all over the world, and his own very loyal patients, who included many rich and famous persons. He delivered primary care one on one, facing cosmetic blemishes and very sick patients with serious systemic illness. He consulted his textbook in front of patients, examined scrapings from scaly toes, performed biopsies, learned and tried new treatments, and looked at microscopic slides himself. He never refused to see any patient any time with any student or doctor.

Dr. Fitzpatrick was a member of more than 20 professional societies in the US and abroad. These include the prestigious American Academy of Arts and Science and the Institute of Medicine of the National Academy of Sciences. He was a founder of the Dermatology Foundation and served as president of the Society for Investigative Dermatology and served in leadership positions of many other academic organizations. Many of the personal qualities and specific scientific contributions that made Fitzpatrick such a powerful influence were recorded in a Festschrift issue of the Journal of Investigative Dermatology (80: 3s-5s, 1983).

Fitzpatrick was most honored and cherished as a teacher. Many medical students working under his supervision decided to become dermatologists. Dermatology residents were influenced for life by the content, approach and style of his care of patients. His comments at teaching conferences were absorbed with reverence; he invariably proposed a clever action plan to solve the most difficult medical riddles. The most powerful components of Fitzpatrick's teaching style were his encyclopedic knowledge, vast experience, relentless problem solving, and his compassionate individualization of treatment.

For his contribution to the training of Japanese dermatologists and his frequent travels to Japan to lecture and teach, he was awarded the prestigious

"Order of the Rising Sun" in 1987. An endowed chair at Harvard Medical School was established in his name in 1982, an honor seldom accorded to an incumbent professor.

Fitzpatrick's most contagious traits were his childlike curiosity and his genuine joy of work, wonderful gifts that were spread to dermatologists throughout the world during his half-century of dedicated service. His leadership is measured not so much by the number of people he led but by the number of leaders he created.

Dr. Fitzpatrick is survived by his wife Beatrice Devaney Fitzpatrick and four children Thomas, Beatrice, Scott and Brian as well as three grandchildren.

In lieu of flowers please consider contributions to The Fitzpatrick Fund for Education c/o Danielle Wachs, MGH Development Office, 100 Charles River Plaza, Suite 600, Boston, MA 02114. Funeral services will be private. A memorial service will be held at The Memorial Church at Harvard Yard at Harvard University at 10 AM, October 21, 2003.

John Parrish

We are looking for:

items to include in the ***PASPCR Newsletter***. Please send in information that you have on:

Meetings of interest
Reports on meetings you have attended
News about PASPCR members
Short stories
Interesting graphics

or anything else you think that the PASPCR membership would be interested in reading. Please email your contributions to bill@lenti.med.umn.edu.

Thanks!

Congratulations.....

...to those who were presented awards at the 11th Annual Meeting of the PASPCR, held in Cape Cod:

A **PASCPR Honorary Membership** was presented to **Dr. Joe Bagnara.**

The **Career Achievement Award** was presented to **Dr. Richard King**.

The **Aaron Lerner Lectureship,** Sponsored by the Johnson & Johnson Consumer Companies, Inc., was given by **Dr. Ruth Halaban**.

Young Investigator Awardees

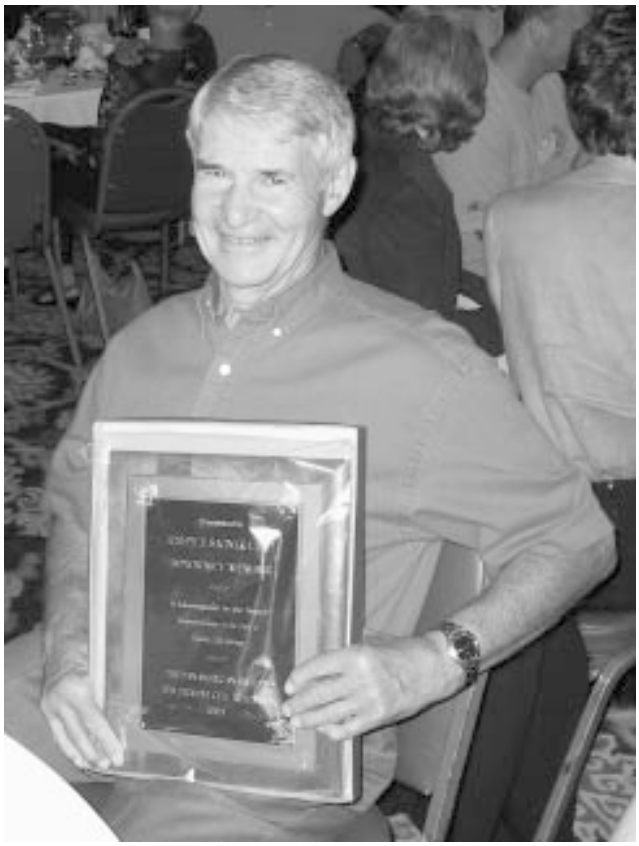
Student
Yari E. Marin
Rutgers University
"Implication of NF-kappa B in mediating the transforming activity of Grm1 in mouse melanoma cells."

Post-Doctoral
Cathy D. Van Raamsdonk
Stanford University
"G protein signaling expands the embryonic population of dermal melanocytes."

Junior Faculty
Prashiela Manga
University of Cincinnati
"A role for Tyrp1 in determining melanocyte sensitivity to 4-(tert)butylphenol."

Travel Awardees

Avner Ittah, Florida International University
Bianca Jefferson, Mississippi State University
Ana Luisa Kadekaro, University of Cincinnati
Valery Kempf, Duke University
Jin Namkoong, Rutgers University
Yari Marin, Rutgers University
Reena Rupani, Yale University
Alexander Sanokhvalou, Duke University
Deborah Spaulding, University of Oklahoma



Joe Bagnara after receiving his Honorary Membership at the 11th annual meeting held at Cape Cod.

A letter from Joe Bagnara

The recently held 11th Annual Meeting of the Pan American Society for Pigment Cell Research was an outstanding success and a real pleasure for me and my wife Lou. The fact that I was the recipient of the Honorary Member Award for 2003 was, of course, one of the highlights for me and I am exceedingly grateful to PASPCR for so honoring me. It is great to know that I am still remembered for whatever contributions I may have made over these many years. My sincere thanks go to all who considered and elected me as this year's awardee.

Another source of pleasure stemmed from reminiscences that arose from again being in Falmouth and Woods Hole. I would like to share some of these with our membership because they emphasize just how far we have come during the last 50 years of research on pigmentation. Some 48 years ago, as a third year graduate student, I was privileged to be accepted as a student in the summer embryology course at the Marine Biology Laboratory (MBL) at Woods Hole. The laboratory where it was taught and the dormitory where I stayed are only a few hundred yards from Aaron Lerner's house where many of us just had the pleasure of the gracious hospitality of Aaron and Millie. As I sipped wine and nibbled on snacks my thoughts went back to that course in 1955 that was taught by several of the most eminent developmental biologists of the time. Among these were Mac Edds, Cliff Grobstein, Clem Markert, John Saunders, Nelson Spratt, J.P. (Trink) Trinkaus, and Ed Zwilling, names that unfortunately my not register with most who read this because it was a long time ago and one's time in the sun is ever so fleeting. I was enthralled by the course and the luminaries that it featured, and thus you can imagine how disappointed I was not to have been able to accept their invitation to spend the second half of the summer there on scholarship. Alas, I was a poor graduate student and I needed that time to finish my second foreign language requirement (necessary in those days), work on my dissertation research, and earn some money since Lou and I were to be married in September.

Despite the importance of the Woods Hole course, it seemed rather extravagant for me to spend the first half of the summer away from our lab in Iowa City where I had just sunk my teeth into my research project and especially in the light of my penurious state. Fortunately, my advisor, Professor Emil Witschi, came to my aid. He offered to pay for my Woods Hole experience in return for my harvesting hundreds and hundreds of shark pituitary glands that he wished to use for bioassay of gonadotropic hormonal content. This seemed especially appealing since I had discovered during the previous year that a hypophysial hormone seemed to control tadpole iridophores (then called guanophores). Thus, if I took with me to Woods Hole a few hundred of my hypophysectomized tadpoles, it would be possible to use them in the assay of the guanophore-stimulating capacity of pituitaries from sharks and other marine fish. So, off I went to Boston by train carrying with me two thermos jugs of hypophysectomized woodfrog tadpoles. When I arrived at the MBL, a bit earlier than the other students in the course, the teaching assistant, Roger Milkman (later quite a successful geneticist) helped me by finding a large aquarium for the tadpoles. He was much intrigued by their shimmering golden appearance brought about by the dispersed and iridescent iridophores. When the students and faculty arrived

and were curious about these strange creatures that were swimming in the tank, he explained that they were whale spermatozoa!

When it came time to do my work for Professor Witschi, I went to the MBL dock where a huge pile of freshly caught dogfish (small sharks, *Squalus* and *Mustelus*) awaited me. Here, surrounded by hungry sea gulls, I spent the whole day with a sharp blade in my hand, tearing through the cartilaginous brain case to dig out pituitary glands for preservation in ethanol. You should be reminded that at this time only a few of the hormones of the adenohypophysis had been even partially purified and the structure of ACTH was in its early stages of chemical elucidation. Aaron Lerner's group was then working on the structure of alpha-MSH, but there was still some doubt of its status as a true hormone. This remained so a little longer in light of its identity with the first 13 amino acids of ACTH. At the same time, the status of beta-MSH was being contemplated by other labs. At Woods Hole, I found that when tested on my hypophysectomized tadpoles, extracts of these dogfish pituitaries, as well as those of other fist, possessed profound melanophore-dispersing activities and moreover, they exerted an iridophore-contracting effect so powerful that in a day or two the iridophores disappeared from sight as their purine crystals were resorbed. During the next year or so, as alpha-MSH was attaining true hormonal status, I was able to show that this hormone affected both melanophores and iridophores and that molecular requirements for these effects were identical.

During these times, frogs were fundamental in studying basic problems in pigmentation as we were in the golden age of comparative pigment cell biology. At this time, the major focus was on the hormone as an active agent for the concept of hormone receptors had not yet really emerged. It was not until the current age of molecular genetics that receptor biology realized its present important state. So, some 50 years later, here we are, at the opposite end of the MSH story, the melanocortin receptors, and in particular, MC1R, the focus of so much of the research presented at this meeting. Work on cold-blooded vertebrate pigmentation has become passé, an exercise in the esoteric, a pursuit of knowledge for its own sake. Perhaps as the pendulum of time returns, in a stroke more rapid than 50 years, attention will again focus on lower vertebrate pigmentation and such problems as characterization of the amphibian melanophore melanocortin receptor will be solved in conjunction with answering the question of whether the putative melanophore inhibiting factor(s) (MIF) are the homologs or the analogs of mammalian agouti protein.

Let me end by extending my personal thanks to Aaron and Millie Lerner for opening their home to all or us and for providing such a gracious reception.

Sincerely,

Joe Bagnara

Meeting Report for the 11th Annual Meeting of the PASPCR

Here is the report on the different sessions of the 11th Annual Meeting of the PASPCR, held at Cape Cod, MA. I would like to thank all of the authors for their contributions.

Session #1, Melanocortin/MSH/agouti protein
by Zalfa Abdel-Malek

The scientific program of the 11th Annual PASPCR meeting opened with the session on melanocortins/MSH/Agouti protein. The keynote speaker was **Greg Barsh** (Stanford Univ.) who presented on the "genetics and genomics of pigment type-switching". In his presentation, Greg described the roles of α-MSH and Agouti signaling protein as antagonists that switch to eumelanin and pheomelanin synthesis, respectively. He also discussed the roles of *Attractin* and *Mahoganin* in regulating the signaling of Agouti via the Mc1r. Greg presented new data on coat color mutations in dogs. His new results ascribed dominant black coat color to a dominant allele of *Agouti*, variegation of black and yellow coat color to an allele of *Mc1r,* and the dark coat color of the German Shepherd pedigree to a loss-of-function of *Agouti.* The highlight of the presentation was that the Barsh laboratory might have discovered a new pigmentary gene that might be responsible for the dominant black color. By crossing Labrador and Greyhound, Greg and his group found that the dominant black mapped to a region of dog chromosome 16 that has not been known to regulate pigmentation. Future identification of this putative gene will extend the ever-growing list of pigmentary genes, and will shed further light on the complexity of regulation of eumelanin and pheomelanin synthesis in mammals.

Zalfa Abdel-Malek (Univ. of Cincinnati) presented on the impact of loss-of function mutations in the *MC1R* gene on the response of human melanocytes to UV radiation. Three human melanocyte cultures that were refractory to α-MSH exhibited a marked increase in apoptosis after UV exposure, compared to melanocytes with similar melanin content and functional MC1R. These three cultures were either homozygous or compound heterozygous for allelic variants of the *MC1R* that are known to be associated with red hair phenotype, poor tanning ability and increased risk for melanoma. Recently, her laboratory identified two additional cultures with loss-of-function MC1R and aberrant response to UV. New results obtained in the Abdel-Malek laboratory revealed that α-MSH promotes the survival of human melanocytes following UV exposure by inhibiting apoptosis. The survival effect of α-MSH, however, was absent in melanocytes with loss-of-function MC1R. Increased apoptosis of the melanocytes is interpreted as an indication of inefficient repair of UV-induced DNA damage, which results in apoptosis or mutagenesis. The possibility that loss-of-function mutations in *MC1R* increase mutagenesis might explain why these mutations increase the risk for melanoma.

Francois Rouzaud (NIH) provided evidence for a new variant of MC1R, namely MC1R 350, which differs from the known MC1R 317 by an additional 33 amino acids in the carboxy terminal domain of the protein. This 350 variant results from alternative splicing of the open reading frame that leads to a longer MC1R mRNA. Expression of this variant by a subset of various human melanocyte cultures did not correlate with their pigmentation. Included in the additional 33 amino acids are 5 cysteine residues that are thought to confer stability to the receptor by anchoring it more firmly in the membrane. Results obtained from ^{125}I-labeled a-MSH and autoradiography suggested thatMC1R, as other G protein coupled receptors, might exist as a dimer. The MC1R 350 variant adds another level of complexity of the *MC1R* and its function as a regulator of human pigmentation.

Catherine Van Raamsdonk (Stanford Univ.) reported on the role of Gq signaling in the regulation of dermal melanocytes. By investigating specific mouse mutants identified by dark skin (DSK), two dominant mutants, DSK1 and DSK 7 were found to cause an abnormal expansion of melanocytes in the dermis during early embryonic development. DSK1 and DSK2 resulted in missense alterations in the G alpha q genes Gnaq and Gna11, respectively, and interacted in an additive manner. Mice that are null for the endothelin B receptor (that signals through Gq) and DSK7 mutant totally lacked pigment. Further investigation of the loss and gain of function mutations in G alpha q genes revealed that signaling through Gq determines the extent of dermal pigmentation. The effects of DSK7 on eumelanin synthesis were independent of MC1R signaling. The significance of this study is that it highlights a new signaling pathway through Gq that regulates dermal pigment cells and possibly contributes to known pigmentary abnormalities in humans, such as blue nevus or Mongolian spot.

Session #2, Subcellular Organelles and Protein Trafficking
by Seth Orlow

Dan Hebert (U Mass) presented work done in his laboratory and in collaboration with Ruth Halaban's lab

regarding the early maturation and processing of tyrosinase. Tyrosinase undergoes extensive glycosylation requiring an extended sojourn in the early secretory pathway, involving the participation of chaperones such as calnexin and Erp57. Disulphide bond formation and oligomerization are also involved. Mutations in tyrosinase and perhaps Tyrp-1 can both interfere with proper Tyr folding. John Hammer (NIH) reviewed the interactions of myosin Va with rab 27a and melanophilin. Myosin Va's interaction with melanosomes depends upon the tail sequences in the melanocytic splice form. Clearly rabGTPases and their interacting proteins play key role in the movement of vesicular cargo by molecular motors.

Dick Swank (Roswell Park) reviewed the 13 mouse loci associated with Hermansky-Pudlak syndrome (HPS)-like phenotypes. He and his collaborators have been able to reproduce the storage-disorder-like lung disease typically lacking in any of the mouse HPS homozygotes by creating double mutants, thus offering a tractable small animal model to understand the pathogenesis of the oft-fatal lung involvement and a means to test potential therapies. J.C. Valencia (Hearing lab, NIH) presented data on the complex processing of gp100. gp100 appears to be transported from the Golgi via the AP-1 adaptor complex, and is extremely highly represented in coated vesicle fractions from a human melanoma cell line MNT-1.

Reena Rupani (Yale) spoke on metastatic human melanomas, spontaneous nonmetastatic mouse melanoma and a constructed mouse melanoma x macrophage hybrid. The human melanoma and the hybrid each exhibited coarse melanin granules that have previously been observed in a very high percentage of human melanomas in tissue sections. These organelles contained the endolysosomal marker CD63, the melanosomal matrix protein gp100, and stained for the glycan recognized by the lectin LPHA. EM analysis is consistent with an autophagosomal origin for these organelles.

H. Watabe (NIH) presented data on aberrant tyrosinase processing in amelanotic SKMel28 cells. Misfolded Tyr is trapped in the ER and its levels can be increased via proteasomal inhibitors consistent with them being involved in degradation of the misfolded protein. Treatment of the cells with vacuolar proton pump inhibitors such as bafilomycin results in increased expression of Tyr in stage II melanosomes and Tyr exit from the ER, but the effects may be complex and may actually inhibit exit from the Golgi.

D. T. Spaulding (Univ Oklahoma) reviewed differences between Caucasian and Black melanocytes. Tyrosinase levels (8-10 fold higher in Black melanocytes) exhibit similar levels of Tyr protein. However by use of acridine orange, fluorescence in Black melanocytes is much lower than in Caucasian, consistent with a much higher internal pH. Na/H antiporters may well be involved, as several are expressed in melanocytes, and amiloride suppresses pigmentation by Black melanocytes. One particular exchanger, NHE3, may be expressed at higher levels in Black melanocytes, suggesting that it plays a role in alkalinizing the melanosome.

Dick King (Univ. Minnesota) reviewed the question of tyrosinase gene mutations in patients presenting with congenital white hair. While in general those born with white hair are more likely to have OCA1, mutations in OCA2 are also a possibility and need to be looked for if a molecular diagnosis is sought.

