PASPCR Newsletter

Volume 9 Number 3 **September, 2001**

Introduction . . .

The **PASPCR** ***Newsletter*** is published quarterly and is intended to serve as a means of communication for the members of our Society. As such, we invite our membership to actively contribute to it. If you attend a scientific meeting and 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 up-coming meetings of interest will also be included. We also want to note any change of affiliation or address that you may have had to help us keep our membership list up-to-date. This is **your** *Newsletter*, and we depend upon you to help us make sure it best serves the Society's needs. Contributions and comments can be sent to Bill Oetting, preferably by Email, to bill@lenti.med.umn.edu.

The PASPCR web page has a new address – **www.paspcr.org**. This new web address should make it easier to remember where the PASPCR web page is in the Internet Universe, as well as stabilize the address for the future. The PASPCR Web Site has had four different web addresses to date (see http://www.cbc.umn.edu/paspcr/webhist.htm). By obtaining this address, it will be assured that the URL to the PASPCR Web site will remain the same, even in the event that the web site is moved to a different server.

The **PASPCR Web** page is the major, up-to-date source of current information for the PASPCR membership. The PASPCR Web page contains information about the PASPCR including the goals, ByLaws and Rules of the Society, future meetings, past issues of the PASPCR *Newsletter* as well as links to other related sites including the InterPig DataBase, the International Federation of Pigment Cell Societies (IFPCS) and the regional Pigment Cell Societies from Europe and Japan. In addition, an updated PASPCR membership directory is available on the PASPCR Web page; please notify us if you wish any or all of your information to be modified or deleted on that site. The PASPCR home page also includes positions available and positions wanted. Postings for **Positions Available** are open to all individuals so long as the position is related to pigment cell research. Postings for **Positions Wanted** will be open only to members of the PASPCR or its sister societies (JSPCR and ESPCR). Please provide an expiration data for any submitted postings. If there is additional information that you wish to have added to this web page, please let us know. Send any comments and/or suggestions to the PASPCR WebMaster, Bill Oetting at bill@lenti.med.umn.edu.

IN THIS ISSUE . . . . .

PanAmerican Society for Pigment Cell Research

c/o **Dr. James J. Nordlund**
Department of Dermatology
University of Cincinnati
231 Bethesda Avenue
Cincinnati, OH 45267-0592
FAX: (513) 558-0198

The **PASPCR Newsletter** is published quarterly; for further information or to submit articles, contact:

Publications Committee:

William S. Oetting, PhD
University of Minnesota
Department of Medicine - Genetics
MMC 485
420 Delaware St. S.E.
Minneapolis, MN 55455
Phone: (612) 624-1139
Email: bill@lenti.med.umn.edu

Vijayasaradhi Setaluri, PhD
Wake Forest University School of Medicine
Department of Medicine
Winston-Salem, NC 27157
Phone: (336) 716-3273
Email: setaluri@bgsm.edu

Giselle Thibaudeau, PhD
Mississippi State University
Department of Biological Sciences
Harned Hall
Mississippi State, MS 39762
Phone: (662) 325-7572
Email: Giselle@ra.msstate.edu

Calendar of Events :

Sept 27 - 29, 2001 10th Annual Meeting of the European Society for Pigment Cell Research, to be held in Rome, Italy
Contact: Meeting Secretariat, Triumph P.R. S.r.l. Via Proba Petronia 3 00136 ROME - ITALY
Phone ++39.06.399631
Fax ++39.06.39735195
e-mail: espcr2001@triumphpr.it

Dec 1-2, 2001 15th Japanese Society for Pigment Cell Research Meeting (JSPCR) Sendai, Japan,
Contact: Prof. S. Shibahara
E-Mail : shibahar@mail.cc.tohoku.ac.jp

Sept 9 - 13, 2002 The XVIIIth International Pigment Cell Conference, to be held in The Hague, Holland.
Contact: Dr. Stan Pavel, President ESPCR, University Hospital Leiden, Dept of Dermatology, PO Box 9600, NL - 2300 RC LEIDEN
Phone: 31-(71) 526 1952
Fax: 31-(71) 524 8106;
E-mail: SPavel@algemeen.azl.nl

Sept 3-7, 2003 XIth Annual Meeting of the PanAmerican Society for Pigment Cell Research, to be held in Wood's Hole, MA.