Finally, **M. Endo** (Jimbow lab, Sapporo) reported upon investigations into the effects of Tyrp-1 on Tyr mediated cytotoxicity. While coexpression of Tyrp1 with Tyr can indeed increase tyrosinase activity and melanin production in both melanocytic and non-melanocytic cells, Tyrp1 can suppress the cytotoxicity of "unprotected" Tyr expression. This toxicity is apparently non-apoptotic in mechanism. Mutations in the domains of Tyrp1 homologous to Tyr's copper binding domains has more dramatic effects on Tyrp1's ability to stimulate pigmentation with little effect on its cytotoxicity-protective abilities. Conversely, missense Tyrp1 mutations had greater effects on cytotoxicity protection than on pigmentation. Deletions affected both. These data suggest that different sites on Tyrp1 may be responsible for the observed pigment enhancing vs. cytotoxicity protecting effects.

Session #3, Cellular Interactions and Signal Transduction

by Miri Seiberg

Lynn Margulis (U Mass) discussed symbiogenesis, a cellular evolutionary process of acquisition of genomes by merger, which led to the creation of "new features" like cellular organelles. She claimed that the accumulation of mutations alone cannot lead to the generation of a new species, and is more likely to result in a sick or dead organism, while genome acquisitions could clearly result in the creation of new species. The talk was centered on the creation of the first eukaryotic, nucleated cell, from a merger between an eubacterium and an archaebacterium. The origin of the nucleus and its cytoskeletal system (nucleus + nuclear connector + motile structures like kinetosome and undulipodia) were discussed.

Natalie Ahn (Univ. of Colorado-Boulder) provided an overview on functional proteomics, and discussed the

pros and cons of two technical approaches, the 2D-PAGE/MS and the multidimensional LC/MS/MS methods. One example demonstrated how the Rho signaling pathway was followed with 2D gels, identifying posttranslational modifications involved in Rho-induced migrations. Another example described the search for melanoma markers for disease progression. Technical issues in peptide sequence assignment during data analysis were discussed. An improvement in the validation of peptide assignment was achieved through the integration of multiple search algorithms.

The first **Aaron B Lerner Honorary Lecture**, given by **Ruth Halaban**, (Yale) was titled "Tyrosinase: not only black and white". Ruth had reviewed the many activities of tyrosinase: catalysis of the production of melanin precursors, proton/pH sensing, self regulatory quality control, coupling of aromatic compounds, and possibly crosslinking. The role of DOPA in the maturation of tyrosinase, resulting in proper folding and movement from the ER to the Golgi was emphasized. Inactive or misfolded tyrosinase is retained in the ER of albino melanocytes and melanoma cells, resulting in proteolytic degradation and no pigment production. Inactive tyrosinase in albino cells was detected using Tyramide cross-linking. An increase in culture media pH could shift tyrosinase of melanoma cells to the Golgi, resulting in pigment production.

VJ Setaluri (Wake Forest) described the role of PI3 kinase and AKT2 signaling in melanosome biogenesis. Inhibition of PI3K blocked the sorting of newly synthesized Tyrp-1 into melanosomes. A yeast two hybrid screen identified a PDZ-domain protein, GIPC, which temporarily interacts with the newly synthesized Tyrp-1. GIPC binds APPL, which is an AKT2-binding protein, and a complex of these three proteins was identified. AKT2 phosphorylation was found stronger in non-pigmented melanocytes.

Ana Luisa Kadekaro (Univ. Cincinnati) discussed endothelin1 and alpha MSH as melanocyte survival factors following UV irradiation. An increase in viable cells, and a reduction in apoptotic cells, was demonstrated following treatment with either ET1 or alpha MSH. Forskolin could mimic the MSH effect, suggesting the involvement of cAMP in the survival mechanism. ET-R antagonists and MC1-R mutants abrogated the protective effects of their respective ligands, demonstrating that the UV-survival signaling involves these receptors. Melanin synthesis per se is not involved in the protective effect, as was documented by rescuing tyrosinase-negative, albino melanocytes, with these agents. The AKT/PKB pathway was shown to be involved in the process.

Session #4 Melanoma, Epidemiology, Vaccine, and Apoptosis
by John Pawelek

Two lectures provided an overview on recent advances in the epidemiology of melanoma and novel drugs that target simultaneously apoptotic and survival pathways. **Dr. Marianne Berwick** (Memorial Sloan-Kettering Cancer Center) discussed new epidemiological data showing that the biological behavior of melanoma differs according to whether it developed under conditions of high or low exposure to UV irradiation. Intriguingly, prognosis of melanoma is better in high incidence populations than low incidence populations and improves in a population as incidence increases. This behavior likely reflects the fact that populations in areas with higher levels of UV have increased awareness of melanoma risk and so detect melanoma earlier, leading to better prognosis.

Dr. Maria Soengas (Univ. Michigan) presented the results of a study using the proteasome inhibitor Bortezomib (Velcade™, previously known as PS-341) as a putative candidate to bypass melanoma chemoresistance. Bortezomib induced massive cell death in 24 aggressive melanoma cell lines without compromising the viability of normal melanocytes. Biochemical studies indicated that Bortezomib activates both non-apoptotic and apoptotic programs in melanoma cells. Thus, casp-8, casp9, -3 and -7 were activated even in cells with low Apaf-1 and high survivin, Bcl-xL, Bcl-2, Mcl-1, FLIP or XIAP. Moreover, the cytotoxic effect of Bortezomib was also independent on the functional status of p53, p19, p16 and the Ras/BRAF/ERK pathway. Fluorescence-based tumor imaging techniques revealed a significant effect of Bortezomib *in vivo* (mouse xenografts), particularly in controlling melanoma metastasis. This effect was significantly enhanced by small molecule inhibitors of Bcl-xL.

The morning symposium then continued with three talks selected from the submitted abstracts. **Dr. V Alexeev** (Jefferson Medical College) discussed the role of activating mutations in the *c-kit* gene in the survival of mouse melanocytes and melanoma cells. Expression of a c-Kit mutant receptor did not induce features of transformation of the mouse melanocyte cell line Melan-C, either *in vitro* or *in vivo*, or increased apoptosis. Conversely, a constitutively active c-Kit receptor induced apoptosis in melanoma. These results highlight the divergent biology or normal and tumorigenic melanocytes.

Dr. Dorothy Bennett (St. George's Hospital Medical School, England) discussed the role of the Inkk4a-Arf locus in the generation of immortal mutant mouse

melanocyte cell lines. Melanocytes isolated from mice with one or two Ink4a-Arf copies deleted fail to senescence in culture and form immortal cell lines without going into crisis. Dr. Bennett has been able to generate 15 immortal mutant mouse melanocyte cell lines by crossing C57BL6/J mutant mice, carrying mutations for Hermandsky-Pudlak, MITF and others, with Ink4a-ARF null mice, and isolation and culture of epidermal melanocytes. Availability of such cell lines will be a useful tool for the biological characterization and in-depth molecular analysis of the respective phenotypes.

Finally, **Dr. K. Fitch** (Stanford Univ.) presented results from a large-scale ENU mouse mutagenesis project. One of the mutants analyzed (Dsk5) was an hypermorphic mutation of the *Egfr* gene. These animals display excess epidermal pigmentation in the footpads that progresses with age. Pigmentation is associated with hyperkeratosis and melanocytosis. Dr. Fitch postulated that the mutation likely affects keratinocytes and secondarily the melanocytes. The Dsk5 mouse model could be used to better understand the pathological link between keratinocyte activation and melanocyte proliferation.

Session #5, Genetic and Comparative Pigment Cell Biology
by Lynn Lamoreux

One of the rewarding aspects of pigment cell research is the breadth and depth of the resources that are available to us. Session # 5, Genetic and Comparative Pigment Cell Biology, sampled a range of animal systems, from human to insect, with special attention to the mouse, and including chickens and chameleons. Unfortunately mentioned only in passing were the fish models that carry so much potential for pigment cell biologists.

Seth Orlow (NYU School of Medicine) reviewed two "Multipass Membrane Proteins that Control Pigmentation". The *p* locus of mice encodes a 12 TM protein whose absence results in tyrosinase positive albinism, with much reduced pigmentation of eumelanic pigmentation of the coat and eyes, and also causes albinism in man. It seems the protein encoded at the *p* locus controls trafficking of tyrosinase, but it is not clear how this is accomplished. Dr. Orlow reported studies in yeast that suggest the protein may facilitate intracellular glutathione transport that might play a role in folding of cysteine-rich tyrosinase. The *underwhite* locus in the mouse encodes MATP, another 12 TM membrane. Mutation at this locus results in pale pigmentation of the hair coat of the mouse that seems superficially similar to that caused by pinkeye, but does not strongly affect eye pigmentation. The effect of the mutation upon melanosome structure and melanization in mouse hair bulb melanocytes is extreme, and mutation in the human can also cause albinism.

This MATP mutation is known also in Medaka fish where it has been referred to as *b*, and also greatly reduces melanization on the body but not the eyes, and in humans as the AIM-1 locus, implicated in OCA4 albinism.

Yasu Tomita (Hokkaido University, Japan) reported the identification of several Japanese patients exhibiting "An Autosomal Dominant Oculocutaneous Albinism Caused by a Mutation in OCA4 Gene, AIM-1". He compared phenotypes and genotypes. Unlike other types of albinism, this exhibits a dominant negative phenotype in the patients examined.

Marjan Huising (NIH) reported "New Findings in Hermansky-Pudlak Syndrome", a disorder or biogenesis of lysosomes and related organelles, of course including melanocytes. She reviewed the six genes that are now identified to cause HPS in humans (HPS1 to HPS6) and described the protein complexes of which they are a part. These include the adaptor complex AP3 and six different protein complexes known as BLOCs (biogenesis of lysosome related complexes).

Emelia Costin (Texas A&M) spoke on the "Characterization of Two new Mouse Melanocyte Lines Carrying the Slaty and Slaty Light Mutations". The slaty locus encodes DOPAchrome tautomerase (Dct), an important regulatory enzyme that plays a pivotal role in the biosynthesis of melanin and the rapid metabolism of its toxic intermediates. In both of these cell lines, Dct activity was reduced compared with wild type cell lines. Confocal microscopy is being used to evaluate intracellular trafficking.

There were two reports of the effect of 4-TBP on melanocytes.

Prashiela Manga (Univ. Cincinnati) discussed "A Role of Tyrp1 in Determining Melanocyte Sensitivity to 4-(tert)-butypylphenol", a chemical that can cause chemical leukoderman and vitiligo. Their research had previously shown that exposure to 4-TBP in culture is preferentially cytotoxic to melanocytes in culture and results in dose dependent initiation of apoptosis and that Tyrp1 expression increased the sensitivity of transfected cells to 4-TBP. This study compared melanocytes obtained from normal individuals with those from an individual with OCA3 (mutant Tyrp1) and concluded that upregulation of Tyrp1 expression increases sensitivity of melanocytes to 4TPB. Tyrp1 may utilize increased amounts of 4TBP as substrate and produce

toxic intermediates at concentrations that eventually cause melanocyte death.

Caroline Le Poole (Loyola University) concentrated on the relationship between stress proteins and apoptosis in "HSP70 and the Response of Melanocytes to 4-TBP**"**, using normal and immortalized melanocytes and fibroblasts. Overexpression of HSP70 enhances MHc Class I expression and sensitizes melanocytes to T-cell-mediated cytotoxicity. Exposure to 4-TPB sensitized melanocyte killing by HLA-matched, melanocyte reactive T cells. Thus it appears that exposure to 4-TBP elevates HSP70 expression by melanocytes which can elicit enhanced cellular immune responses to melanocytes, thus contributing to vitiligo.

Gisela Erf (Univ. Arkansas) used Smyth Chickens to study vitiligo at the organismal level, Evaluating environmental impact on "Circulating Melanocyte-Specific Auto-Antibodies and Feather Infiltrating Lymphocytes in young Smyth Line Chickens prior to Visible onset of Vitiligo". Turkey herpesvirus (HVT) administration at hatch is associated with a high incidence of vitiligo in these chickens. Groups of chicks were seperately innoculated with HVT or with control. Antibodies to the HVT were identified in feathers several weeks before the onset of vitiligo.

Beautiful pictures of chameleons accompanied **Randy Morrison's** (McDaniel College) report, "An Analysis of Skin Color in Panther Chameleons from Different Regions of Madagascar using Reflectance Spectrophotometry". The colors are interesting both because of their creation upon the body of the animal, studied by wave-length spectra obtained using reflectance spectrophotometry, and because of the evolutionary implications of geographical distribution of the color forms in the wild. Data were analyzed in terms of hue, brightness, saturation. This approach offers the potential to correlate the spectral (noninvasive) data with ultrastructure of the multiple chromatophores that make up a complex and highly specialized phenotype.

Insects are one of the earliest models of pigment formation. **Manickam Sugumaran**, (U Mass) in "Molecular Interactions of Insect Phenol Oxidases", described the significance of phenol oxidase to both the sclerotization pathway, or hardening of the exoskeleton, and the melanogenic pathway. Melanin biosynthesis is associated with three physiologically important processes in the insect: immune response, wound healing, and pigment formation. Thus the phenol oxidases in insects are required for a complexity of processes such that their absence is life threatening. To perform these multiple tasks, phenol oxidase participates in a number of protein complexes, three of which were discussed.

Session #6, Melanoma, Genetics, Animal Models and Angiogenesis
by Vince Hearing

The Melanoma, Genetics, Animal Models and Angiogenesis Session was held on Saturday afternoon at the PASPCR meeting. The turnout was excellent and there was ample discussion following each of the talks, which are summarized as follows:

Boris Bastian (Univ. of California-San Francisco) began the session discussing the use of array comparative genomic hybridization (CGH) to examine gene expression in nevi (with limited proliferation) and melanoma (with unlimited proliferation). His studies were aimed to characterize the genetic differences between those 2 populations, and they performed their analyses on microdissected paraffin-embedded tissue sections. In brief, they found that melanomas had many differently expressed genes while the nevi had relatively few. Cyclin D1 was a gene commonly up-regulated in the melanomas, and they found that amplifications of different genes varied by their type and location on the body, e.g. acral, mucosal and non-acral melanomas. Mutations in bRAF also varied significantly by melanoma type, but there was not a correlation in that expression and disease outcome/ survival. They confirmed the results obtained with the array CGH by fluorescence in situ hybridization (FISH). Interestingly, they found aberrant melanocytes often 1 – 2 cm outside of the malignant area, and these are considered precursor cells of melanoma in situ, herein termed field cells. Bastian provided a mechanistic basis for these findings in relation to genetic hits from the environment (e.g. UV) and stated that wider margins might be necessary during surgical excision of melanoma outside of the standard excision margins.

Lynda Chin (Dana-Farber Cancer Center) then followed with a lecture about the genetically engineered mouse models for melanoma, and discussed the standard melanoma-signature mutations in CDK4, INK4a, bARF and Myc. They developed a model based on transgenic mice generated via the Ras gene linked to the tyrosinase promoter to obtain specific expression in melanocytes, and then they activated p16/INK4a or p19/ARF in knockout mice to induce melanoma-genesis. The question arose as to whether those tumors harbored secondary mutations, and they used the array CGH technique to assess that, and found that the answer was yes. That also found similar amplification regions as were found in the human melanoma studies discussed earlier by Bastian. The induced mouse tumors had similar histopathologic properties and characteristics

to human melanomas. UVB cooperates with ARF but not with p16 in melanoma-genesis, i.e. UVB targets the Rb pathway for melanoma promotion. When Ras was put on a tetracycline-inducible promoter, they found that continued expression of Ras was required for tumor growth, which reflects in part angiogenic factors secreted by these cells that is required for the continued development of the malignant cell population.

Juan Recio (George Washington University) then presented another mouse model for melanomas that was developed in Glenn Merlino's laboratory. In that model, hepatocyte growth factor (HGF)-transgenic mice were produced and then were exposed to UVB to induce tumorigenesis. Neonatal UVB exposure was strictly required to generate melanomas, which is consistent with observations of the role of UV on melanoma-genesis in humans (i.e. dependency on UV doses in early life). The question was posed as to what genetic mutations contributed to the development of malignant melanoma. They found that INK4a/ARF gene expression is lost in the mouse melanomas produced in this system, and this loss correlated well with the UV-induction of the tumors. Array CGH was used to show the loss of INK4a in mouse melanomas. These tumor lines are proving useful to dissect the cMet-signal pathway, and Recio described a pathway in which CD44 interacts with cMet to stimulate ERK1/2 to then stimulate Egr1 and proliferation. HGF activates ATF2 and CRE transcription factors. This model will be quite useful to further characterize the signaling pathways involved and also to elucidate mechanisms involved in UV-induced melanoma-genesis.

Y.E. Marin (Rutgers University) then presented the first of 2 papers from Suzie Chen's group on the role of Grm1 in mouse melanoma cells. She discussed the involvement of NFkappaB (a transcription factor frequently deregulated in many types of cancers) in Grm1 gene expression. Ectopic expression of Grm1 is sufficient for melanoma-genesis in mice (Grm1 is the receptor for glutamate). An important question is what are the cellular signaling events involved in this process. They created a transgenic albino mouse (termed TG-3) which then gave rise to amelanotic melanomas. NFkappaB is an excellent candidate, and they found that it was constitutively active in this system. It is normally regulated by IKK phosphorylation.

Suzie Chen (Rutgers University) then continued this theme, explaining that Grm1 is a G protein coupled receptor, and that its altered function results in melanomas in mice. They linked the Dct promoter to the Grm1 cDNA to allow for specific expression in melanocytes and generated a transgenic animal. They found that it worked through the phosphorylation of ERK1/2 and their next goals are to establish the intermediate links between Grm1 and ERK1/2 that are important to this process.

Michael Detmar (Mass General Hospital) then presented another overview lecture on angiogenesis and lymphangiogenesis. Those 2 processes are induced by hypoxia and by hyperplasia of keratinocytes which stimulates release of VEGF (vascular endothelial growth factor) which in turn stimulates endothelial cell proliferation. He mentioned that PlGF (placental growth factor) was also a minor player in these processes but wouldn't be discussed further. VEGF can facilitate skin inflammation, which can be very persistent. VEGF-transgenic mice develop severe and persistent inflammation which eventually develops into skin lesions. This can be abrogated in thrombospondin 1 transgenic mice. The inflammatory response to UV can also be abrogated in those transgenic mice. Many therapies have been developed which are based on inhibiting angiogenesis to reduce melanoma outgrowth; those have been tested in mouse models and a phase I clinical trial is currently underway on melanoma patients. But is there a distinct relationship between lymphangiogenesis and melanoma? Actually there is no clear correlation between blood vessel size or number and metastatic or nonmetastatic melanomas. However, there is a large (~2-fold) difference in lymphatics between those 2 types of melanomas suggesting that lymphangiogenesis may play a more important role than angiogenesis. This turns out to be an excellent prognostic indicator.