Welcome to New Members

by James J Nordlund

We welcome the following new member to the **PASPCR** . . .

Sheila M. Schmutz, Ph.D.
University of Saskatchewan
Department of Animal Science

Deborah T. Spaulding
University of Oklahoma Health Sciences Center
Department of Biochemistry and Molecular Biology

Richard A. Spritz, M.D.
University of Colorado Health Sciences Center
Human Medical Genetics Program

If anyone is interested in joining our Society or wishes to sponsor a member, application forms can be obtained from Dr. James J. Nordlund at the PASPCR Secretary/Treasurer's office.

Corporate Sponsors

by James J Nordlund

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.

GOLD Corporate Patrons	***SILVER Corporate Patrons***
Procter and Gamble Co	Avon Products, Inc
Shiseido Co, Ltd	Galderma Laboratories, Inc
	Stiefel Laboratories
	Combe, Inc.

Mouse News

by Lynn Lamoreux

We are very pleased to announce that the congenic colony of mouse pigment mutants that is housed at Texas A&M University has been temporarily funded for three primary purposes:

1. To use these congenic mutants to make congenic pigment cell lines as appropriate;
2. To cryopreserve these important stocks so they will not again be threatened with extinction; and
3. To make them available to the community of pigment cell researchers and to the many scientists in other fields who share interest in our mutants.

This funding was obtained (in alphabetical order) by:
Dr. Dorothy Bennett, Professor, St. George Hospital Medical School Dr. Rick Ermel, Associate Professor, Texas A&M University Dr. M. Lynn Lamoreux, Visiting Research Scientist, Texas A&M University Dr. Jim Womack, NAS, Professor, Texas A&M University

Mouse News continued:

This colony emphasizes loci that drive the major functions of the pigment system, as follows:

1. Cell survival - the white-spotting loci are broadly represented. We hold a number of alleles at the MITF locus.
2. Melanogenesis - the loci that function in melanogenesis and are implicated in albinism, including tyr, trp-1, trp-2
3. Pheomelanin/eumelanin - representative alleles at the agouti locus, the Mcr1 locus, and modifying loci.
4. And varous other mutant pigment loci.

Alleles are held congenic with the inbred strain, C57BL/6J. Thus it is possible to make mice that contain one mutant or multiple mutant loci, all expressed within a controlled, uniform genetic background. This fact makes our stocks readily available to study the functions of individual gene loci, or to study the ways in which pigment loci (or their products/functions) INTERACT with each other and with their environment within the organism. Some alleles are also available on another inbred strain where they are expressed differently (in terms of mouse phenotype).

If you want to discuss these mutant mice or cell lines please contact Lynn Lamoreux (mllamoreux@hotmail.com) or Dot Bennett (dbennett@sghms.ac.uk).

From the Editor - *Pigment Cell Research*

***Vince Hearing**, Editor*

Announcement - Anyone interested in obtaining a limited number of back issues of the journal ***Pigment Cell Research***, please take note. The former Editors of the journal, Profs. Joseph Bagnara and Jiro Matsumoto, have forwarded all their extra copies of past issues of ***Pigment Cell Research*** to the current Editorial Office. Anyone who is missing a back issue or two of the journal from their collection can contact the office to request those. Not all back issues are available and they will be provided when available on a first-come, first-served basis. Contact the Editorial Office by Email (editor@pigment.org) and state the issue(s) needed; be sure to provide your full shipping address.

Notice from the Organizers of the 17th IPCC in Nagoya

IPCC-Nagoya Organizers are purchasing a limited number of **extra copies of the IPCC Supplement** to sell to those who are interested. These issues will cost 5,000 yen (about $50), and if you would like to reserve and order a copy, please contact Dr. Kazumasa Wakamatsu at kwaka@fujita-hu.ac.jp, and he will send you the information you need.

And now for the rest of the story.

In this issue, there is no **'rest of the story'**. This section will return for the December issue. If you wish to know how a particular line of investigation got started, or know of a story that would be interesting to readers of the PASPCR Newsletter, please email me at bill@lenti.med.umn.edu, and I will try to get **the rest of the story**.

Reports on the Xth Annual Meeting of the PASCPR
June 14-17, 2001
Minneapolis, Minnesota

Symposium I: Comparative Biology and Evolution
By Nels Granholm

It was the express purpose of the Organizing Committee of the 10th Annual PASPCR conference to present provocative symposia in order to place the concepts of pigment cell biology into a broader context. Symposium I – Comparative Biology and Evolution advanced that goal.

Three symposium and four platform speakers provided an overview and current state of the art on how demographic, evolutionary, and genetic factors may have altered the sequence and/or incidence of polymorphisms within the human MC1R gene (Makova, Rees), the value of genetic analysis of skin and hair color in humans as evidence for the modus operandi of evolution in humans (Shriver), and current updates on the overall reliability of various methods to measure response to UV radiation in human skin (Tadokora), contributions of P gene and MC1R gene mutations in the etiology of OCA2 (Schmidt), absence of human agouti gene polymorphisms in previously identified MC1R variants (van Daal), and roles of various stimulatory agents (IBMX, bafilomycin) on the dynamics of tyrosinase synthesis and/or activation in human melanocytes as mediated by hydrogen exchanger/transporter mechanisms within melanosomes (Spaulding).

MC1R, one of a five-member family of G protein-coupled seven-repeat transmembrane receptor encoding genes, is indeed an intriguing gene, since it plays a central role in skin color variation in humans. To date, MCIR is about the only gene known that can provide at least a partial explanation for phenotypic variation in human pigmentation. GenBank comparisons, including nucleotide change estimates of synonymous (no change in the amino acid) and non-synonymous (changes in nucleotides leading to a different amino acid) substitutions, indicate that MC1R has evolved at a faster rate than other members of the melanocortin receptor family.

Point mutations that affect the functionality of proteins are generally disfavored by natural selection; one would assume that amino sequences of such critically important proteins would remain constant over time within and between species, like histones perhaps or like the amino acids at active sites of specific enzymes. However, point mutations affecting amino acids of proteins not as essential for protein function are not disfavored and may become fixed in species ancestors by random genetic drift. And some mutations may be favored by selection and are thus rapidly fixed in a species. If the rate of change of DNA or amino acids is constant or linear over time (a kind of molecular clock), then we can make assumptions about when groups or species diverged from one another based on the numbers of substitutions. Contributions by Drs. Makova, Rees, and Shriver helped us to gain a practical application and understanding of these and related principles as applied to evolutionary changes in gene (MC1R) sequences.

Much of the data on MC1R dealt with the role of selection on MC1R nucleotide differences (polymorphisms) between African, Asian, and European populations. Jon Rees looked particularly at the ORF of MC1R whereas Dr. Makova characterized 6.6 kb of the MC1R upstream of the ORF. So, what does this tell us about the polymorphisms of MC1R? We have data on polymorphisms of the expressed sequences of MC1R as well as 6.6 kb of DNA "upstream" of the ORF.

Dr Makova drew the following conclusions: 1. The average nucleotide diversity (polymorphism) in the 6.6 kb upstream regions of human MC1R, exceptionally high when compared to other comparable gene sequences, may be due to high mutation rate, high recombination rate, and/or presence of Alu repeats, 2. As opposed to the coding region of MC1R, the promoter region is highly polymorphic in Africans when compared to Asians and Europeans, and this pattern is consistent with a population expansion in Africans, 3. Exhaustive analyses of patters of polymorphisms in 54 Asians, Africans, and Europeans suggest possible purifying selection acting within the middle and portions of the 5' subregions, diversifying selection in some sites, and possible relaxation of functional constraints, and 4. Dr. Makova also identified sites potentially important for MC1R promoter function.

Following Dr. Makova's analysis of the non-coding region of MC1R, Dr. Jon Rees summarized the current status of the MC1R coding region in his presentation, "The Importance of being Red". Sequence analysis of MC1R can enable us to determine the extent to which MC1R controls human pigmentation. It is of interest to know the number of MC1R functional variants, how those variants regulate phenotype, and in an evolutionary sense, what can MC1R tell us about evolution of pigmentation and about human evolution in general. Dr. Rees outlined a number of common sequence variants (codons 151, 160, 294, and 142) that account for about 80% of northern Europeans with red hair. MC1R also has an effect on cutaneous phenotypes, especially in response to

UV irradiation; Dr. Rees reported a dosage effect of UV between wildtype, heterozygote, and compound heterozygote genotypes of MC1R. Experiments designed to relate MC1R genotype to precise pigmentation patterns in hair (balance of eu- and phaeomelanin) and skin response to UV allow Dr. Rees and coworkers to further our understanding of the relationship between MC1R sequence diversity and the actual physiology of the mutated receptors.