John Pawelek (Yale) then presented his laboratory's work on coarse melanin as an specific indicator of malignancy and corroborating evidence of the hybrid melanoma theory. Coarse melanin occurs in virtually 100% of metastases and not so frequently in primary tumors. They used tissue microarray to show that LPHA staining is commonly positive in metastases of many types of tumors, not just melanomas. Pawelek also discussed a patient who had a bone marrow transplant and who subsequently developed renal cell carcinoma. The metastases in that patient had genetic markers not only for the patient for also for the donor, proving that at least in those metastatic tumor cells, hybridization of cells from both sources had occurred. For those interested, a paper will be published in the Sept 1 issue of Cancer Research detailing some of the above.

Toshihiko Hoashi (Tokyo Koseinenkin Hospital, Japan) then discussed their study on the expression of various MMPs (matrix metalloproteinases) and their inhibitors (TIMPs) in various types of melanomas. He described their expression in lentigo malignant melanoma (LMM), superficial spreading melanoma (SSM), acral lentiginous melanoma (ALM), nodular melanoma (NM) and desmoplastic melanoma (DM).

He reviewed the substrate specificity of the different MMPs, noting that MMP9 was particularly interesting because it degraded collagen type IV, a major component of the basement membrane and thus was an advantageous protease to permit metastasis. Many previous studies showed contrasting results on the expression of various MMPs and TIMPs in different types of melanomas, and Hoashi's study (which examined matched samples of primary and metastatic tumors from the same patients) found that in general there were no dramatic changes in the expression of any of the MMPs or TIMPs between primary and metastatic melanomas in the 16 patients they examined, although there were slight increases in MMP7 and TIMP1 in all lymph node metastases. However, MMP9 expression in DM was dramatically increased in all 6 metastatic tissues examined compared with the expression of MMP9 in primary tumors, suggesting an important role for MMP9 in the metastatic spread of those tumors.

Shosuke Ito (Kumamoto Univ. School of Medicine, Japan) then summarized his group's research on the presence and analysis of melanogenic intermediates in the serum and urine of melanoma patients. They found that eumelanin and pheomelanin intermediates are partially secreted from melanomas and are then methylated and can be detected in the serum and urine. They found an excellent correlation of 5-SCD content with the progression of disease. In serum, 4-AHP (4-aminohydroxyphenylalanine) is of comparable significance to the presence of 5-SCD (5-S-cysteinyldopa), both being markers of pheomelanin production. In sum, the latter compound is of great potential value in diagnosing the course of disease in melanoma patients.

Session #7, Transcriptional Regulation
by Ray Boissy

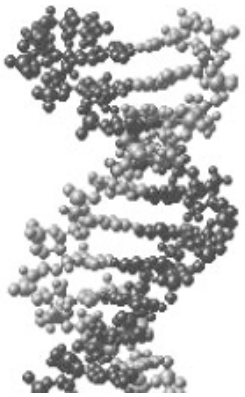
The symposium entitled "Transcriptional Regulation" focused on the pioneer field of transcriptional regulation of the embryonic commitment of the melanocytes and their eventual survival. This is an exciting field because many new regulatory molecules/transcription factors have recently been identified and their coordinate interactions are now being elucidated.

The symposium began with a presentation entitled "Genomic analysis of neural crest-melanocyte development" by **William Pavan** (NIH). The expression and associated functions of SOX10, PAX3 and MITF during embryogenesis were presented. An analysis of their temporal expression in normal embryogenesis and specific alterations in various mutants of these transcription factors has lead to their proposed sequential interactive role in melanocyte commitment.

The elaborate role of MITF in signaling pathways of the melanocytes was reviewed by **David Fisher** (Dana-Farber Cancer Center). Two significant associations with MITF have recently been identified. The gene for an associated transcription factor TFEB, when translocated in papillary renal cell carcinomas, results in aberrant expression of several melanocytic antigens. In addition, a downstream target of MITF activation is the anti-apoptic molecule Bcl2. Associated with mutation of MITF has been neurosensory deafness, as exemplified in Waardenburg syndrome type II or Tietz syndrome.

The lack of melanoblast development and the associated otic morphologic/physiologic defect in MitfMi-Wh/+ mice was presented by **Thomas Hornyak** (Henry Ford Hospital). "The overexpression of beta-catenin affects the proliferation and migration of melanoblasts" was presented by Lionel LaRue. Catenin appears to both medicate the interaction between cadherins and the cytoskeleton and to function as transcription factors. Aberrant expression of catenin in transgenic mice and melanoma cells demonstrated the role of this molecule in regulating proliferation and migration of melanoblasts.

Finally, the role a unique transcription factor, FOXN1, in pigmentation was presented by **Loren Weiner** (Mass General Hospital, Harvard Univ.). Mutations of FOXN1 are responsible for the immunocompromised, hairless "nude" mouse. A transgenic mouse expressing FOXN1 in the basal epidermis via the keratin 5 promoter resulted in the development of interfollicular melanocytes. It was proposed that from the population of hair follicle destined melanoblast there was recruited cells that homed into the interfollicular epidermis via signaling cytokines regulated by FOXN1. This symposium clearly demonstrated the numerous intricate and interactive roles of known and unknown molecules regulating melanocyte development.



Positions - Wanted and Available

Postings for **Positions Available** will be open to all individuals and institutions so long as the position is related to pigment cell research. Postings for **Positions Wanted** will be open only to members of the PanAmerican Society for Pigment Cell Research or its sister societies (JSPCR and ESPCR). Send postings to Bill Oetting at bill@lenti.med.umn.edu. Please provide an expiration date for any submitted postings. Final decisions will be made by the Publications Committee of the PASPCR.

Postdoctoral Research Associate
Fox Chase Cancer Center.
Two NIH-funded postdoctoral positions are available to work on the development of neural crest–derived melanocytes and enteric neurons in mice. We are interested in the signals required for proper migration and differentiation of these lineages during mouse embryogenesis and use various genetic manipulation techniques and existing mutants for our studies. Fox Chase Cancer offers competitive salaries to its postdocs and was recently named one of the best places to work for Postdocs (http://www.fccc.edu/news/2003/Best-Places-for-Postdocs-02-20-2003.html). Candidates with a recent PhD or MD/PhD with strong background in molecular biology, genetics or developmental biology are encouraged to apply. Please submit CV, and names of 3 references to:

Dr. Myung K. Shin
Program in Cellular and Developmental Biology
Fox Chase Cancer Center
Philadelphia, PA 19111, USA
Email: MK_Shin@fccc.edu

Postdoctoral Position
Polarized Kit-ligand expression in the epidermis: Its role in human melanocyte homeostasis

A postdoctoral position (fully funded for the first year with the possibility of a 2 year extension) is immediately available in the Department of Pathology, Centre Medical Universitaire at the University of Geneva, Switzerland. The project is supervised by Dr. Bernhard Wehrle-Haller and Prof. Beat Imhof and is within the frame of a collaboration between the University of Geneva and Industry.

The aim of this project is to understand the role of kit-ligand in melanocyte homeostasis in the adult epidermis and how manipulation of kit-ligand expression or localization in keratinocytes affect melanocyte behavior. The project will employ cell-biological, pharmaceutical, biochemical as well transgenic approaches (mouse) to develop methods to modify Kit-ligand localization (polarity and cell surface expression) in vivo and to study melanocyte behavior in response to such altered Kit-ligand presentation. For references and rational see Wehrle-Haller and Imhof (2001, J. Biol. Chem. 276, 12667-74) and Grichnik et al., (1998, J. Invest. Dermatol. 111, 233-38).

The Centre Medical Universitaire provides a stimulatory research environment located within the City of Geneva. Research in the department is centered around problems of autoimmunity, wound healing, inflammation, cell-cell junctions and cell migration. Geneva, located at the lake of Geneva in close proximity to the French Alps, provides a rich multicultural environment facilitating social integration.

Interested candidates preferably having experience in one or more of the aforementioned domains should send their CV (e.g. e-mail) including names and contacting information of two references to:

Bernhard Wehrle-Haller PhD
Department of Pathology
Centre Medical Universitaire
1. Rue Michel-Servet
1211 Geneva 4
Switzerland
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Bernhard.Wehrle
Haller@medecine.unige.ch

Postdoctoral Research Position
A postdoctoral position is available immediately to study the transcriptional co-repressor and co-activator activities of the oncogenic protein Ski in human melanomas (PNAS (USA) 97:5924-5929, 2000). Seeking individuals with experience in EMSA, *in vitro* transcription-translation, site-directed mutagenesis and yeast two-hybrid screening. Interested individuals should send inquiries and applications (including CV, a brief description of past experience and future research interests, and the name of three references) to:

Estela E. Medrano, Ph.D.
Huffington Center on Aging
Baylor College of Medicine
One Baylor Plaza N-803.01
Houston, TX 77030

Baylor College of Medicine is an Equal Opportunity Employer

Research Associate/Post Doctoral Fellow Position Available

Position available for either an entry level postdoctoral fellow or a more senior research associate to study the molecular and cellular biology of the melanocyte in general and the pathophysiology of vitiligo in specific. The research project will focus globally on the role of survival factors and apoptotic regulators on the viability of melanocytes in the skin and in culture. In addition, the project will focus on the genetic and cellular susceptibility of melanocytes from patients with vitiligo to under apoptosis in response to various stimuli. Postdoctoral fellow candidate should have experience with routine molecular and cellular techniques including cell culturing, site directed mutagenesis, and protein biochemistry. Research Associate candidate should have similar experiences utilizing the melanocyte system. Candidate will become part of an interactive research group focusing of various aspects of pigmentation in the Department of Dermatology and on skin physiology in the Skin Sciences Institute within the University of Cincinnati College of Medicine. Send curriculum vitae and list of three references to:

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Postdoctoral Fellows - Cancer and Developmental Biology - Two NIH-funded positions are available for fellows interested in studying the Hedgehog signaling pathway in development and disease using skin as a model system. One project centers on defining the function of the Hedgehog pathway during skin appendage morphogenesis (Dev. Biol. 205: 1-9, 1999); a second project focuses on understanding how deregulated activation of this pathway gives rise to basal cell carcinomas (Nature Genet. 24: 216-7, 2000). Applicants should have a solid background in molecular and cell biology, with experience in transgenic animal models desirable but not required. Interested individuals should send a CV, letter of interest, and names of three references to: Dr. Andrzej Dlugosz, University of Michigan, Department of Dermatology and Comprehensive Cancer Center, 3310 CCGC, Box 0932, 1500 East Medical Center Drive, Ann Arbor, MI 48109-0932 Email: dlugosza@umich.edu. The University of Michigan is an Equal Opportunity Employer.

Postdoctoral Fellow - Postdoctoral positions are available immediately to study post-embryonic development in zebrafish. NIH-funded research is aimed at identifying the genetic and cellular bases for development of the adult pigment pattern and somatic metamorphosis. The lab uses a wide variety of methods including genetic screening, genetic mapping and positional cloning, gene expression analysis, cell transplantation and classical histology. Postdoctoral fellows would be expected ultimately to develop independent research programs and would have the opportunity to participate in ongoing genetic screens for mutants affecting post-embyronic development.

For more information see:
http://www.biosci.utexas.edu/IB/faculty/parichy/research.htm
http://www.biosci.utexas.edu/IB/faculty/parichy/pubs.html
Applications including CV and contact information for three references should be sent to:

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Bibliography:

The Bibliography published in this issue covers the period June, 2003 through August, 2003. If you notice a paper that was not detected by this search that should be included, please send it to us and we will include it in the next issue. By its very nature, assignment of a reference to a particular category is arbitrary and we urge you to read through all categories to make sure you don't miss any pertinent to your field.

MELANINS, MELANOGENS & MELANOGENESIS

Boshoff A, Burton MH, Burton SG: Optimization of catechol production by membrane-immobilized polyphenol oxidase: A modeling approach. BIOTECHNOL BIOENG 83:1-7 (2003).

Buszman E, R¢zanska R: Interaction of quinidine, disopyramide and metoprolol with melanin in vitro in relation to drug-induced ocular toxicity. PHARMAZIE 58:507-511 (2003).

Dohil MA, Billman G, Pransky S, Eichenfield LF: The congenital lingual melanotic macule. Arach Dermatol 139:767 (2003).

Doss RP, Deisenhofer J, vonNidda HAK, Soeldner AH, McGuire RP: Melanin in the extracellular matrix of germlings of Botrytis cinerea. PHYTOCHEMISTRY 63:687-691 (2003).

Farmer PJ, Gidanian S, Shahandeh B, DiBilio AJ, Tohidian N, Meyskens FL: Melanin as a target for melanoma chemotherapy: Pro-oxidant effect of oxygen and metals on melanoma viability. PIGM CELL RES 16:273-279 (2003).

Friedman T, Westreich M, Mozes SN, Dorenbaum A, Herman O: Tattoo pigment in lymph nodes mimicking metastatic malignant melanoma. PLAST RECONSTR SURG 111:2120-2122 (2003).

Gaggioli C, Busca R, Abbe P, Ortonne JP, Ballotti R: Microphthalmia-associated transcription factor (MITF) is required but is not sufficient to induce the expression of melanogenic genes. PIGM CELL RES 16:374-382 (2003).

Im SJ, Kim KN, Yun YG, Lee JC, Mun YJ, Kim JH, Woo WH: Effect of Radix Ginseng and Radix Trichosanthis on the melanogenesis. BIOL PHARM BULL 26:849-853 (2003).

Immerstrand C, Jager EWH, Magnusson K, Sundqvist T, Lundstr"m I, Ingan„s O, Peterson KH: Altered impedance during pigment aggregation in Xenopus laevis melanophores. MED BIOL ENG COMPUT 41:357-364 (2003).

Ito S: A chemist's view of melanogenesis. PIGM CELL RES 16:230-236 (2003).

Kim DS, Hwang ES, Lee JE, Kim SY, Kwon SB, Park KC: Sphingosine-1-phosphate decreases melanin synthesis via sustained ERK activation and subsequent MITF degradation. J CELL SCI 116:1699-1706 (2003).

Li G, Ju HK, Chang HW, Jahng Y, Lee SH, Son JK: Melanin biosynthesis inhibitors from the bark of Machilus thunbergii. BIOL PHARM BULL 26:1039-1041 (2003).

Manning JT, Bundred PE, Henzi P: Melanin and HIV in sub-Saharan Africa. J THEOR BIOL 223:131-133 (2003).

Marneros AG, Olsen BR: Age-dependent iris abnormalities in collagen XVIII/endostatin deficient mice with similarities to human pigment dispersion syndrome. INVEST OPHTHALMOL VISUAL SCI 44:2367-2372 (2003).

Morris-Jones R, Youngchim S, Gomez BL, Aisen P, Hay RJ, Nosanchuk JD, Casadevall A, Hamilton AJ: Synthesis of melanin-like pigments by Sporothrix schenckii in vitro and mammalian infection. INFEC IMMUNITY 71:4026-4033 (2003).

Nosanchuk JD, Casadevall A: Budding of melanized Cryptococcus neoformans in the presence or absence of L-dopa. MICROBIOLOGY SGM 149:1945-1951 (2003).

Rivera MRP, Ishihara M, Mihara M: A case of non-selective phagocytosis of hemosiderin and melanin of dermal histiocytes in stasis dermatitis. ARCH DERMATOL RES 295:19-23 (2003).

Roulin A, Dijkstra C: Genetic and environmental components of variation in eumelanin and phaeomelanin sex-traits in the barn owl. HEREDITY 90:359-364 (2003).

Rubianes MD, Rivas GA: Use of a melanin-type polymer to improve the selectivity of glucose biosensors. ANAL LETT 36:1311-1323 (2003).

Senar JC, Figuerola J, DomŠnech J: Plumage coloration and nutritional condition in the great tit Parus major: the roles of carotenoids and melanins differ. NATURWISSENSCHAFTEN 90:234-237 (2003).

Siebeck UE, Collin SP, Ghoddusi M, Marshall NJ: Occlusable corneas in toadfishes: light transmission, movement and ultrastruture of pigment during light- and dark-adaptation. J EXP BIOL 206:2177-2190 (2003).

Song H, Cho D, Jeon JH, Han SH, Hur DY, Kim YS, Choi I: Vitamin D-3 up-regulating protein 1 (VDUP1) antisense DNA, regulates tumorigenicity and melanogenesis of murine melanoma cells via regulating the expression of fas ligand and reactive oxygen species. IMMUNOL LETT 86:235-247 (2003).

Svensson SPS, Lindgren S, Powell W, Green H: Melanin inhibits cytotoxic effects of doxorubicin and daunorubicin in MOLT 4 cells. PIGM CELL RES 16:351-354 (2003).

Tadokoro T, Kobayashi N, Zmudzka BZ, Ito S, Wakamatsu K, Yamaguchi Y, Korossy KS, Miller SA, Beer JZ, Hearing VJ: UV-induced DNA damage and melanin content in human skin differing in racial/ethnic origin. FASEB J 17:NIL (2003).

Tian SY, Garcia-Rivera J, Yan B, Casadevall A, Stark RE: Unlocking the molecular structure of fungal melanin using C-13 biosynthetic labeling and solid-state NMR. BIOCHEMISTRY USA 42:8105-8109 (2003).

Wang ZQ, VandeBerg JL: Loss of melanogenic response to DNA damage correlates with the metastatic phenotype of a melanoma cell line from Monodelphis domestica. MELANOMA RES 13:111-112 (2003).
Weeraratna AT: Serial analysis of gene expression (SAGE): Advances, analysis and applications to pigment cell research. PIGM CELL RES 16:183-189 (2003).