Dr. Mark Shriver outlined his recent work on the identification of genes contributing to pigmentation phenotypes in humans. As contrasted from the analysis of other complex multifactorial human disorders (e.g., obesity, diabetes, hypertension), Dr. Shriver believes that mammalian pigmentation genes may offer a more compelling experimental model to assess complex genetic interaction in the understanding of human pathology etiologies. For example many of the known pigmentation genes in mice and other mammals possess homologous sequences in humans that are responsible for human pathologies (e.g., albinism and Waardenberg Syndrome) that regulate in part the wide variation in human pigmentary phenotypes. By adopting methods like Mapping by Admixture Linkage Disequilibrium (MALD) to identify genes for polygenic traits, Dr. Shriver outlined current studies designed to detect and map pigmentation genes for skin color, hair color, eye color, and UV responsiveness.

Slide Session I: Pigmentation
By Nels Granholm

Dr. Tadokora and others presented data on the ability of normal human skin of various racial/ethnic groups to respond to UV exposure as determined by DNA damage/repair and melanin content as well as melanin synthesis. Their results suggest that both skin sensitivity as well as racial/ethnic origin are important determinants in response to UV and may be of value in predicting the risk of skin cancers.

An unusually pigmented human subject predicted to be a compound mutant at both P and MC1R loci (OCA2 plus unusual red hair) was discussed by Schmidt and others. Sequence analysis revealed a compound heterozygote for the P gene (N489D/W679C) and heterozygous at MC1R (R160W). This is the first published identification of a human OCA-like phenotype associated with red hair; the particular type of OCA for this subject should be distinguished from OCA3 (rufous/red OCA) due to the unique compound genotype.

Because of the existence of red-haired human phenotypes possessing wildtype MC1R sequences, additional loci besides MC1R may be directly involved in hair color. The agouti locus is a likely candidate due to its prominent role in coat color genetics of mice and other mammals. Drs. van Daal and Voisey undertook a study to analyze the entire agouti gene in humans (various racial/ethnic groups) for the presence of polymorphisms. Interestingly, following exhaustive analyses of agouti (ASP) sequences of subjects previously identified as positive for unusual MC1R variations, no polymorphisms were detected. Thus loci other than ASP and MC1Rmost likely participate in hair color in humans.

Tyrosinase activity in human melanosomes may be regulated in part by melanosomal pH. Data presented by Spaulding and others support a potentiating effect of IBMX and bafilomycin on the activation of preexisting tyrosinase rather than de novo tyrosinase synthesis. Regarding the mechanism, these authors also presented data suggesting that cAMP-elevating drugs like IBMX may be functioning in part via a hydrogen exchanger/transported within melanosomes.

To summarize, analysis of MC1R is not only interesting in and of itself but also as a model for human evolution. Characterizations of MC1R DNA and various expressed mutant proteins provide valuable data on generation of pigmentation phenotypes, UV susceptibility, as well as physiologically significant ligand-receptor interactions at MC1R as well as other members of the melanocortin family. Secondly, as a determinant of human skin and hair color, MC1R may be a major model gene, along with a number of others, for the analysis of human evolution. Thanks to all speakers of this session for provocative discussions.

Symposium II: New Approaches to the Pigment Cell
By Jean Bolognia

Using Gene Expression Patterns to Characterize Biological Diversity
Charles P. Perou, PhD, UNC

- cluster analyses of cDNA microarrays were utilized as a means to investigate the biological diversity of breast cancers that is noted clinically and histologically
- a common reference was developed in order to have baseline signal intensity; 11 different cell lines, both benign and malignant, composed this common reference
- an examination of biopsy specimens from 40 patients with T3 (≥5cm) breast cancers (in 20 cases, samples pre- as well as post-treatment with adriamycin were available) demonstrated: (1) the individuality of each breast cancer and the maintenance of this individuality post chemotherapy; (2) clusters of proliferation genes that correlated with the mitotic rate and the PCNA- and Ki67-labelling of the tumors; and (3) confirmation of the estrogen-receptor (ER) and ERBB2 status of the carcinomas
- the microarray analyses led to unexpected results including identification of: (1) a subtype of ER-positive breast carcinomas that had a poor prognosis (ER-positive breast carcinomas generally have a good prognosis); and (2) breast carcinomas with few p53 mutations that had a good prognosis as compared to those with multiple p53 mutations that had a poor prognosis
- in the future, such prognostic information could be used prospectively to identify individuals who would require more intensive therapy

The Role of Stem Cells in the Development of the Retina
Thomas Reh, PhD, Univ Washington

- the optic vesicle gives rise to the neural retina, the pigmented epithelium, and the optic stalk and this process requires interaction with the surrounding tissues
- factors expressed in the microenvironment include FGF and sonic hedgehog, and FGF produced by the nearby surface ectoderm promotes the development of the neural retina; overexpression of FGF leads to two layers of neural retina and no pigmented epithelium (the normal situation is one layer of neural retina and one layer of pigmented epithelium)
- the mesenchyme of the head produces the signals required for the development of the pigmented epithelium such that removal of this mesenchyme leads to decreased expression of two genes associated with the development of the pigmented epithelium, *MITF* then *Wnt13*; at the same time, the mesenchyme inhibited the expression of genes associated with the development of the neural retina
- studies pointed to activin, a TGFß-related protein, as one of the factors produced by the mesenchyme of the head (which is a neural crest-derived tissue); in organ cultures, activin can substitute for the mesenchyme of the head
- development of the neural retina is viewed as a default pathway and in amphibians as well as chicken and mammalian embryos, the pigmented epithelium has the ability to regenerate the neural retina; FGF promotes this process of regeneration and activin inhibits it
- greater insight into the process of regeneration of the neural retina could lead to its application clinically

Modulation of Melanogenesis in vitro: Importance of Keratinocyte-Melanocyte Interactions
Rainer Schmidt, PhD, L'Oréal

- co-cultures of normal human keratinocytes (NHK) and normal human melanocytes (NHM) that contained a ratio of melanocytes:keratinocytes similar to the *in vivo* situation were made possible via a defined medium
- in the presence of fetal calf serum and high concentrations of calcium, interactions between the cultured keratinocytes and melanocytes were enhanced
- in co-cultures as well as raft organ cultures utilizing NHK, NHM and de-epithelialized dermis, the rate of melanin synthesis was assessed via 2-^{14}C thiouracil uptake
- irradiation of co-cultures with UVB or UVA resulted in a dose-dependent increase in melanin synthesis while UVB irradiation of NHM (without NHK) led to increased melanin production only in the setting of cytotoxicity
- the expected enhancement or inhibition of melanin synthesis was observed in the organ cultures following treatment with tyrosine, kojic acid, or UV irradiation plus sunscreens
- the baseline pigmentation of the organ cultures was dependent upon the skin type of the donor of the NHM and independent of the skin type of the donor of the NHK

Slide session II: Cell biology
By Jean Bolognia

The Pink-Eyed Dilution Protein Acts Early in Melanosome Biogenesis
P. Manga, K. Chen, S.J. Orlow, New York University SOM

- the potential functions of the transmembrane P protein include: (1) tyrosine transporter; (2) structural protein of the melanosome; (3) stabilization of the melanosomal complex; (4) regulation of melanosomal pH; and (5) localization of melanosomal proteins
- evidence was provided to support this fifth possible function of the P protein; e.g., in *p* null melanocytes: (1) a major portion of the tyrosinase is cleaved, released from its membrane location and excreted into the culture media; (2) a fraction of the tyrosinase is retained in the ER; and (3) the P protein co-localizes with endoplasmic reticulum (ER) markers
- treatment with bafilomycin induces pigmentation and an increase in tyrosinase activity (but not an increase in tyrosinase protein) in null *p* melanocytes; this is accompanied by a decrease in the retention of tyrosinase within the ER and a decrease in the excretion of tyrosinase
- proposed functions for the P protein include proper folding of the tyrosinase protein within the ER or pH regulation within the ER (in particular an increase in the pH of the ER)

Melanosome Mapping by Purification of Early Stage Melanosomes
T. Kushimoto, V. Basrur, J. Valencia, J. Matsunaga, W.D. Vieira, J. Muller, E. Appella, V.J. Hearing, NCI, NIH