MELANOSOMES, MELANOCYTES & KERATINOCYTES

Dermoscopy of melanocytic neoplasms - Subpatterns of dysplastic/Atypical nevi. ARCH DERMATOL 139:970 (2003).
Alkhateeb A, Fain PR, Thody A, Bennett DC, Spritz RA: Epidemiology of vitiligo and associated autoimmune diseases in caucasian probands and their families. PIGM CELL RES 16:208-214 (2003).
Anderson BE, Miller JJ, Machley CL, Ioffreda MD: A 21-year-old woman with progressive reticulated pigmentation of the extremities. ARCH DERMATOL 139:659-660 (2003).
Andersson TPM, Svensson SPS, Karlsson AM: Regulation of melanosome movement by MAP kinase. PIGM CELL RES 16:215-221 (2003).
Argenziano G, Soyer HP, Chimenti S, Talamini R, Corona R, Sera F, Binder M, Cerroni L, DeRosa G, Ferrara G, Hofmann-Wellenhof R, Landthater M, Menzies SW, Pehamberger H, Piccolo D, Rabinovitz HS, Schiffner R, Staibano S, Stolz W, Bartenjev I, Blum A, Braun R, Cabo H, Carli P, DeGiorgi V, Fleming MG, Grichnik JM, Grin CM, Halpern AC, Johr R, Katz B, Kenet RO, Kittler H, Kreusch J, Malvehy J, Mazzocchetti G, Oliviero M, ™demir F, Peris K, Perotti R, Perusquia A, Pizzichetta MA, Puig S, Rao B, Rubegni P, Saida T, Scalvenzi M, Seidenari S, Stanganelli I, Tanaka M, Westerhoff K, Wolf IH, Braun-Falco O, Kerl H, Nishikawa T, Wolff K: Dermoscopy of pigmented skin lesions: Results of a consensus meeting via the Internet. J AMER ACAD DERMATOL 48:679-693 (2003).
Barrett JH, Gaut R, Wachsmuth R, Bishop JAN, Bishop DT: Linkage and association analysis of nevus density and the region containing the melanoma gene CDKN2A in UK twins. BRIT J CANCER 88:1920-1924 (2003).
Bastian BC: Understanding the progression of melanocytic neoplasia using genomic analysis: from fields to cancer. ONCOGENE 22:3081-3086 (2003).
Bauer J, Garbe C: Acquired melanocytic nevi as risk factor for melanoma development. A comprehensive review of epidemiological data. PIGM CELL RES 16:297-306 (2003).
Bennett DC: Human melanocyte senescence and melanoma susceptibility genes. ONCOGENE 22:3063-3069 (2003).
Berardesca E, Maibach H: Ethnic skin: Overview of structure and function. J AMER ACAD DERMATOL 48:S139 (2003).
Berson JF, Theos AC, Harper DC, Tenza D, Raposo G, Marks MS: Proprotein convertase cleavage liberates a fibrillogenic fragment of a resident glycoprotein to initiate melanosome biogenesis. J CELL BIOL 161:521-533 (2003).
Blum A, Rassner G, Garbe C: Modified ABC-point list of dermoscopy: A simplified and highly accurate dermoscopic algorithm for the diagnosis of cutaneous melanocytic lesions. J AMER ACAD DERMATOL 48:672-678 (2003).
Borovansky J, Elleder M: Melanosome degradation: Fact or fiction. PIGM CELL RES 16:280-286 (2003).
Braun-Falco M, Hein R, Ring J, McNutt NS: Histopathological characteristics of small diameter melanocytic naevi. J CLIN PATHOL 56:459-464 (2003).
Br,,nstr”m R, Ull,n H, Brandberg Y: A randomised population-based intervention to examine the effects of the ultraviolet index on tanning behaviour. EUR J CANCER 39:968-974 (2003).
Carli P, DeGiorgi V, Giannotti B: Why digital follow-up of dermoscopically equivocal pigmented lesions should be discouraged. BRIT J DERMATOL 148:1272-1273 (2003).
Chan ACL, Ho LC, Yip WWL, Cheung FC: Pigmented ependymoma with lipofuscin and neuromelanin production. ARCH PATHOL LAB MED 127:872-875 (2003).
Chiba T, Kashiwagi K, Chiba N, Ishijima K, Furuichi M, Kogure S, Abe K, Tsukahara S: Comparison of iridial pigmentation between latanoprost and isopropyl unoprostone: a long term prospective comparative study. BRIT J OPHTHALMOL 87:956-959 (2003).
Dalton SR, Fillman EP, Altman CE, Gardner TL, Davis TL, Bastian BC, Libow LF, Elston DM: Atypical junctional melanocytic proliferations in benign lichenoid keratosis. HUM PATHOL 34:706-709 (2003).
Delmas W, Martinozzi S, Bourgeois Y, Holzenberger M, Larue L: Cre-mediated recombination in the skin melanocyte lineage. GENESIS 36:73-80 (2003).
Dooley TP, Curto EV, Davis RL, Grammatico P, Robinson ES, Wilborn TW: DNA microarrays and likelihood ratio bioinformatic methods: Discovery of human melanocyte biomarkers. PIGM CELL RES 16:245-253 (2003).
Du JY, Miller AJ, Widlund HR, Horstmann MA, Ramaswamy S, Fisher DE: MLANA/MART1 and SlLV/PMEL17/GP100 are transcriptionally regulated by MITF in melanocytes and melanoma. AMER J PATHOL 163:333-343 (2003).
Fain PR, Gowan K, LaBerge GS, Alkhateeb A, Steller GL, Talbert J, Bennett DC, Spritz RA: A genomewide screen for generalized vitiligo: Confirmation of AIS1 on chromosome 1p31 and evidence for additional susceptibility loci. AMER J HUM GENET 72:1560-1564 (2003).
Feuillet L, Kaphan E, Audoin B, Witjas T, Pelletier J, Pellissier JF, Cherif AA: Melanocytosis meningitis and large congenital melanocytic naevus: neurocutaneous melanosis. REV NEUROL 159:435-439 (2003).

Gasbarri A, DelPrete F, Girnita L, Martegani MP, Natali PG, Bartolazzi A: CD44s adhesive function spontaneous and PMA-inducible CD44 cleavage are regulated at post-translational level in cells of melanocytic lineage. Melanoma Res 13:325 2003

Gauthier Y, Andre MC, Ta‹eb A: A critical appraisal of vitiligo etiologic theories. Is melanocyte loss a melanocytorrhagy? PIGM CELL RES 16:322-332 (2003).

Gontier E, Cario-Andr, M, Vergnes P, Bizik J, SurlŠve-Bazeille JE, Ta‹eb A: The 'Abtropfung phenomenon' revisited: Dermal nevus cells from congenital nevi cannot activate matrix metalloproteinase 2 (MMP-2). PIGM CELL RES 16:366-373 (2003).

Gupta S, Kumar B: Epidermal grafting in vitiligo: Influence of age, site of lesion, and type of disease on outcome. J AMER ACAD DERMATOL 49:99-104 (2003).

Guzman E, Langowski JL, Owen-Schaub L: Mad dogs, Englishmen and apoptosis: The role of cell death in UV-induced skin cancer. APOPTOSIS 8:315-325 (2003).

Halder RM, Nootheti PK: Ethnic skin disorders overview. J AMER ACAD DERMATOL 48:S143-S148 (2003).

Hussein MR, Roggero E, Tuthill RJ, Wood GS, Sudilovsky O: Identification of novel deletion loci at 1p36 and 9p22-21 in melanocytic dysplastic Nevi and cutaneous malignant melanomas. ARCH DERMATOL 139:816-817 (2003).

Huynh PM, Glusac EJ, Alvarez-Franco M, Berwick M, Bolognia JL: Numerous, small, darkly pigmented melanocytic nevi: The cheetah phenotype. J AMER ACAD DERMATOL 48:707-713 (2003).

Ichihashi M, Ueda M, Budiyanto A, Bito T, Oka M, Fukunaga M, Tsuru K, Horikawa T: UV-induced skin damage. TOXICOLOGY 189:21-39 (2003).

Inoue K, Hosoi J, Ideta R, Ohta N, Ifuku O, Tsuchiya T: Stress augmented ultraviolet-irradiation-induced pigmentation. J INVEST DERMATOL 121:165-171 (2003).

Jul, S, Boss, P, Egidy G, Panthier JJ: Establishment and characterization of a normal melanocyte cell line derived from pig skin. PIGM CELL RES 16:407-410 (2003).

Kauser S, Schallreuter KU, Thody AJ, Gummer C, Tobin DJ: Regulation of human epidermal melanocyte biology by -endorphin. J INVEST DERMATOL 120:1073-1080 (2003).

Kennedy C, Bajdik CD, Willemze R, deGruijl FR, Bavinck JNB: The influence of painful sunburns and lifetime sun exposure on the risk of actinic keratoses, seborrheic warts, melanocytic nevi, atypical nevi, and skin cancer. J INVEST DERMATOL 120:1087-1093 (2003).

Kuroda TS, Ariga H, Fukuda M: The actin-binding domain of Slac2-a/melanophilin is required for melanosome distribution in melanocytes. MOL CELL BIOL 23:5245-5255 (2003).

Kushimoto T, Valencia JC, Costin GE, Toyofuku K, Watabe H, Yasumoto KI, Rouzaud F, Vieira WD, Hearing VJ: The melanosome: An ideal model to study cellular differentiation. PIGM CELL RES 16:237-244 (2003).

Larue L, Kumasaka M, Goding CR: b-catenin in the melanocyte lineage. PIGM CELL RES 16:312-317 (2003).

Lee HO, Levorse JM, Shin MK: The endothelin receptor-B is required for the migration of neural crest-derived melanocyte and enteric neuron precursors. DEVELOP BIOL 259:162-175 (2003).

Leonard JH, Marks LH, Chen W, Cook AL, Boyle GM, Smit DJ, Brown DL, Stow JL, Parsons PG, Sturm RA: Screening of human primary melanocytes of defined melanocortin-1 receptor genotype: Pigmentation marker, ultrastructural and UV-survival studies. PIGM CELL RES 16:198-207 (2003).

Lepe V, Moncada B, Castanedo-Cazares JP, Torres-Alvarez MB, Ortiz CA, Torres-Rubalcava AB: A double-blind randomized trial of 0.1% tacrolimus vs 0.05% clobetasol for the treatment of childhood vitiligo. Arch Dermatol 139:581-585 (2003).

Mantovani S, Garbelli S, Palermo B, Campanelli R, Brazzelli V, Borroni G, Martinetti M, Benvenuto F, Merlini G, dellaCuna GR, Rivoltini L, Giachino C: Molecular and functional bases of self-antigen recognition in long-term persistent melanocyte-specific CD8(+) T cells in one vitiligo patient. J INVEST DERMATOL 121:308-314 (2003).

Na GY, Lee KH, Kim MK, Lee SJ, Kim DW, Kim JC: Polymorphisms in the melanocortin-1 receptor (MC1R) and agouti signaling protein (ASIP) genes in Korean vitiligo patients. PIGM CELL RES 16:383-387 (2003).

Nakamura S, Yokozeki H, Nishioka K: Acute pigmentation due to minocycline therapy in atopic dermatitis. BRIT J DERMATOL 148:1073-1074 (2003).

Nestor SL, Perry A, Kurtkaya Z, Abell-Aleff P, Rosemblat AM, Burger PC, Scheithauer BW: Melanocytic colonization of a meningothelial meningioma: Histopathological and ultrastructural findings with immunohistochemical and genetic correlation: Case report. NEUROSURGERY 53:211-214 (2003).

Pagnanelli G, Soyer HP, Argenziano G, Talamini R, Barbati R, Bianchi L, Campione E, Carboni I, Carrozzo AM, Chimenti MS, DeSimoni I, Falcomat… V, Neto IF, Francesconi F, Ginebri A, Hagman J, Marulli GC, Palamara F, Vidolin AP, Piemonte P, Soda R, Chimenti S: Diagnosis of pigmented skin lesions by dermoscopy: web-based training improves diagnostic performance of non-experts. BRIT J DERMATOL 148:698-702 (2003).

Palmieri G, Ascierto PA, Cossu A, Colombino M, Casula M, Botti G, Lissia A, Tanda F, Castello G: Assessment of genetic instability in melanocytic skin lesions through microsatellite analysis of benign naevi, dysplastic naevi, and primary melanomas and their metastases. MELANOMA RES 13:167-170 (2003).

Perluigi M, DeMarco F, Foppoli C, Coccia R, Blarzino C, Marcante ML, Cini C: Tyrosinase protects human melanocytes from ROS-generating compounds. BIOCHEM BIOPHYS RES COMMUN 305:250-256 (2003).

Piepmeier JM, Hedley-Whyte ET: Melanocytic colonization of a meningothelial meningioma: Histopathological and ultrastructural findings with immunohistochemical and genetic correlation: Case report - Comments. NEUROSURGERY 53:214-215 (2003).

Plettenberg H, Assmann T, Ruzicka T: Childhood vitiligo and tacrolimus - Immunomodulating treatment for an autoimmune disease. ARCH DERMATOL 139:651-654 (2003).

Pollock PM, Cohen-Solal K, Sood R, Namkoong J, Martino JJ, Koganti A, Zhu H, Robbins C, Makalowska I, Shin SS, Marin Y, Roberts KG, Yudt LM, Chen A, Cheng J, Incao A, Pinkett HW, Graham CL, Dunn K, Crespo-Carbone SM, Mackason KR, Ryan KB, Sinsimer D, Goydos J, Reuhl KR, Eckhaus M, Meltzer PS, Pavan WJ, Trent JM, Chen S: Melanoma mouse model implicates metabotropic glutamate signaling in melanocytic neoplasia. NAT GENET 34:108-112 (2003).

Prelovsek PM, Bulog B: Biogenesis of melanosomes in Kupffer cells of Proteus anguinus (Urodela, Amphibia). PIGM CELL RES 16:345-350 (2003).

Reynolds N, Kenealy J, Mercer N: Carbon dioxide laser dermabrasion for giant congenital melanocytic nevi. PLAST RECONSTR SURG 111:2209-2214 (2003).

Rochaix P, Lacroix-Triki M, Lamant L, Pichereaux C, Valmary S, Puente E, AlSaati T, Monsarrat B, Susini C, Buscail L, Delsol G, Voigt JJ: PNL2, a new monoclonal antibody directed against a fixative-resistant melanocyte antigen. MODERN PATHOL 16:481-490 (2003).

Ruiz-Maldonado R, Orozco-Covarrubias L, Ridaura-Sanz C, Dur n-McKinster C, Guti,rrez MDD, Tamayo-S nchez L: Desmoplastic hairless hypopigmented naevus: a variant of giant congenital melanocytic naevus. BRIT J DERMATOL 148:1253-1257 (2003).

Sandby-Moller J, Poulsen T, Wulf HC: Influence of epidermal thickness, pigmentation and redness on skin autofluorescence. PHOTOCHEM PHOTOBIOL 77:616-620 (2003).

Sauer B, Ruwisch L, Kleuser B: Antiapoptotic action of 1,25-dihydroxyvitamin D-3 in primary human melanocytes. MELANOMA RES 13:339-347 (2003).

Schiffner R, Schiffner-Rohe J, Landthaler M, Stolz W: Long-term dermoscopic follow-up of melanocytic naevi: clinical outcome and patient compliance. BRIT J DERMATOL 149:79-86 (2003).

Seidenari S, Martella A, Pellacani G: Polarized light-surface microscopy for description and classification of small and medium-sized congenital melanocytic naevi. ACTA DERMATO VENEREOL 83:271-276 (2003).

Springer M, Engelhart K, Biesalski HK: Effects of 3-isobutyl-1-methylxanthine and kojic acid on cocultures and skin equivalents composed of HaCaT cells and human melanocytes. ARCH DERMATOL RES 295:88-91 (2003).

Spritz RA, Chiang PW, Oiso N, Alkhateeb A: Human and mouse disorders of pigmentation. CURR OPIN GENET DEVELOP 13:284-289 (2003).

Suto JI, Sekikawa K: Genetic determinants of sable and umbrous coat color phenotypes in mice. Pigm Cell Res 16:388, 2003.

Sviderskaya EV, Gray-Schopfer VC, Hill SP, Smit NP, Evans-Whipp TJ, Bond J, Hill L, Bataille V, Peters G, Kipling D, Wynford-Thomas D, Bennett DC: p16/cyclin-dependent kinase inhibitor 2A deficiency in human melanocyte senescence, apoptosis, and immortalization: Possible implications for melanoma progression. J NAT CANCER INST 95:723-732 (2003).

Tadokoro T, Rouzaud F, Itami S, Hearing VJ, Yoshikawa K: The inhibitory effect of androgen and sex-hormone-binding globulin on the intracellular cAMP level and tyrosinase activity of normal human melanocytes. Pigm Cell Res 16:190, 2003.

vanderMei IAF, Ponsonby AL, Dwyer T, Blizzard L, Simmons R, Taylor BV, Butzkueven H, Kilpatrick T: Past exposure to sun, skin phenotype, and risk of multiple sclerosis: case-control study. BRIT MED J 327:316-320 (2003).

Wankowicz-Kalinska A, vandenWijngaard RMJG, Tigges BJ, Westerhof W, Ogg GS, Cerundolo V, Storkus WJ, Das PK: Immunopolarization of CD4(+) and CD8(+) T cells to type-1-like is associated with melanocyte loss in human vitiligo. LAB INVEST 83:683-695 (2003).

Wankowicz-Kalinska A, Lepoole C, VanDenWijngaard R, Storkus WJ, Das PK: Melanocyte-specific immune response in melanoma and vitiligo: Two faces of the same coin? PIGM CELL RES 16:254-260 (2003).

Whiteman DC, Watt P, Purdie DM, Hughes MC, Hayward NK, Green AC: Melanocytic nevi, solar keratoses, and divergent pathways to cutaneous melanoma. J NAT CANCER INST 95:806-812 (2003).

Wolters FLC, Klis SFL, deGroot JCMJ, Hamers FPT, Prieskorn DA, Miller JM, Smoorenburg GF: Systemic co-treatment with -melanocyte stimulating hormone delays hearing loss caused by local cisplatin administration in guinea pigs. HEAR RES 179:53-61 (2003).

Yoon TJ, Lei TC, Yamaguchi Y, Batzer J, Wolber R, Hearing VJ: Reconstituted 3-dimensional human skin of various ethnic origins as an in vitro model for studies of pigmentation. ANAL BIOCHEM 318:260-269 (2003).