- melanosomes from human melanoma cells were isolated via a sucrose-density gradient, subjected to free flow electrophoresis for further purification, and then examined for enzyme activities
- stage II melanosomes were found to have high levels of tyrosinase and Dct activity; they also contained the proteins MART1 and gp100 (as detected in association with the internal matrix of the melanosome by HMB45)
- stage I melanosomes were found to have high levels of Tyrp1 and gp100 protein (as detected on the exterior surface of the melanosome by a-PEP13)
- a model was presented where tyrosinase, Tyrp1 and Lamp 2 are transported to stage I melanosomes via early and late endosomes while gp100 is transported to stage I melanosomes directly from the smooth ER (see presentation by Michael Marks for different model)

Melanosome Transfer to Keratinocytes is Regulated by Surface Glycoproteins and Melanosome Distribution in Keratinocytes is Regulated by the Recipient Keratinocytes
R.E. Boissy, L. Minwalla, I.C. LePoole, R.R. Wickett: presented by R. Sarangarajan Univ of Cincinnati SOM

- the use of fluorescein-labelled melanosomes allowed the examination of melanosomes within keratinocytes in co-cultures of melanocytes and keratinocytes
- the addition of specific neoglycoproteins and lectins as well as mixtures of these glycoproteins inhibited the transfer of melanosomes (14-44% by FACS analysis and 67-93% by EM); those glycoproteins that bind galactose were more effective inhibitors than those that bind mannose
- in co-cultures of NHK and NHM from lightly pigmented skin and co-cultures of NHK and NHM from darkly pigmented skin, the expected clustering of melanosomes [61%] and single dispersion of melanosomes [78%] within keratinocytes, respectively, was observed
- in co-cultures of NHK from lightly pigmented skin and NHM from darkly pigmented skin clustering of melanosomes [66%] was observed while single dispersion [64%] was observed in co-cultures of NHK from darkly pigmented skin and NHM from lightly pigmented skin; i.e., the source of the keratinocytes determined the distribution pattern (see Rainer Schmidt abstract for comparison)

Induction of Melanogenesis and Cellular Signaling Pathways by Bicyclic Monoterpene Diols
D.A. Brown, J.W. Galvin, M.T. Canning, A.B. Brown, D.B. Yarosh, AGI Dermatics

- monoterpenes are natural plant products that have aroma and are used in products such as perfumes
- two synthesized bicyclic monoterpene diols (BMD) were shown to increase tyrosinase activity in co-cultures of NHK and NHM; in two mutation assays, neither compound was mutagenic and the 2,2-dimethyl-3-propanyldiol norbornane proved to be the more potent agent
- the BMD's induced nitric oxide (NO) synthesis and based upon studies utilizing inhibitors of various steps in the NO/cGMP/PKG pathway, were hypothesized to work via this signaling pathway
- in a pilot study, application of BMD-containing liposomes to human skin in combination with retinols enhanced pigmentation to a greater extent than retinols alone

Analysis of the Signaling Pathway and the DNA Damaging Effects of UVB on Human Melanocytes
E. Pereira, M.C. Scott, A.L. Kadekaro, R. Kavanagh, H.G. Shertzer, and Z.A. Abdel-Malek, Univ Cincinnati SOM
UVA Induces Oxidative Stress and Genotoxicity in Human Melanocytes
Z.A. Abdel-Malek, A.L. Kadekaro, M.C. Scott, E. Pereira, R. Kavanagh, H. Kanto, and H.G. Shertzer, Univ Cincinnati SOM

- *in vitro*, melanocytes isolated from darkly pigmented skin have a greater melanogenic response to UVB irradiation than do melanocytes isolated from lightly pigmented skin and a higher frequency of cyclobutane dimer formation
- UVB irradiation of NHM also results in an arrest in the G0-G1 phase of the cell cycle as well as a dose-dependent increase in the production of H_2O_2
- UVB irradiation induces apoptosis of NHM as evidenced by an increase in the levels of Bax and a decrease in Bcl2
- UVB irradiation induced the phosphorylation of the stress activated MAP kinases p38 and JNK/SAPK (independent of $p90^{rek}$)
- oxidative stress as well as photoproduct production were thought to be involved in the effects of UVB irradiation on NHM in culture
- UVA irradiation penetrates deeper into the dermis than UVB and is known to generate oxygen species; a single UVA irradiation can increase tyrosinase activity
- UVA in doses of 22 to 100 J/cm^2 resulted in a dose-dependent inhibition of growth with arrest of cells at the G1-S boundary; cytotoxicity was observed at doses >58J/cm^2
- UVA irradiation (35 J/cm^2) was associated with a decrease in intracellular glutathione and an increase in H_2O_2 production as well an increase in several stress-response-related processes, e.g., levels of p53, expression of p21, and phosphorylation of the MAP kinase p38
- oxidative stress was thought to be involved in the effects of UVA irradiation on NHM in culture