MELANOMA & METASTASIS

Melanoma: an unexpected decrease in deaths. EUR J CANCER 39:711 (2003).
Ackerman AB: The significance of vascular invasion in primary melanomas of thin or intermediate thickness - In reply. ARCH DERMATOL 139:810 (2003).
Al Jamal RT, M,,kitie T, Kivel,, T: Nucleolar diameter and microvascular factors as independent predictors of mortality from malignant melanoma of the choroid and ciliary body. INVEST OPHTHALMOL VISUAL SCI 44:2381-2389 (2003).
Alexander A, Samlowski WE, Grossman D, Bruggers CS, Harris RM, Zone JJ, Noyes RD, Bowen GM, Leachman SA: Metastatic melanoma in pregnancy: Risk of transplacental metastases in the infant. J CLIN ONCOL 21:2179-2186 (2003).
Alizadeh H, Howard K, Mellon J, Mayhew E, Rusciano D, Niederkorn JY: Reduction of liver metastasis of intraocular melanoma by interferon- gene transfer. INVEST OPHTHALMOL VISUAL SCI 44:3042-3051 (2003).
Ascierto PA, Palmieri G, Botti G, Satriano RA, Stanganelli I, Bono R, Testori A, Bosco L, Daponte A, Carac• C, Chiofalo MG, Melucci MT, Calignano R, Tatangelo F, Cochran AJ, Castello G: Early diagnosis of malignant melanoma: Proposal of a working formulation for the management of cutaneous pigmented lesions from the Melanoma Cooperative Group. INT J ONCOL 22:1209-1215 (2003).
Baldi A, Santini D, DeLuca A, Paggi MG: CDNA array technology in melanoma: An overview. J Cell Physiol 196:219, 2003.
Barbazetto IA, Lee TC, Rollins IS, Chang S, Abramson DH: Treatment of choroidal melanoma using photodynamic therapy. AMER J OPHTHALMOL 135:898-899 (2003).
Barbour AH, Coventry BJ: Dendritic cell density and activation status of tumour-infiltrating lymphocytes in metastatic human melanoma: possible implications for sentinel node metastases. MELANOMA RES 13:263-269 (2003).
Barzilai DA, Singer ME: The potential impact on melanoma mortality of reducing rates of suboptimal excision margins. J INVEST DERMATOL 120:1067-1072 (2003).
Bastian BC: Hypothesis: A role for telomere crisis in spontaneous regression of melanoma. Arch Dermatol 139:667, 2003.
Bataille V: Genetic epidemiology of melanoma. EUR J CANCER 39:1341-1347 (2003).
Bauer TW, Gutierrez M, Dudrick DJ, Li JR, Blair IA, Menon C, Fraker DL: A human melanoma xenograft in a nude rat responds to isolated limb perfusion with TNF plus melphalan. SURGERY 133:420-428 (2003).
Bedikian AY, Papadopoulos N, Plager C, Eton O, Ring S: Phase II evaluation of temozolomide in metastatic choroidal melanoma. MELANOMA RES 13:303-306 (2003).
Behrmann I, Wallner S, Komyod W, Heinrich PC, Schuierer M, Buettner R, Bosserhoff AK: Characterization of methylthioadenosin, phosphorylase (MTAP) expression in malignant melanoma. AMER J PATHOL 163:683-690 (2003).
Belda-Iniesta C, Gonz lez RMSA, Cuesta E, Gonz lez-Bar¢n M: Atrioventricular nodal blocking secondary to melanoma infiltration. MELANOMA RES 13:433-434 (2003).
Bergman L, Seregard S, Nilsson B, Lundell G, Ringborg U, Ragnarsson-Olding B: Uveal melanoma survival in Sweden from 1960 to 1998. INVEST OPHTHALMOL VISUAL SCI 44:3282-3287 (2003).
Bishop JAN, Corrie PG, Gore ME, Hall PN, Kirkham N, Roberts DLL, Anstey AV, Barlow RJ, Cox NH: BDS Melanoma Guidelines - Reply. BRIT J DERMATOL 148:1082 (2003).
Boasberg PD, O'Day SJ, Kristedja TS, Martin M, Wang HJ, Deck R, Shinn K, Ames P, Tamar B, Petrovich Z: Biochemotherapy for metastatic melanoma with limited central nervous system involvement. ONCOLOGY BASEL 64:328-335 (2003).
Bogdan I, Smolle J, Kerl H, Burg G, Bni R: Melanoma ex naevo: a study of the associated naevus. Melanoma Res 13:213 2003.
Boisgard R, Vincent-Naulleau S, Leplat JJ, Bouet S, LeChalony C, Tricaud Y, Horak V, Geffrotin C, Frelat G, Tavitian B: A new animal model for the imaging of melanoma: correlation of FDG PET with clinical outcome, macroscopic aspect and histological classification in Melanoblastoma-bearing Libechov Minipigs. Eur J Nuclmed Mol Imaging 30:826-834 (2003).
Boldt C, Lehmann R, Osmers R, B•rrig KF: Primary malignant melanoma of the uterine cervix. Report of two cases and review of the literature. PATHOLOGE 24:226-235 (2003).
Bono A, Baldi M, Mauricho A, Tomatis S: Distribution of melanoma on breast surface suggests its etiology. INT J CANCER 105:434 (2003).
Bosserhoff AK, Buettner R: Establishing the protein MIA (melanoma inhibitory activity) as a marker for chondrocyte differentiation. BIOMATERIALS 24:3229-3234 (2003).
Bottoni U, Izzo P, Richetta A, Mannooranparampil TJ, Devirgiliis V, DelGiudice M, Reale MG, Frati L, Calvieri S: S100 serum level: a tumour marker for metastatic melanoma. MELANOMA RES 13:427-429 (2003).
Boulaiz H, Prados J, Marchal JA, Garc¡a AM, Alvarez L, Melguizo C, Carrillo E, Ramos JL, Ar nega A: Transfection of MS-36 melanoma cells with gef gene inhibits proliferation and induces modulation of the cell cycle. Cancer Sci 94:564, 2003.
Brkic G, Gopas J, Tanic N, Dedovic-Tanic N, Benharroch D, Finkelstein-Jaworowsky E, Kedar I, Dimitrijevic B: Genomic instability in drug-resistant human melanoma cell lines detected by Alu-I-arbitrary-primed PCR. ANTICANCER RES 23:2601-2608 (2003).
Brurberg KG, Graff BA, Rofstad EK: Temporal heterogeneity in oxygen tension in human melanoma xenografts. BRIT J CANCER 89:350-356 (2003).

Bussani R, Cova M, Pozzi-Mucelli R, Camilot D, Silvestri F: Extensive metastatic leptomeningeal melanomatosis as the first clinical sign of a cutaneous melanoma: Morphological correlations between magnetic resonance imaging and autopsy findings. A case report. HUM PATHOL 34:625-628 (2003).

Calista D: Regression of a cutaneous melanoma metastasis after intralesional cidofovir. Melanoma Res 13:205-206 (2003).

Carli P, DeGiorgi V, Betti R, Vergani R, Catricala C, Mariani G, Simonacci M, Bettacchi A, Bottoni U, LoScocco G, Mulas P, Giannotti B: Relationship between cause of referral and diagnostic outcome in pigmented lesion clinics: a multicentre survey of the Italian Multidisciplinary Group on Melanoma (GIPMe). MELANOMA RES 13:207-211 (2003).

Carli P, DeGiorgi V, Palli D, Maurichi A, Mulas P, Orlandi C, Imberti GL, Stanganelli I, Soma P, Dioguardi D, Catricala C, Betti R, Cecchi R, Bottoni U, Bonci A, Scalvenzi M, Giannotti B: Dermatologist detection and skin self-examination are associated with thinner melanomas - Results from a survey of the Italian Multidisciplinary Group on melanoma. ARCH DERMATOL 139:607-612 (2003).

Carli P, Mannone F, DeGiorgi V, Nardini P, Chiarugi A, Giannotti B: The problem of false-positive diagnosis in melanoma screening: the impact of dermoscopy. MELANOMA RES 13:179-182 (2003).

Carr KM, Bittner M, Trent JM: Gene-expression profiling in human cutaneous melanoma. ONCOGENE 22:3076-3080 (2003).

Castiglia D, Pagani E, Alvino E, Vernole P, Marra G, Cannav• E, Jiricny J, Zambruno G, D'Atri S: Biallelic somatic inactivation of the mismatch repair gene MLH1 in a primary skin melanoma. GENE CHROMOSOME CANCER 37:165-175 (2003).

Chakraborty AK, Pawelek JM: GnT-V, macrophage and cancer metastasis: A common link. CLIN EXP METASTAS 20:365-373 (2003).

Chamberlain AJ, Fritschi L, Kelly JW: Nodular melanoma: Patients' perceptions of presenting features and implications for earlier detection. J AMER ACAD DERMATOL 48:694-701 (2003).

Chapman MS, Spencer SK, Brennick JB: Histologic resolution of melanoma in situ (lentigo maligna) with 5% imiquimod cream. ARCH DERMATOL 139:943-944 (2003).

Chen Y, Alm K, Vujcic S, Kramer DL, Kee K, Diegelman P, Porter CW: The role of mitogen-activated protein kinase activation in determining cellular outcomes in polyamine analogue-treated human melanoma cells. Cancer Res 63:3619-3625 (2003).

Chen Z, Zhang K, Zhang X, Yuan XH, Yuan ZY, Jin L, Xiong M: Comparison of gene expression between metastatic derivatives and their poorly metastatic parental cells implicates crucial tumor-environment interaction in metastasis of head and neck squamous cell carcinoma. CLIN EXP METASTAS 20:335-342 (2003).

Cheng HC, Abdel-Ghany M, Pauli BU: A novel consensus motif in fibronectin mediates dipeptidyl peptidase IV adhesion and metastasis. J BIOL CHEM 278:24600-24607 (2003).

Chorny JA, Barr RJ, Kyshtoobayeva A, Jakowatz J, Reed RJ: Ki-67 and p53 expression in minimal deviation melanomas as compared with other nevomelanocytic lesions. MODERN PATHOL 16:525-529 (2003).

Chowers I, Amer R, Pe'er J: The correlation among different immunostaining evaluation methods for the assessment of proliferative activity in uveal melanoma. CURR EYE RES 25:369-372 (2002).

Christensen D: Data still cloudy on association between sunscreen use and melanoma risk. J Nat Cancer Inst 95:932, 2003.

Chung MH, Gupta RK, Hsueh E, Essner R, Ye W, Yee R, Morton DL: Humoral immune response to a therapeutic polyvalent cancer vaccine after complete resection of thick primary melanoma and sentinel lymphadenectomy. J Clin Oncol 21:313, 2003.

Cohen Y, Goldenberg-Cohen N, Parrella P, Chowers I, Merbs SL, Pe'er J, Sidransky D: Lack of BRAF mutation in primary uveal melanoma. INVEST OPHTHALMOL VISUAL SCI 44:2876-2878 (2003).

Cook MG, Green MA, Anderson B, Eggermont AMM, Ruiter DJ, Spatz A, Kissin MW, Powell BWEM: The development of optimal pathological assessment of sentinel lymph nodes for melanoma. J PATHOL 200:314-319 (2003).

Crocetti E, Carli P: Unexpected reduction of mortality rates from melanoma in males living in central Italy. EUR J CANCER 39:818-821 (2003).

Cruz J, Reis-Filho JS, Silva P, Lopes JM: Expression of c-met tyrosine kinase receptor is biologically and prognostically relevant for primary cutaneous malignant melanomas. ONCOLOGY BASEL 65:72-82 (2003).

Dadras SS, Paul T, Bertoncini J, Brown LF, Muzikansky A, Jackson DG, Ellwanger U, Garbe C, Mihm MC, Detmar M: Tumor lymphangiogenesis - A novel prognostic indicator for cutaneous melanoma metastasis and survival. AMER J PATHOL 162:1951-1960 (2003).

Danson S, Lorigan P, Arance A, Clamp A, Ranson M, Hodgetts J, Lomax L, Ashcroft L, Thatcher N, Middleton MR: Randomized phase II study of temozolomide given every 8 hours or daily with either interferon alfa-2b or thalidomide in metastatic malignant melanoma. J CLIN ONCOL 21:2551-2557 (2003).

Darvas Z, Sakurai E, Schwelberger HG, Hegyesi H, Rivera E, Othsu H, Watanabe T, P llinger E, Falus A: Autonomous histamine metabolism in human melanoma cells. MELANOMA RES 13:239-246 (2003).

Davids V, Kidson SH, Hanekom GS: Melanoma patient staging histopathological versus molecular evaluation of the sentinel node. MELANOMA RES 13:313-324 (2003).

Debniak T, G¢rski B, Cybulski C, Jakubowska A, Kurzawski G, Lener M, Mierzejewski M, Masojc B, Medrek K, Kladny J, Zaluga E, Maleszka R, Chosia M, Lubinski J: Germline 657del5 mutation in the NBS1 gene in patients with malignant melanoma of the skin. MELANOMA RES 13:365-370 (2003).

Demierre MF, Nathanson L: Chemoprevention of melanoma: An unexplored strategy. J CLIN ONCOL 21:158-165 (2003).
Dennh"fer R, Kurschat P, Zigrino P, Klose A, Bosserhoff A, VanMuijen G, Krieg T, Mauch C, Hunzelmann N: Invasion of melanoma cells into dermal connective tissue in vitro: Evidence for an important role of cysteine proteases. INT J CANCER 106:316-323 (2003).
Devi PU, Kamath R: Radiosensitizing effect of withaferin A combined with hyperthermia on mouse fibrosarcoma and melanoma. J RADIAT RES 44:1-6 (2003).
deVries E, Schouten LJ, Visser O, Eggermont AMM, Coebergh JWW: Rising trends in the incidence of and mortality from cutaneous melanoma in the Netherlands: a Northwest to Southeast gradient? EUR J CANCER 39:1439-1446 (2003).
deWilt JHW, McCarthy WH, Thompson JF: Surgical treatment of splenic metastases in patients with melanoma. J AMER COLL SURGEONS 197:38-43 (2003).
Dionne SO, Smith MH, Marincola FM, Lake DF: Functional characterization of CTL against gp100 altered peptide ligands. CANCER IMMUNOL IMMUNOTHER 52:199-206 (2003).
Dissemond J, Kothen T, M"rs J, Weimann TK, Lindeke A, Goos M, Wagner SN: Downregulation of tapasin expression in progressive human malignant melanoma. ARCH DERMATOL RES 295:43-49 (2003).
Dissemond J, Goette P, Moers J, Lindeke A, Goos M, Ferrone S, Wagner SN: Immunoproteasome subunits LMP2 and LMP7 downregulation in primary malignant melanoma lesions: association with lack of spontaneous regression. MELANOMA RES 13:371-377 (2003).
Dissemond J, G"tte P, M"rs J, Lindeke A, Goos M, Ferrone S, Wagner SN: Association of TAP1 downregulation in human primary melanoma lesions with lack of spontaneous regression. MELANOMA RES 13:253-258 (2003).
Dong JL, Phelps RG, Qiao R, Yao S, Benard O, Ronai Z, Aaronson SA: BRAF oncogenic mutations correlate with progression rather than initiation of human melanoma. CANCER RES 63:3883-3885 (2003).
Dranoff G: GM-CSF-secreting melanoma vaccines. ONCOGENE 22:3188-3192 (2003).
Dudley ME, Wunderlich JR, Shelton TE, Even J, Rosenberg SA: Generation of tumor-infiltrating lymphocyte cultures for use in adoptive transfer therapy for melanoma patients. J IMMUNOTHER 26:332-342 (2003).
Edmunds SC, Cree IA, D¡N¡colanton¡o F, Hungerford JL, Hurren JS, Kelsell DP: Absence of BRAF gene mutations in uveal melanomas in contrast to cutaneous melanomas. BRIT J CANCER 88:1403-1405 (2003).
Eedy DJ: Surgical treatment of melanoma. BRIT J DERMATOL 149:2-12 (2003).
Emmert S, Zutt M, Haenssle H, Neumann C, Kretschmer L: Inefficacy of vindesine monotherapy in advanced stage IV malignant melanoma patients previously treated with other chemotherapeutic agents. Melanoma Res 13:299-302 (2003).
Errico ME, Staibano S, Tranfa F, Bonavolonta G, LoMuzio L, Somma P, Lucariello A, Mansueto G, D'Aponte A, Ferrara G, DeRosa G: Expression of cyclin-D1 in uveal malignant melanoma. ANTICANCER RES 23:2701-2706 (2003).
Eskandarpour M, Hashemi J, Kanter L, Ringborg U, Platz A, Hansson J: Frequency of UV-inducible NRAS mutations in melanomas of patients with germline CDKN2A mutations. J NAT CANCER INST 95:790-798 (2003).
Evans AV, Child FJ, Russell-Jones R: Lesson of the week - Zosteriform metastasis from melanoma. BRIT MED J 326:1025-1026 (2003).
Evans GRD: Investigation of the growth and metastasis of malignant melanoma in a murine model: The role of supplemental vitamin A. PLAST RECONSTR SURG 112:159-161 (2003).
Farkas B, Hantschel M, Magyarlaki M, Becker B, Scherer K, Landthaler M, Pfister K, Gehrmann M, Gross C, Mackensen A, Multhoff G: Heat shock protein 70 membrane expression and melanoma-associated marker phenotype in primary and metastatic melanoma. MELANOMA RES 13:147-152 (2003).
Feskanich D, Willett WC, Hunter DJ, Colditz GA: Dietary intakes of vitamins A, C, and E and risk of melanoma in two cohorts of women. BRIT J CANCER 88:1381-1387 (2003).
Fidler IJ: Timeline - The pathogenesis of cancer metastasis: the 'seed and soil' hypothesis revisited. NAT REV CANCER 3:453-458 (2003).
Fisher GH, Lang PG: Treatment of melanoma in situ on sun-damaged skin with topical 5% imiquimod cream complicated by the development of invasive disease. ARCH DERMATOL 139:945-947 (2003).
Fonsatti E, Sigalotti L, Coral S, Colizzi F, Altomonte M, Maio M: Methylation-regulated expression of HLA class I antigens in melanoma. INT J CANCER 105:430-431 (2003).
Franklin MC, Kadkhodayan S, Ackerly H, Alexandru D, Distefano MD, Elliott LO, Flygare JA, Mausisa G, Okawa DC, Ong D, Vucic D, Deshayes K, Fairbrother WJ: Structure and function analysis of peptide antagonists of melanoma inhibitor of apoptosis (ML-IAP). BIOCHEMISTRY USA 42:8223-8231 (2003).
Furukawa K, Horie M, Okutomi K, Sugano S, Furukawa K: Isolation and functional analysis of the melanoma specific promoter region of human GD3 synthase gene. BBA GENE STRUCT EXPRESS 1627:71-78 (2003).
Garc¡a-Lora A, Algarra I, Collado A, Garrido F: Tumour immunology, vaccination and escape strategies. EUR J IMMUNOGENET 30:177-183 (2003).
Garcia-Lora A, Algarra I, Garrido F: MHC class I antigens, immune surveillance, and tumor immune escape. J CELL PHYSIOL 195:346-355 (2003).

Gerbaud L, Lejeune ML, Abou-Samra T, Doz M, Mathey MF, D'Incan M, D,chelotte P, Souteyrand P, Glanddier PY: Epidemiological survey of melanoma in the Auvergne region (France): Is there an increased incidence in Auvergne? EUR J EPIDEMIOL 18:331-335 (2003).

Ghosh R, Ott AM, Seetharam D, Slaga TJ, Kumar AP: Cell cycle block and apoptosis induction in a human melanoma cell line following treatment with 2-methoxyoestradiol: therapeutic implications? MELANOMA RES 13:119-127 (2003).

Gillanders E, Juo SHH, Holland EA, Jones M, Nancarrow D, Freas-Lutz D, Sood R, Park N, Faruque M, Markey C, Kefford RF, Palmer J, Bergman W, Bishop DT, Tucker MA, Bressac-dePaillerets B, Hansson J, Stark M, Gruis N, Bishop JN, Goldstein AM, Bailey-Wilson JE, Mann GJ, Hayward N, Trent J: Localization of a novel melanoma susceptibility locus to 1p22. AMER J HUM GENET 73:301-313 (2003).

Gillgren P, Brattstr"m G, Frisell J, Palmgren J, Ringborg U, Hansson J: Body site of cutaneous malignant melanoma - a study on patients with hereditary and multiple sporadic tumours. MELANOMA RES 13:279-286 (2003).

Gollob JA, Veenstra KG, Parker RA, Mier JW, McDermott DF, Clancy D, Tutin L, Koon H, Atkins MB: Phase I trial of concurrent twice-weekly recombinant human interleukin-12 plus low-dose IL-2 in patients with melanoma or renal cell carcinoma. J CLIN ONCOL 21:2564-2573 (2003).

Gorden A, Osman I, Gai WM, He D, Huang WQ, Davidson A, Houghton AN, Busam K, Polsky D: Analysis of BRAF and N-RAS mutations in metastatic melanoma tissues. CANCER RES 63:3955-3957 (2003).

Gradilone A, Gazzaniga P, Ribuffo D, Scarpa S, Cigna E, Vasaturo F, Bottoni U, Innocenzi D, Calvieri S, Scuderi N, Frati L, Aglian• AM: Survivin, bcl-2, bax, and bcl-X gene expression in sentinel lymph nodes from melanoma patients. J CLIN ONCOL 21:306-312 (2003).

Guo J, Wen DR, Huang RR, Paul E, W•nsch P, Itakura E, Cochran AJ: Detection of multiple melanoma-associated markers in melanoma cell lines by RT in situ PCR. EXP MOL PATHOL 74:140-147 (2003).

H†kansson A, H†kansson L, Gustafsson B, Krysander L, Rettrup B, Ruiter D, Bernsen MR: On the effect of biochemotherapy in metastatic malignant melanoma: An immunopathological evaluation. MELANOMA RES 13:401-407 (2003).

H†kansson A, Gustafsson B, Abdiu A, Krysander L, H†kansson L: Bcl-2 expression in metastatic malignant melanoma. Importance for the therapeutic efficacy of biochemotherapy. CANCER IMMUNOL IMMUNOTHER 52:249-254 (2003).

Hadden PW, Damato BE: Simultaneous presentation of choroidal melanoma in mother and daughter. BRIT J OPHTHALMOL 87:793-794 (2003).

Haritopoulos KN, Lazaris AC, Kavantzas N, Tseleni-Balafouta S, Thomopoulou G, Aroni K: ICAM-1 and (3) integrin immunoexpression in malignant melanoma cells: can they be used as additional predictors? APMIS 111:421-429 (2003).

Hayward NK: Genetics of melanoma predisposition. ONCOGENE 22:3053-3062 (2003).

Heegaard S, Spang-Thomsen M, Prause JU: Establishment and characterization of human uveal malignant melanoma xenografts in nude mice. MELANOMA RES 13:247-251 (2003).

Hellstrand K: Melanoma immunotherapy: a battle against radicals? TRENDS IMMUNOL 24:232-233 (2003).

Hendrix MJC, Seftor EA, Hess AR, Seftor REB: Vasculogenic mimicry and tumour-cell plasticity: Lessons from melanoma. NAT REV CANCER 3:411-421 (2003).

Hendrix MJC, Seftor EA, Hess AR, Seftor REB: Molecular plasticity of human melanoma cells. Oncogene 22:3070, 2003.

Higuchi T, Fujiwara H, Egawa H, Sato Y, Yoshioka S, Tatsumi K, Itoh K, Maeda M, Fujita J, Fujii S: Cyclic AMP enhances the expression of an extravillous trophoblast marker, melanoma cell adhesion molecule, in choriocarcinoma cell JEG3 and human chorionic villous explant cultures. MOL HUM REPROD 9:359-366 (2003).

Hsueh EC, Gupta RK, Lefor A, Reyzin G, Ye W, Morton DL: Androgen blockade enhances response to melanoma vaccine. J SURG RES 110:393-398 (2003).

Hu YP, Haq B, Carraway KL, Savaraj N, Lampidis TJ: Multidrug resistance correlates with overexpression of Muc4 but inversely with P-glycoprotein and multidrug resistance related protein in transfected human melanoma cells. BIOCHEM PHARMACOL 65:1419-1425 (2003).

Ivanov VN, Bhoumik A, Ronai Z: Death receptors and melanoma resistance to apoptosis. ONCOGENE 22:3152-3161 (2003).

Jackson DP, Watling D, Rogers NC, Banks RE, Kerr IM, Selby PJ, Patel PM: The JAK/STAT pathway is not sufficient to sustain the antiproliferative response in an interferon-resistant human melanoma cell line. Melanoma Res 13:219, 2003.

Jhappan C, Noonan FP, Merlino G: Ultraviolet radiation and cutaneous malignant melanoma. Oncogene 22:3099, 2003.

Kamei T, Inui M, Nakamura S, Okumura K, Goto A, Tagawa T: Interferon- and anti-Fas antibody-induced apoptosis in human melanoma cell lines and its relationship to bcl-2 cleavage and bak expression. Melanoma Res 13:153-159 (2003).

Kanzler MH, Swetter SM: Malignant melanoma. J AMER ACAD DERMATOL 48:780-783 (2003).

Kichina JV, Rauth S, DasGupta TK, Gudkov AV: Melanoma cells can tolerate high levels of transcriptionally active endogenous p53 but are sensitive to retrovirus-transduced p53. ONCOGENE 22:4911-4917 (2003).

Kim H, Jung SE, Lee EH, Kang SW: Magnetic resonance imaging of vaginal malignant melanoma. J COMPUT ASSIST TOMOGR 27:357-360 (2003).

Kivel,, T, Grambsch PM: Evaluation of sampling strategies for modeling survival of uveal malignant melanoma. INVEST OPHTHALMOL VISUAL SCI 44:3288-3293 (2003).

Kivel,, T, Suciu S, Hansson J, Kruit WHJ, Vuoristo MS, Kloke O, Gore M, Hahka-Kemppinen M, Parvinen LM, Kumpulainen E, Humblet Y, Pyrh"nen S: Bleomycin, vincristine, lomustine and dacarbazine (BOLD) in combination with recombinant interferon alpha-2b for metastatic uveal melanoma. EUR J CANCER 39:1115-1120 (2003).

Klisovic DD, Katz SE, Effron D, Klisovic MI, Wickham J, Parthun MR, Guimond M, Marcucci G: Depsipeptide (FR901228) inhibits proliferation and induces apoptosis in primary and metastatic human uveal melanoma cell lines. INVEST OPHTHALMOL VISUAL SCI 44:2390-2398 (2003).

Koganehira Y, Takeoka M, Ehara T, Sasaki K, Murata H, Saida T, Taniguchi S: Reduced expression of actin-binding proteins, h-caldesmon and calponin h1, in the vascular smooth muscle inside melanoma lesions: an adverse prognostic factor for malignant melanoma. BRIT J DERMATOL 148:971-980 (2003).

Koh D, Wang H, Lee J, Chia KS, Lee HP, Goh CL: Basal cell carcinoma, squamous cell carcinoma and melanoma of the skin: analysis of the Singapore Cancer Registry data 1968-97. BRIT J DERMATOL 148:1161-1166 (2003).

Kozlowska K, Zarzeczna M, Cichorek M, W¢jcik S: Characterization of interleukin 10 and NO release by transplantable melanoma cell lines with regard to their progression. NEOPLASMA 50:85-90 (2003).

Kraemer KH: NRAS hypermutability in familial melanoma with CDKN2A mutations - Cause and effect? J NAT CANCER INST 95:768-769 (2003).

Krasilnikov M, Ivanov VN, Dong J, Ronai Z: ERK and PI3K negatively regulate STAT-transcriptional activities in human melanoma cells: implications towards sensitization to apoptosis. ONCOGENE 22:4092-4101 (2003).

Laing JHE, Wilson GD, Martindale CA: Proliferation rates in human malignant melanoma: relationship to clinicopathological features and outcome. MELANOMA RES 13:271-277 (2003).

Lambert WC: The significance of vascular invasion in primary melanomas of thin or intermediate thickness. ARCH DERMATOL 139:809 (2003).

Larrosa M, Tom s-Barber n FA, Esp¡n JC: Grape polyphenol resveratrol and the related molecule 4-hydroxystilbene induce growth inhibition, apoptosis, S-phase arrest, and upregulation of cyclins A, E, and B1 in human SK-Mel-28 melanoma cells. J AGR FOOD CHEM 51:4576-4584 (2003).

Laud K, Kannengiesser C, Avril MF, Chompret A, Stoppa-Lyonnet D, Desjardins L, Eychene A, Demenais F, Lenoir GM, Bressac-dePaillerets B: BRAF as a melanoma susceptibility candidate gene? CANCER RES 63:3061-3065 (2003).

Lawson KA, Anderson K, Menchaca M, Atkinson J, Sun LZ, Knight V, Gilbert BE, Conti C, Sanders BG, Kline K: Novel vitamin E analogue decreases syngeneic mouse mammary tumor burden and reduces lung metastasis. MOL CANCER THER 2:437-444 (2003).

Lean CL, Bourne R, Thompson JF, Scolyer RA, Stretch J, Li LXL, Russell P, Mountford C: Rapid detection of metastatic melanoma in lymph nodes using proton magnetic resonance spectroscopy of fine needle aspiration biopsy specimens. MELANOMA RES 13:259-261 (2003).

Leenders W, K•sters B, Pikkemaat J, Wesseling P, Ruiter D, Heerschap A, Barentsz J, deWaal RMW: Vascular endothelial growth factor-A determines detectability of experimental melanoma brain metastasis in Gd-DTPA-enhanced MRI. INT J CANCER 105:437-443 (2003).

Lesimple T, Moisan A, Carsin A, Ollivier I, Mousseau M, Meunier B, Leberre C, Collet B, Quillien V, Drenou B, Lefeuvre-Plesse C, Chevrant-Breton J, Toujas L: Injection by various routes of melanoma antigen-associated macrophages: biodistribution and clinical effects. CANCER IMMUNOL IMMUNOTHER 52:438-444 (2003).

Leung E, Kanwar RK, Kanwar JR, Krissansen GW: Mucosal vascular addressin cell adhesion molecule-1 is expressed outside the endothelial lineage on fibroblasts and melanoma cells. IMMUN CELL BIOL 81:320-327 (2003).

Liedert B, Materna V, Schadendorf D, Thomale J, Lage H: Overexpression of cMOAT (MRP2/ABCC2) is associated with decreased formation of platinum-DNA adducts and decreased G(2)-arrest in melanoma cells resistant to cisplatin. J INVEST DERMATOL 121:172-176 (2003).

Lim DS, Kwak YS, Kim JH, Ko SH, Yoon WH, Kim CH: Antitumor efficacy of reticulol from Streptoverticillium against the lung metastasis model B16F10 melanoma - Lung metastasis inhibition by growth inhibition of melanoma. CHEMOTHERAPY 49:146-153 (2003).

Lowe JB, Hurst E, Moley JF, Cornelius LA: Sentinel lymph node biopsy in patients with thin melanoma. ARCH DERMATOL 139:617-621 (2003).

Lucas CR, Sanders LL, Murray JC, Myers SA, Hall RP, Grichnik JM: Early melanoma detection: Nonuniform dermoscopic features and growth. J AMER ACAD DERMATOL 48:663-671 (2003).

Maellaro E, Pacenti L, DelBello B, Valentini MA, Mangiavacchi P, DeFelice C, Rubegni P, Luzi P, Miracco C: Different effects of interferon- on melanoma cell lines: a study on telomerase reverse transcriptase, telomerase activity and apoptosis. BRIT J DERMATOL 148:1115-1124 (2003).

Makovitzky J, Schmitz C, Vogt-Weber B, Nizze H: Primary malignant melanoma of the cervix uteri: A case report of a rare tumor. ANTICANCER RES 23:1063-1067 (2003).

Mansour AM, Drevs J, Esser N, Hamada FM, Badary OA, Unger C, Fichtner I, Kratz F: A new approach for the treatment of malignant melanoma: Enhanced antitumor efficacy of an albumin-binding doxorubicin prodrug that is cleaved by matrix metalloproteinase 2. CANCER RES 63:4062-4066 (2003).

Margalit O, Eisenbach L, Amariglio N, Kaminski N, Harmelin A, Pfeffer R, Shohat M, Rechavi G, Berger R: Overexpression of a set of genes, including WISP-1, common to pulmonary metastases of both mouse D122 Lewis lung carcinoma and B16-F10.9 melanoma cell lines. BRIT J CANCER 89:314-319 (2003).

Margenthaler JA, Meier JD, Virgo KS, Johnson DY, Goshima K, Chan D, Handler BS, Johnson FE: Geographic variation in posttreatment surveillance intensity for patients with cutaneous melanoma. AMER J SURG 186:194-200 (2003).

Maza S, Valencia R, Geworski L, Sandrock D, Zander A, Audring H, Dr,,ger E, Winter H, Sterry W, Munz DL: Influence of fast lymphatic drainage on metastatic spread in cutaneous malignant melanoma: a prospective feasibility study. EUR J NUCL MED MOL IMAGING 30:538-544 (2003).

McCarthy DO, Meisner LF, Bourdeau-Heller J, Roberts TR, Wu SQ, Warner TF, Albertini MR: Localization of transfected B7-1 (CD80) DNA in human melanoma cells after particle-mediated gene transfer. Cancer Genet Cytogenet 144:106, 2003.

McCarty MF, Bielenberg DR, Nilsson MB, Gershenwald JE, Barnhill RL, Ahearne P, Bucana CD, Fidler IJ: Epidermal hyperplasia overlying human melanoma correlates with tumour depth and angiogenesis. MELANOMA RES 13:379-387 (2003).

Medrano EE: Repression of TGF- signaling by the oncogenic protein SKI in human melanomas: consequences for proliferation, survival, and metastasis. ONCOGENE 22:3123-3129 (2003).

Melia M, Moy CS, Reynolds SM, Cella D, Murray TG, Hovland KR, Hayman JA, Mangione CM: Development and validation of disease-specific measures for choroidal melanoma - COMS-QOLS report no. 2. Arch Ophthalmol 121:1010-1020 (2003).

Mercer KE, Pritchard CA: Raf proteins and cancer: B-Raf is identified as a mutational target. BBA Rev Cancer 1653:25, 2003.

Merighi S, Baraldi PG, Gessi S, Iannotta V, Klotz KN, Leung E, Mirandola P, Tabrizi MA, Varani K, Borea PA: Adenosine receptors and human melanoma. DRUG DEVELOP RES 58:377-385 (2003).

Meyer P, Klaes R, Schmitt C, Boettger MB, Garbe C: Exclusion of BRAF(V599E) as a melanoma susceptibility mutation. INT J CANCER 106:78-80 (2003).

Middleton M, Harris AL, Kurwa H, Millard P, Hollowood K, Cassell O: BDS Melanoma Guidelines. BRIT J DERMATOL 148:1081-1082 (2003).

Miller CG, Fraser NW: Requirement of an integrated immune response for successful neuroattenuated HSV-1 therapy in an intracranial metastatic melanoma model. MOL THER 7:741-747 (2003).

Miracco C, Maellaro E, Pacenti L, DelBello B, Valentini MA, Rubegni P, Pirtoli L, Volpi C, Santopietro R, Tosi P: Evaluation of MDRl, LRP, MRP, and topoisomerase II gene mRNA transcripts before and after interferon-a, and correlation with the mRNA expression level of the telomerase subunits hTERT and TEP1 in five unselected human melanoma cell lines. INT J ONCOL 23:213-220 (2003).

Missotten GS, Journ,e-deKorver JG, deWolff-Rouendaal D, Keunen JE, Schlingemann RO, Jager MJ: Heat shock protein expression in the eye and in uveal melanoma. INVEST OPHTHALMOL VISUAL SCI 44:3059-3065 (2003).

Mortarini R, Piris A, Maurichi A, Molla A, Bersani I, Bono A, Bartoli C, Santinami M, Lombardo C, Ravagnani F, Cascinelli N, Parmiani G, Anichini A: Lack of terminally differentiated tumor-specific CD8(+) T cells at tumor site in spite of antitumor immunity to self-antigens in human metastatic melanoma. CANCER RES 63:2535-2545 (2003).

Moseley GW, Elliott J, Wright MD, Partridge LJ, Monk PN: Interspecies contamination of the KM3 cell line: Implications for CD63 function in melanoma metastasis. INT J CANCER 105:613-616 (2003).

Nathanson SD: Insights into the mechanisms of lymph node metastasis. CANCER 98:413-423 (2003).

Negin BP, Riedel E, Oliveria SA, Berwick M, Coit DG, Brady MS: Symptoms and signs of primary melanoma - Important indicators of Breslow depth. CANCER 98:344-348 (2003).

Nettelbeck DM, Rivera AA, Davydova J, Dieckmann D, Yamamoto M, Curiel DT: Cyclooxygenase-2 promoter for tumour-specific targeting of adenoviral vectors to melanoma. MELANOMA RES 13:287-292 (2003).

Neudauer CL, McCarthy JB: Insulin-like growth factor I-stimulated melanoma cell migration requires phosphoinositide 3-kinase but not extracellular-regulated kinase activation. EXP CELL RES 286:128-137 (2003).

Nicholson S, Guile K, John J, Clarke IA, Diffley J, Donnellan P, Michael A, Szlosarek P, Dalgleish AG: A randomized phase II trial of SRL172 (Mycobacterium vaccae) ñ low-dose interleukin-2 in the treatment of metastatic malignant melanoma. MELANOMA RES 13:389-393 (2003).

Noorda EM, Vrouenraets BC, Nieweg OE, Klasse JM, vanderZee J, Kroon BBR: Long-term results of a double perfusion schedule using high dose hyperthermia and melphalan sequentially in extensive melanoma of the lower limb. MELANOMA RES 13:395-399 (2003).

Nordlund JR, Robertson DM, Herman DC: Ultrasound biomicroscopy in management of malignant iris melanoma. ARCH OPHTHALMOL 121:725-727 (2003).

Novellino L, Renkvist N, Rini F, Mazzocchi A, Rivoltini L, Greco A, Deho P, Squarcina P, Robbins PF, Parmiani G, Castelli C: Identification of a mutated receptor-like protein tyrosine phosphatase as a novel, class IIHLA-restricted melanoma antigen. J IMMUNOL 170:6363-6370 (2003).