Symposium III: Intracellular Trafficking and Organelle Biogenesis
By Vijayasaradhi Setaluri

This symposium highlighted the recent advances in intracellular sorting of lysosomal and melanosomal proteins, biogenesis of melanosomes and their transport in melanocytes. The speakers illustrated how a wide range of experimental approaches, including mouse genetics and molecular genetic analysis of human pigmentation disorders, are helping us understand the intricate mechanisms of assembly and intracellular transport of organelles. Appropriately, the symposium opened with a talk by J. Bonifacino (NIH) on the molecular machinery for biogenesis of lysosomes, the most extensively studied organelles. Discussion of lysosome biogenesis is also relevant for pigment cell biology in light of many similarities between melanosomes and lysosomes. Bonifacino described the role of a new class of proteins known as Golgi-localized, gamma-ear containing, ARF-binding proteins (GGAs) in sorting of mannose 6-phosphate receptors (MPRs). Binding of the amino terminal VHS domains of clathrin-associated GGAs, specifically to the di-leucine sorting signal in the cytoplasmic tails of MPRs was shown to mediate sorting of MPRs from the trans-Golgi network (TGN) to endosomes. AP-1, the adaptor protein which was originally thought to mediate this sorting, is now relegated to a less important position in sorting MPRs and thereby lysosome biogenesis.

The ongoing debate over the relationship between lysosomes and melanosomes was addressed by Micheal Marks (Univ. Pennsylvania). Using immunogold electronmicroscopy as a principal tool, Marks suggested that in pigment cells, melanosomes represent a lineage of organelles distinct from conventional endosomes and lysosomes. The most significant findings described include the possible involvement of a Pmel17 enriched coated-endosome like structures in melanosome biogenesis, and the observation that melanosomal proteins are segregated from the late endocytic pathway.

While the early events in the biogenesis of melanosomes are still being worked out, much progress has been made in understanding the molecular mechanisms involved in the polarized transport of melanosomes toward keratinocytes. N. Jenkins (NCI) described the genetic approaches that led to the identification of melanophilin, a protein encoded by leaden (ln) gene. In ln mice melanin synthesis is normal but melanosome transport is impaired resulting in clumping of melanosomes, a phenotype similar to that found in dilute (d) and ashen (ash) mutant mice. Jenkins proposed that melanophilin, a novel Rab effector protein, functions as part of a transport complex with MyoVa and Rab27a proteins encoded, respectively, by d and ash loci. Data on candidate genes for dilute suppressor, a locus that suppresses ashen and leaden was also presented.

Understanding vesicular transport has implications for not only pigmentation but also other human disorders. Defects in vesicle formation and trafficking manifest as hypopigmentation and storage pool deficiencies. Whereas Griscelli syndrome and Chediak-Higashi syndrome result from vesicle trafficking, defects in vesicle formation appear to be responsible for Hermansky-Pudlak syndrome (HPS), a group of disorders characterized by oculocutaneous albinism and platelet storage pool deficiency. William Gahl (NIH) described the molecular characterization of HPS-1, HPS-2 and HPS-3 genes and a candidate HPS-4 gene. Among these, the function of only HPS-2 gene product, a subunit of adaptor complex (AP-3), in vesicle formation is understood.