Nystrom ML, Steele JPC, Shamash J, Neville F, Oliver RTD: Low-dose continuous chemotherapy for metastatic melanoma: a phase II trial. MELANOMA RES 13:197-199 (2003).
O'Day SJ, Agarwala SS, Naredi P, Kass CL, Gehlsen KR, Glaspy J: Treatment with histamine dihydrochloride and interleukin-2 in patients with advanced metastatic malignant melanoma: a detailed safety analysis. Melanoma Res 13:307-311 (2003).
O'Rourke MGE, Johnson M, Lanagan C, See J, Yang J, Bell JR, Slater GJ, Kerr BM, Crowe B, Purdie DM, Elliott SL, Ellem KAO, Schmidt CW: Durable complete clinical responses in a phase I/II trial using an autologous melanoma cell/dendritic cell vaccine. CANCER IMMUNOL IMMUNOTHER 52:387-395 (2003).
Ogawa R, Aoki R, Hyakusoku H: A rare case of intracranial metastatic amelanotic melanoma with cyst. J CLIN PATHOL 56:548-551 (2003).
Ohara M, Fujikura T, Fujiwara H: Augmentation of the inhibitory effect of blue light on the growth of B16 melanoma cells by riboflavin. INT J ONCOL 22:1291-1295 (2003).
Oka M, Kageshita T, Ono T, Goto A, Kuroki T, Ichihashi M: Protein kinase C associates with phospholipase D-1 and enhances basal phospholipase D activity in a protein phosphorylation-independent manner in human melanoma cells. J INVEST DERMATOL 121:69-76 (2003).
Palmieri G, Ascierto PA, Perrone F: Prognostic value of circulating melanoma cells detected by reverse transcriptase-polymerase chain reaction (vol 21, pg 767, 2003). J CLIN ONCOL 21:2048 (2003).
Pataer A, Chada S, Hunt KK, Roth JA, Swisher SG: Adenoviral melanoma differentiation-associated gene 7 induces apoptosis in lung cancer cells through mitochondrial permeability transition-independent cytochrome c release. J THORAC CARDIOVASC SURG 125:1328-1335 (2003).
Pavel S, Smit NPM, vanderMeulen H, Kolb RM, deGroot AJL, vanderVelden PA, Gruis NA, Bergman W: Homozygous germline mutation of CDKN2A/p16 and glucose-6-phosphate dehydrogenase deficiency in a multiple melanoma case. MELANOMA RES 13:171-178 (2003).
Peterson AC, Harl¡n H, Gajewski TF: Immunization with Melan-A peptide-pulsed peripheral blood mononuclear cells plus recombinant human interleukin-12 induces clinical activity and T-cell responses in advanced melanoma. J CLIN ONCOL 21:2342-2348 (2003).
Pf"hler C, Haus A, Palmowski A, Ugurel S, Ruprecht KW, Thirkill CE, Tilgen W, Reinhold U: Melanoma-associated retinopathy: high frequency of subclinical findings in patients with melanoma. BRIT J DERMATOL 149:74-78 (2003).
Pf"hler C, Cree IA, Ugurel S, Kuwert C, Haass N, Neuber K, Hengge U, Corrie PG, Zutt M, Tilgen W, Reinhold U: Treosulfan and gemcitabine in metastatic uveal melanoma patients: results of a multicenter feasibility study. ANTI CANCER DRUG 14:337-340 (2003).
Phan GQ, Touloukian CE, Yang JC, Restifo NP, Sherry RM, Hwu P, Topalian SL, Schwartzentruber DJ, Seipp CA, Freezer LJ, Morton KE, Mavroukakis SA, White DE, Rosenberg SA: Immunization of patients with metastatic melanoma using both class I- and class II-restricted peptides from melanoma-associated antigens. J IMMUNOTHER 26:349-356 (2003).
Phan GQ, Yang JC, Sherry RM, Hwu P, Topalian SL, Schwartzentruber DJ, Restifo NP, Haworth LR, Seipp CA, Freezer LJ, Morton KE, Mavroukakis SA, Duray PH, Steinberg SM, Allison JP, Davis TA, Rosenberg SA: Cancer regression and autoimmunity induced by cytotoxic T lymphocyte-associated antigen 4 blockade in patients with metastatic melanoma. PROC NAT ACAD SCI USA 100:8372-8377 (2003).
Polsky D, Cordon-Cardo C: Oncogenes in melanoma. ONCOGENE 22:3087-3091 (2003).
Pu LLQ, Wells KE, Cruse CW, Shons AR, Reintgen DS: Prevalence of additional positive lymph nodes in complete lymphadenectomy specimens after positive sentinel lymphadenectomy findings for early-stage melanoma of the head and neck. PLAST RECONSTR SURG 112:43-49 (2003).
Qin J, Berwick M, Ashbolt R, Dwyer T: Quantifying the change of melanoma incidence by Breslow thickness. BIOMETRICS 58:665-670 (2002).
Quan WDY, Quan FM: Outpatient experience with moderate dose bolus interleukin-2 in metastatic malignant melanoma and kidney cancer. J IMMUNOTHER 26:286-290 (2003).
R•nger TM, Kotas M, Poot M, Leverkus M, Epe B, Jeggo PA, Hellfritsch D: Reduced joining of DNA ends correlates with chromosomal instability in three melanoma cell lines. TUMOR BIOL 24:100-108 (2003).
R•ttinger D, Li R, Urba WJ, Fox BA, Hu HM: Evaluation of a preclinical model of bone metastasis for the study of adoptive immunotherapy. EUR SURG RES 35:346-351 (2003).
Ramirez-Montagut T, Turk MJ, Wolchok JD, Guevara-Patino JA, Houghton AN: Immunity to melanoma: unraveling the relation of tumor immunity and autoimmunity. ONCOGENE 22:3180-3187 (2003).
Ramjeesingh R, Leung R, Siu CH: Interleukin-8 secreted by endothelial cells induces chemotaxis of melanoma cells through the chemokine receptor CXCR1. FASEB J 17:NIL (2003).
Ravindranath MH, Hsueh EC, Verma M, Ye W, Morton DL: Serum total ganglioside level correlates with clinical course in melanoma patients after immunotherapy with therapeutic cancer vaccine. J IMMUNOTHER 26:277-285 (2003).
Rawlings NG, Simko E, Bebchuk T, Caldwell SJ, Singh B: Localization of integrin v3 and vascular endothelial growth factor receptor-2 (KDR/Flk-1) in cutaneous and oral melanomas of dog. HISTOL HISTOPATHOL 18:819-826 (2003).

Rib, A, McNutt NS: S100A6 protein expression is different in Spitz nevi and melanomas. Modern Pathol 16:505-511 (2003).
Rich JN, Shi Q, Hjelmeland M, Cummings TJ, Kuan CT, Bigner DD, Counter CM, Wang XF: Bone-related genes expressed in advanced malignancies induce invasion and metastasis in a genetically defined human cancer model. J BIOL CHEM 278:15951-15957 (2003).
Rieber M, Rieber MS: N-acetylcysteine enhances UV-mediated caspase-3 activation, fragmentation of E2F-4, and apoptosis in human C8161 melanoma: inhibition by ectopic Bcl-2 expression. BIOCHEM PHARMACOL 65:1593-1601 (2003).
Robertson DA: Changing concepts in the management of choroidal melanoma. Amer J Ophthalmol 136:161-170 (2003).
Rodrigues EG, Travassos LR: Endogenous accumulation of IFN- in IFN—R-/- mice increases resistance to B16F10-Nex2 murine melanoma: a model for direct IFN- anti-tumor cytotoxicity in vitro and in vivo. Cytokines Cell Mol Ther 7:107, 2003.
Rofstad EK, Henriksen K, Galappathi K, Mathiesen B: Antiangiogenic treatment with thrombospondin-1 enhances primary tumor radiation response and prevents growth of dormant pulmonary micrometastases after curative radiation therapy in human melanoma xenografts. CANCER RES 63:4055-4061 (2003).
Rosenberg SA, Yang JC, Sherry RM, Hwu P, Topalian SL, Schwartzentruber DJ, Restifo NP, Haworth LR, Seipp CA, Freezer LJ, Morton KE, Mavroukakis SA, White DE: Inability to immunize patients with metastatic melanoma using plasmid DNA encoding the gp100 melanoma-melanocyte antigen. HUM GENE THER 14:709-714 (2003).
Rossi CR, Lejeune FJ, Pontes L, Foletto M, DeSalvo GL, Pilati PL, Mocellin S, Ribeiro M, Lopes M, Lise M: Phase I-II study on isolation antiblastic fotemustine perfusion after dacarbazine chemosensitization for advanced melanoma of the extremities. MELANOMA RES 13:293-297 (2003).
Ruiz-Cabello F, Traversari C, Garrido F: Multiple mechanisms are responsible for the alteration in the expression of HLA class I antigens in melanoma. INT J CANCER 105:432-433 (2003).
Ryuke Y, Mizuno M, Natsume A, Suzuki O, Nobayashi M, Kageshita T, Matsumoto K, Saida T, Yoshida J: Growth inhibition of subcutaneous mouse melanoma and induction of natural killer cells by liposome-mediated interferon- gene therapy. MELANOMA RES 13:349-356 (2003).
Sabel MS, Sondak VK: Is there a role for adjuvant high-dose interferon—2b in the management of melanoma? DRUGS 63:1053-1058 (2003).
Sacu S, S¸gur-Eltz N, Horvat R, Lukas JR, Zehetmayer M: Intumescent cataract after topical mitomycin-C for conjunctival malignant melanoma. AMER J OPHTHALMOL 136:375-377 (2003).
Salti GI, DasGupta TK: Predicting residual lymph node basin disease in melanoma patients with sentinel lymph node metastases. AMER J SURG 186:98-101 (2003).
Sander CS, Hamm F, Elsner P, Thiele JJ: Oxidative stress in malignant melanoma and non-melanoma skin cancer. BRIT J DERMATOL 148:913-922 (2003).
Sarkar D, Leszczyniecka M, Kang DC, Lebedeva IV, Valerie K, Dhar S, Pandita TK, Fisher PB: Down-regulation of myc as a potential target for growth arrest induced by human polynucleotide phosphorylase (hPNPase(old-35)) in human melanoma cells. J BIOL CHEM 278:24542-24551 (2003).
Schiffner R, Wilde O, Schiffner-Rohe J, Stolz W: Difference between real and perceived power of dermoscopical methods for detection of malignant melanoma. EUROPEAN J DERMATOLOGY 13:288-293 (2003).
Schmid-Wendtner MH, Paerschke G, Baumert J, Plewig G, Volkenandt M: Value of ultrasonography compared with physical examination for the detection of locoregional metastases in patients with cutaneous melanoma. MELANOMA RES 13:183-188 (2003).
Scott RJ, Vajdic CM, Armstrong BK, Ainsworth CJ, Meldrum CJ, Aitken JF, Kricker A: BRCA2 mutations in a population-based series of patients with ocular melanoma. (vol 102, pg 188, 2003). INT J CANCER 105:882 (2003).
Segal NH, Pavlidis P, Noble WS, Antonescu CR, Viale A, Wesley UV, Busam K, Gallardo H, DeSantis D, Brennan MF, Cordon-Cardo C, Wolchok JD, Houghton AN: Classification of clear-cell sarcoma as a subtype of melanoma by genomic profiling. J CLIN ONCOL 21:1775-1781 (2003).
Sharpless NE, Chin L: The INK4a/ARF locus and melanoma. ONCOGENE 22:3092-3098 (2003).
Sherbet GV, Patil D: Genetic abnormalities of cell proliferation, invasion and metastasis, with special reference to gynaecological cancers. ANTICANCER RES 23:1357-1371 (2003).
Shonukan T, Bagayogo I, McCrea PD, Chao M, Hempstead B: Neurotrophin-induced melanoma cell migration is mediated through the actin-bundling protein fascin. ONCOGENE 22:3616-3623 (2003).
Shrayer DP, Lukoff H, King T, Calabresi P: The effect of Taurolidine on adherent and floating subpopulations of melanoma cells. ANTI CANCER DRUG 14:295-303 (2003).
Shukla V, Gude RP: Potentiation of lipid peroxidation in B16F10 and B16F1 melanoma cells by caffeine, a methylxanthine derivative: Relationship to intracellular glutathione. CHEMOTHERAPY 49:71-75 (2003).
Singh AD, Topham A: Survival rates with uveal melanoma in the United States: 1973-1997. Ophthalmology 110:962, (2003).
Singh AD, Topham A: Incidence of uveal melanoma in the United States: 1973-1997. Ophthalmology 110:956-961 (2003).
Slater M, Scolyer RA, Gidley-Baird A, Thompson JF, Barden JA: Increased expression of apoptotic markers in melanoma. MELANOMA RES 13:137-145 (2003).

Smetsers TFCM, VandeWesterlo EMA, tenDam GB, Clarijs R, Versteeg EMM, vanGeloof WL, Veerkamp JH, vanMuijen GNP, vanKuppevelt TH: Localization and characterization of melanoma-associated glycosaminoglycans: Differential expression of chondroitin and heparan sulfate epitopes in melanoma. CANCER RES 63:2965-2970 (2003).
Soengas MS, Lowe SW: Apoptosis and melanoma chemoresistance. ONCOGENE 22:3138-3151 (2003).
Stahl JM, Cheung M, Sharma A, Trivedi NR, Shanmugam S, Robertson GP: Loss of PTEN promotes tumor development in malignant melanoma. CANCER RES 63:2881-2890 (2003).
Steeg PS: Angiogenesis inhibitors: motivators of metastasis? NATURE MED 9:822-823 (2003).
Straatsma BR, Diener-West M, Caldwell R, Engstrom RE: Mortality after deferral of treatment or no treatment for choroidal melanoma. AMER J OPHTHALMOL 136:47-54 (2003).
Streit M, Detmar M: Angiogenesis, lymphangiogenesis, and melanoma metastasis. ONCOGENE 22:3172-3179 (2003).
Strickland FM, Pathak S, Multani AS, Pelley RP, Donawho CK: Molecular characterization of new melanoma cell lines from C3H mice induced by ethanol plus ultraviolet radiation. CANCER RES 63:3503-3510 (2003).
Suzuki M, Shinkai M, Honda H, Kobayashi T: Anticancer effect and immune induction by hyperthermia of malignant melanoma using magnetite cationic liposomes. MELANOMA RES 13:129-135 (2003).
Swan MC, Hudson DA: Malignant melanoma in South Africans of mixed ancestry: a retrospective analysis. MELANOMA RES 13:415-419 (2003).
Tagawa ST, Lee P, Snively J, Boswell W, Ounpraseuth S, Lee S, Hickingbottom B, Smith J, Johnson D, Weber JS: Phase I study of intranodal delivery of a plasmid DNA vaccine for patients with Stage IV melanoma. CANCER 98:144-154 (2003).
Tanaka S, Harada M, Mine T, Noguchi M, Gohara R, Azuma K, Tamura M, Yamada A, Morinaga A, Nishikori M, Katagiri K, Itoh K, Yamana H, Hashimoto T: Peptide vaccination for patients with melanoma and other types of cancer based on pre-existing peptide-specific cytotoxic T-lymphocyte precursors in the periphery. J IMMUNOTHER 26:357-366 (2003).
Tellez C, Bar-Eli M: Role and regulation of the thrombin receptor (PAR-1) in human melanoma. Oncogene 22:3130, 2003.
Thallinger C, Wolschek MF, Wacheck V, Maierhofer H, G•nsberg P, Polterauer P, Pehamberger H, Monia BP, Selzer E, Wolff K, Jansen B: Mcl-1 antisense therapy chemosensitizes human melanoma in a SCID mouse xenotransplantation model. J INVEST DERMATOL 120:1081-1086 (2003).
Tschentscher F, H•sing J, H"lter T, Kruse E, Dresen IG, J"ckel KH, Anastassiou G, Schilling H, Bornfeld N, Horsthemke B, Lohmann DR, Zeschnigk M: Tumor classification based on gene expression profiling shows that uveal melanomas with and without monosomy 3 represent two distinct entities. CANCER RES 63:2578-2584 (2003).
Tucker MA, Goldstein AM: Melanoma etiology: where are we? ONCOGENE 22:3042-3052 (2003).
Um SW, Yoo CG, Lee CT, Han SK, Shim YS, Kim YW: Apparent primary pleural melanoma: case report and literature review. RESP MED 97:586-587 (2003).
Vajdic C, Kricker A, Duffy DL, Aitken JF, Stark M, terHuurne JAC, Martin NG, Armstrong BK, Hayward NK: Ocular melanoma is not associated with CDKN2A or MC1R variants - a population-based study. MELANOMA RES 13:409-413 (2003).
Vajdic CM, Hutchins AM, Kricker A, Aitken JF, Armstrong BK, Hayward NK, Armes JE: Chromosomal gains and losses in ocular melanoma detected by comparative genomic hybridization in an Australian population-based study. CANCER GENET CYTOGENET 144:12-17 (2003).
VanGool AR, Fekkes D, Kruit WHJ, Mulder PGH, tenHagen TLM, Bannink M, Maes M, Eggermont AMM: Serum amino acids, biopterin and neopterin during long-term immunotherapy with interferon-alpha in high-risk melanoma patients. PSYCHIAT RES 119:125-132 (2003).
Vannucci L, Fiserov A, Sadalapure K, Lindhorst TK, Kuldov M, Rossmann P, Horv th O, Kren V, Krist P, Bezouska K, Luptovcov M, Mosca F, Posp¡sil M: Effects of N-acetyl-glucosamine-coated glycodendrimers as biological modulators in the B16F10 melanoma model in vivo. INT J ONCOL 23:285-296 (2003).
Vehvil„inen P, Hyyti„inen M, Keski-Oja J: Latent transforming growth factor—binding protein 2 is an adhesion protein for melanoma cells. J BIOL CHEM 278:24705-24713 (2003).
Veldman RJ, Mita A, Cuvillier O, Garcia V, Klappe K, Medin JA, Campbell JD, Carpentier S, Kok JW, Levade T: The absence of functional glucosylceramide synthase does not sensitize melanoma cells for anticancer drugs. FASEB J 17:NIL (2003).
Vermi W, Bonecchi R, Facchetti F, Bianchi D, Sozzani S, Festa S, Berenzi A, Cella M, Colonna M: Recruitment of immature plasmacytoid dendritic cells (plasmacytoid monocytes) and myeloid dendritic cells in primary cutaneous melanomas. J PATHOL 200:255-268 (2003).
Veronesi A, Pizzichetta MA, DeGlacomi C, Gatti A, Trevisan G: A two-year regional program for the early detection of cutaneous melanoma. TUMORI 89:1-5 (2003).
Vihinen PP, Pyrh"nen SO, K„h„ri VM: New prognostic factors and developing therapy of cutaneous melanoma. ANN MED 35:66-78 (2003).
Villa R, Folini M, Porta CD, Valentini A, Pennati M, Daidone MG, Zaffaroni N: Inhibition of telomerase activity by geldanamycin and 17-allylamino, 17-demethoxygeldanamycin in human melanoma cells. CARCINOGENESIS 24:851-859 (2003).
Vorobiof DA, Rapoport BL, Mahomed R, Karime M: Phase II study of pegylated liposomal doxorubicin in patients with metastatic malignant melanoma failing standard chemotherapy treatment. MELANOMA RES 13:201-203 (2003).

Wakamatsu K, Yokochi M, Naito A, Kageshita T, Ito S: Comparison of phaeomelanin and its precursor 5-S-cysteinyldopa in the serum of melanoma patients. MELANOMA RES 13:357-363 (2003).

Wang H, Benda PM, Piepkorn MW: Parasitism of basal cell carcinoma by lentigo maligna melanoma. J AMER ACAD DERMATOL 48:S92-S94 (2003).

Wascher RA, Morton DL, Kuo C, Elashoff RM, Wang HJ, Gerami M, Hoon DSB: Molecular tumor markers in the blood: Early prediction of disease outcome in melanoma patients treated with a melanoma vaccine. J Clin Oncol 21:2558-2563 (2003).

Weinzweig J, Tattini C, Lynch S, Zienowicz R, Weinzweig N, Spangenberger A, Edstrom L: Investigation of the growth and metastasis of malignant melanoma in a murine model: The role of supplemental vitamin A. PLAST RECONSTR SURG 112:152-158 (2003).

Weiss M, Hettmer S, Smith P, Ladisch S: Inhibition of melanoma tumor growth by a novel inhibitor of glucosylceramide synthase. CANCER RES 63:3654-3658 (2003).

Willhauck M, Scheibenbogen C, Pawlita M, M"hler T, Thiel E, Keilholz U: Restricted T-cell receptor repertoire in melanoma metastases regressing after cytokine therapy. CANCER RES 63:3483-3485 (2003).

Wolchok JD, Williams L, Pinto JT, Fleisher M, Krown SE, Hwu WJ, Livingston PO, Chang C, Chapman PB: Phase I trial of high dose paracetamol and carmustine in patients with metastatic melanoma. MELANOMA RES 13:189-196 (2003).

Wu H, Goel V, Haluska FG: PTEN signaling pathways in melanoma. ONCOGENE 22:3113-3122 (2003).

Yerneni LK, Jayaraman S: Pharmacological action of high doses of melatonin on B16 murine melanoma cells depends on cell number at time of exposure. MELANOMA RES 13:113-117 (2003).

Yoshioka S, Fujiwara H, Higuchi T, Yamada S, Maeda M, Fujii S: Melanoma cell adhesion molecule (MCAM/CD146) is expressed on human luteinizing granulosa cells: enhancement of its expression by hCG, interleukin-1 and tumour necrosis factor-. MOL HUM REPROD 9:311-319 (2003).

Yu GP, Hu DN, McCormick S, Finger PT: Conjunctival melanoma: Is it increasing in the United States? AMER J OPHTHALMOL 135:800-806 (2003).

Zalatnai A, Szende B, T¢th M, R cz K: Primary malignant melanoma of adrenal gland in a 41-yr-old woman. ENDOCR PATHOL 14:101-105 (2003).

Zalaudek I, Horn M, Richtig E, H"dl S, Kerl H, Smolle J: Local recurrence in melanoma in situ: influence of sex, age, site of involvement and therapeutic modalities. BRIT J DERMATOL 148:703-708 (2003).

Zhang XD, Borrow JM, Zhang XY, Nguyen T, Hersey P: Activation of ERK1/2 protects melanoma cells from TRAIL-induced apoptosis by inhibiting Smac/DIABLO release from mitochondria. ONCOGENE 22:2869-2881 (2003).

Zhang Y, Chaux P, Stroobant V, Eggermont AMM, Corthals J, MaillŠre B, Thielemans K, Marchand M, Boon T, vanderBruggen P: A MAGE-3 peptide presented by HLA-DR1 to CD4(+) T cells that were isolated from a melanoma patient vaccinated with a MAGE-3 protein. J IMMUNOL 171:219-225 (2003).

Zimmermann VS, Bondanza A, Rovere-Querini P, Colombo B, Sacchi A, Fascio U, Corti A, Manfredi AA: Characterisation of functional biotinylated TNF- targeted to the membrane of apoptotic melanoma cells. J Immunol Method 276:79-87 (2003).

MSH, POMC, GROWTH FACTORS & RECEPTORS

Alrubaian J, Sollars C, Danielson PB, Dores RM: Evaluating the radiation of the POMC gene in teleosts: characterization of American eel POMC. GEN COMP ENDOCRINOL 132:384-390 (2003).

Bragan‡a J, Eloranta JJ, Bamforth SD, Ibbitt JC, Hurst HC, Bhattacharya S: Physical and functional interactions among AP-2 transcription factors, p300/CREB-binding protein, and CITED2. J BIOL CHEM 278:16021-16029 (2003).

Gellert GC, Kitson RP, Goldfarb RH: Urokinase-type plasminogen activator receptor crosslinking in an NK cell line increases integrin surface expression by the MAP kinase/ERK 1/2 signaling pathway. J CELL BIOCHEM 89:279-288 (2003).

Joseph CG, Bauzo RM, Xiang ZM, Haskell-Luevano C: Urea small molecule agonists on mouse melanocortin receptors. BIOORG MEDICINAL CHEM LETTER 13:2079-2082 (2003).

Kerje S, Lind J, Sch•tz K, Jensen P, Andersson L: Melanocortin 1-receptor (MC1R) mutations are associated with plumage colour in chicken. ANIM GENET 34:241-248 (2003).

McKenzie CA, Harding RM, Tomlinson JB, Ray AJ, Wakamatsu K, Rees JL: Phenotypic expression of melanocortin-1 receptor mutations in black Jamaicans. J INVEST DERMATOL 121:207-208 (2003).

Okazaki M, Yoshimura K, Suzuki Y, Uchida G, Kitano Y, Harii K, Imokawa G: The mechanism of epidermal hyperpigmentation in cafe-au-lait macules of neurofibromatosis type 1 (von Recklinghausen's disease) may be associated with dermal fibroblast-derived stem cell factor and hepatocyte growth factor. BRIT J DERMATOL 148:689-697 (2003).

Pissios P, Maratos-Flier E: Melanin-concentrating hormone: from fish skin to skinny mammals. TRENDS ENDOCRINOL METAB 14:243-248 (2003).

Pissios P, Trombly DJ, Tzameli I, Maratos-Flier E: Melanin-concentrating hormone receptor 1 activates extracellular signal-regulated kinase and synergizes with G(s)-coupled pathways. ENDOCRINOLOGY 144:3514-3523 (2003).

Saito H, Yasumoto KI, Takeda K, Takahashi K, Yamamoto H, Shibahara S: Microphthalmia-associated transcription factor in the wnt signaling pathway. PIGM CELL RES 16:261-265 (2003).

Sakata S, Sakamaki S, Watanabe K, Nakamura N, Toyokuni S, Nishimune Y, Mori C, Yonehara S: Involvement of death receptor Fas in germ cell degeneration in gonads of Kit-deficient W-v/W-v mutant mice. CELL DEATH DIFFERENTIATION 10:676-686 (2003).

Sturm RA, Duffy DL, Box NF, Chen W, Smit DJ, Brown DL, Stow JL, Leonard JH, Martin NG: The role of melanocortin-1 receptor polymorphism in skin cancer risk phenotypes. PIGM CELL RES 16:266-272 (2003).

Tammler U, Quillan JM, Lehmann J, Sad,e W, Kassack MU: Design, synthesis, and biological evaluation of non-peptidic ligands at the Xenopus laevis skin-melanocortin receptor. EUR J MED CHEM 38:481-493 (2003).

Taylor AW: Modulation of regulatory T cell immunity by the neuropeptide alpha-melanocyte stimulating hormone. CELL MOL BIOL 49:143-149 (2003).

Vanti WB, Nguyen T, Cheng R, Lynch KR, George SR, O'Dowd BF: Novel human G-protein-coupled receptors. BIOCHEM BIOPHYS RES COMMUN 305:67-71 (2003).

DEVELOPMENTAL BIOLOGY

Adur J, Takizawa S, Quan JX, Uchide T, Saida K: Increased gene expression and production of murine endothelin receptors after birth. BIOCHEM BIOPHYS RES COMMUN 305:700-706 (2003).

Aoki Y, Saint-Germain N, Gyda M, Magner-Fink E, Lee YH, Credidio C, Saint-Jeannet JP: Sox10 regulates the development of neural crest-derived melanocytes in Xenopus. DEVELOP BIOL 259:19-33 (2003).

B,,umer N, Marquardt T, Stoykova A, Spieler D, Treichel D, Ashery-Padan R, Gruss P: Retinal pigmented epithelium determination requires the redundant activities of Pax2 and Pax6. DEVELOPMENT 130:2903-2915 (2003).

Dupin E, LeDouarin NM: Development of melanocyte precursors from the vertebrate neural crest. Oncogene 22:3016, 2003.

Elworthy S, Lister JA, Carney TJ, Raible DW, Kelsh RN: Transcriptional regulation of mitfa accounts for the sox10 requirement in zebrafish melanophore development. DEVELOPMENT 130:2809-2818 (2003).

Malicki J, Jo H, Pujic Z: Zebrafish N-cadherin, encoded by the glass onion locus, plays an essential role in retinal patterning. DEVELOP BIOL 259:95-108 (2003).

Mollaaghababa R, Pavan WJ: The importance of having your SOX on: role of SOX10 in the development of neural crest-derived melanocytes and glia. ONCOGENE 22:3024-3034 (2003).

Mouriaux F, Kherrouche Z, Maurage CA, Demailly FX, Labalette P, Saule S: Expression of the c-kit receptor in choroidal melanomas. MELANOMA RES 13:161-166 (2003).

Panteleyev AA, Mitchell PJ, Paus R, Christiano AM: Expression patterns of the transcription factor AP-2 during hair follicle morphogenesis and cycling. J INVEST DERMATOL 121:13-19 (2003).

Stenkamp DL, Frey RA: Extraretinal and retinal hedgehog signaling sequentially regulate retinal differentiation in zebrafish. DEVELOP BIOL 258:349-363 (2003).

Umebachi Y, Osanai M: Perturbation of the wing color pattern of a swallowtail butterfly, Papilio xuthus, induced by acid carboxypeptidase. ZOOL SCI 20:325-331 (2003).

Wehrle-Haller B: The role of kit-ligand in melanocyte development and epidermal homeostasis. Pigm Cell Res 16:287, 2003.

Widlund HR, Fisher DE: Microphthalamia-associated transcription factor: a critical regulator of pigment cell development and survival. ONCOGENE 22:3035-3041 (2003).

DIFFERENTIATION

Anderson PD, Huizing M, Claassen DA, White J, Gahl WA: Hermansky-Pudlak syndrome type 4 (HPS-4): clinical and molecular characteristics. HUM GENET 113:10-17 (2003).

Berryere TG, Schmutz SM, Schimpf RJ, Cowan CM, Potter J: TYRP1 is associated with dun coat colour in Dexter cattle or how now brown cow? ANIM GENET 34:169-175 (2003).

Chai BX, Neubig RR, Millhauser GL, Thompson DA, Jackson PJ, Barsh GS, Dickinson CJ, Li JY, Lai YM, Gantz I: Inverse agonist activity of agouti and agouti-related protein. PEPTIDES 24:603-609 (2003).

Chen QX, Liu XD, Huang H: Inactivation kinetics of mushroom tyrosinase in the dimethyl sulfoxide solution. BIOCHEMISTRY ENGL TR 68:644-649 (2003).

Chiang PW, Oiso N, Gautam R, Suzuki T, Swank RT, Spritz RA: The Hermansky-Pudlak Syndrome 1 (HPS1) and HPS4 proteins are components of two complexes, BLOC-3 and BLOC-4, involved in the biogenesis of lysosome-related organelles. J BIOL CHEM 278:20332-20337 (2003).

Ciciotte SL, Gwynn B, Moriyama K, Huizing M, Gahl WA, Bonifacino JS, Peters LL: Cappuccino, a mouse model of Hermansky-Pudlak syndrome, encodes a novel protein that is part of the pallidin-muted complex (BLOC-1). Blood 101:4402, 2003.

Dorey SE, Neveu MM, Burton LC, Sloper JJ, Holder GE: The clinical features of albinism and their correlation with visual evoked potentials. BRIT J OPHTHALMOL 87:767-772 (2003).

Francis E, Wang N, Parag H, Halaban R, Hebert DN: Tyrosinase maturation and oligomerization in the endoplasmic reticulum require a melanocyte-specific factor. J BIOL CHEM 278:25607-25617 (2003).

Fridman C, Hosomi N, Varela MC, Souza AH, Fukai K, Koiffmann CP: Angelman syndrome associated with oculocutaneous albinism due to an intragenic deletion of the P gene. AM J MED GENET PART A 119A:180-183 (2003).
Gomes AQ, Ali BR, Ramalho JS, Godfrey RF, Barral DC, Hume AN, Seabra MC: Membrane targeting of Rab GTPases is influenced by the prenylation motif. MOL BIOL CELL 14:1882-1899 (2003).
Hedrick PW: Hopi Indians, "cultural" selection, and albinism. AMER J PHYS ANTHROPOL 121:151-156 (2003).
Kanehira T, Takekoshi S, Nagata H, Osamura RY, Homma T: Kinobeon A as a potent tyrosinase inhibitor from cell culture of safflower: In vitro comparisons of kinobeon A with other putative inhibitors. PLANTA MED 69:457-459 (2003).
Land EJ, Ramsden CA, Riley PA, Yoganathan G: Mechanistic studies of catechol generation from secondary quinone amines relevant to indole formation and tyrosinase activation. PIGM CELL RES 16:397-406 (2003).
Land EJ, Ramsden CA, Riley PA: Tyrosinase autoactivation and the chemistry of ortho-quinone amines. ACCOUNT CHEM RES 36:300-308 (2003).
Mouriaux F, Vincent S, Kherrouche Z, Maurage CA, Planque N, Mont, D, Labalette P, Saule S: Microphthalmia transcription factor analysis in posterior uveal melanomas. EXP EYE RES 76:653-661 (2003).
Nazarian R, Falc¢n-P,rez JM, Dell'Angelica EC: Biogenesis of lysosome-related organelles complex 3 (BLOC-3): A complex containing the Hermansky-Pudlak syndrome (HPS) proteins HPS1 and HPS4. Proc Nat Acad Sci USA 100:8770, 2003.
Negroiu G, Dwek RA, Petrescu SM: The inhibition of early N-glycan processing targets TRP-2 to degradation in B16 melanoma cells. J BIOL CHEM 278:27035-27042 (2003).
Nihei KI, Kubo I: Identification of oxidation product of arbutin in mushroom tyrosinase assay system. BIOORG MEDICINAL CHEM LETTER 13:2409-2412 (2003).
Oetting WS, Fryer JP, Shriram S, King RA: Oculocutaneous albinism type 1: The last 100 years. Pigm Cell Res 16:307, 2003.
Olivares C, Solano F, Garc¡a-Borr¢n JC: Conformation-dependent post-translational glycosylation of tyrosinase - Requirement of a specific interaction involving the cub metal binding site. J BIOL CHEM 278:15735-15743 (2003).
Seo SY, Sharma VK, Sharma N: Mushroom tyrosinase: Recent prospects. J AGR FOOD CHEM 51:2837-2853 (2003).
Shiino M, Watanabe Y, Umezawa K: Synthesis and tyrosinase inhibitory activity of novel N-hydroxybenzyl-N-nitrosohydroxylamines. BIOORG CHEM 31:129-135 (2003).
Siegbahn PEM: The catalytic cycle of tyrosinase: peroxide attack on the phenolate ring followed by O-O bond cleavage. J BIOL INORG CHEM 8:567-576 (2003).
So H, Rho J, Jeong D, Park R, Fisher DE, Ostrowski MC, Choi Y, Kim N: Microphthalmia transcription factor and PU.1 synergistically induce the leukocyte receptor osteoclast-associated receptor gene expression. J Biol Chem 278:24209, 2003.
Son JK, Park JS, Kim JA, Kim Y, Chung SR, Lee SH: Prenylated flavonoids from the roots of Sophora flavescens with tyrosinase inhibitory activity. PLANTA MED 69:559-561 (2003).
Sugimoto K, Nishimura T, Nomura K, Sugimoto K, Kuriki T: Syntheses of arbutin—glycosides and a comparison of their inhibitory effects with those of -arbutin and arbutin on human tyrosinase. CHEM PHARM BULL TOKYO 51:798-801 (2003).
Trieselmann NZ, Soboloff J, Berger SA: Mast cells stimulated by membrane-bound, but not soluble, steel factor are dependent on phospholipase C activation. CELL MOL LIFE SCI 60:759-766 (2003).
Valero E, Carri¢n P, Var¢n R, Garc¡a-Carmona F: Quantification of acetaminophen by oxidation with tyrosinase in the presence of Besthorn's hydrazone. ANAL BIOCHEM 318:187-195 (2003).
Wichers HJ, Recourt K, Hendriks M, Ebbelaar CEM, Biancone G, Hoeberichts FA, Mooibroek H, Soler-Rivas C: Cloning, expression and characterisation of two tyrosinase cDNAs from Agaricus bisporus. APPL MICROBIOL BIOTECHNOL 61:336-341 (2003).
Wu LC, Chen YC, Ho JAA, Yang CS: Inhibitory effect of red koji extracts on mushroom tyrosinase. J AGR FOOD CHEM 51:4240-4246 (2003).
Xie LP, Chen QY, Huang H, Wang HZ, Zhang RQ: Inhibitory effects of some flavonoids on the activity of mushroom tyrosinase. BIOCHEMISTRY ENGL TR 68:487-491 (2003).

MISCELLANEOUS

Bennett DC, Lamoreux ML: The color loci of mice - A genetic century. PIGM CELL RES 16:333-344 (2003).
Ellers J, Boggs CL: The evolution of wing color: Male mate choice opposes adaptive wing color divergence in Colias butterflies. EVOLUTION 57:1100-1106 (2003).
Horth L: Melanic body colour and aggressive mating behaviour are correlated traits in male mosquitofish (Gambusia hotbrooki). PROC ROY SOC LONDON SER B 270:1033-1040 (2003).