It is becoming increasingly clear that exit of melanosomal proteins from the endoplasmic reticulum (ER) is a regulated event, and some pigmentary disorders are ER retention diseases. R. Halaban (Yale Univ.) presented data that suggests proper folding and exit of tyrosinase from the ER is induced by its substrates DOPA and tyrosinase. V. Hearing et al. (Toyofuku, NCI) analyzed intracellular processing of tyrosinase and TRP-1 in mouse melanocyte lines expressing mutant tyrosinase or mutant TRP-1, and proposed that OCA1 and OCA3 are ER retention diseases where mutation of one melanogenic protein affects the maturation and stability of others in the melanogenic pathway. S. Orlow and his coworkers (B. Shen, NYU) expressed wild type and mutant Oa1-GFP in heterologous COS cells and showed that Oa1 affects structure of late endosomes. Setaluri and coworkers (Wake Forest U.) presented data that suggests a role for GIPC, a PDZ-domain protein, in sorting and targeting of TRP-1.

Slide Session V: Cutaneous Pathology and Vitiligo
By Gisela F. Erf

Dr. G. Emilia Costin presented data on the assessment of drug-delivery systems using N-butyldeoxynojirimycin (NB-DJN) inhibition of tyrosinase as an end-point. NB-DJN is an inhibitor of ER a-glucosidase known to inactivate tyrosinase in B16-F1 melanoma cells. However, high concentrations of NB-DJN (5 mM) were required to effectively inhibit tyrosinase, suggesting inefficient cellular uptake of NB-DJN. Cellular uptake of NB-DJN could be greatly increased by encapsulating NB-DJN in liposomes. The most effective delivery system for NB-DJN was found to be pH-sensitive liposomes, requiring 100 to 1000 times less NB-DJN for inhibition of tyrosinase activity. Empty pH-sensitive liposomes carriers did not affect tyrosinase activity and were not toxic to the cell. Hence, the pH-sensitive liposome is a highly efficient carrier for delivery of ER-targeted drugs.

Dr. Guido W. Swart presented data on novel cDNAs identified when comparing mRNA expression profiles at various stages of human melanocyte transformation. One of the transcripts picked up during RT PCR-based subtractive hybridization is pCMa1which was localized to the distal, telomere proximal region on the short arm of chromosome 11.p15.1-2. cDNA clone pCMa1 (0.45 kb) did not contain a unique long reading frame and Northern blot analyses revealed multiple complementary pCMa1 transcripts of different lengths. *In situ* hybridization with an arbitrarily defined minus strand cRNA probe known to bind to a 4.0 kb plus transcript of pCMa1 revealed differential expression of pCMa1depending on the stage of neoplastic progression of melanocytes. The level of plus transcripts was highest in melanocytic nevi (10/10), variable in primary melanoma lesions (5/6), and negative in normal skin melanocytes and most (3/4) metastatic melanoma. The transient expression of pCMa1 in the neoplastic progression of melanocytes suggests that pCMa1 is a molecular marker for early stages of melanocyte transformation.

Dr. Rangaprasad Sarangarajan reported data on the role of the pro- and anti-apoptotic proteins of the Bcl-2 family in melanocyte apoptosis induced by 4-tertiary butyl phenol (4-TBP) in the etiopathology of contact vitiligo. Expression of four members of the Bcl-2 family (i.e., Bcl-2, Bcl-x, Bax, and Mcl-1) in normal human melanocytes (NHM) cultured with or without 250 µM 4-TBP was analyzed by flow cytometry and immunofluorescence techniques. Exposure of NHM to 4-TBP altered Bcl-2 expression whereas expression of the other apoptotic proteins was unchanged. Western blotting for tyrosinase, TRP-1 and Bcl-2 in NHM cells exposed to 4-TBP for 24, 48, and 72 h revealed no detectable change in all three proteins at 24 h, whereas decreased levels of Bcl-2 and tyrosinase were observed at later time points of 4-TBP exposure. Considering the anti-apoptotic role of Bcl-2, a minimal increase in Bcl-2 expression at 24 h may be an effort to protect the melanocyte from apoptosis induced by 4-TBP, whereas the drop in Bcl-2 after prolonged exposure to 4-TBP may promote cells to undergo apoptosis.

Ms. Xiaoli Wang presented two papers on the etiopathology of autoimmune vitiligo in Smyth line (SL) chickens. In her first presentation, she reported data on demonstrating the presence of interferon gamma (IFNγ) in the feather (the site of melanocyte destruction) of vitiliginous SL chickens using Northern blotting with an anti-sense chicken (ch)-INFγ-specific digoxigen-labeled riboprobe and immunoblotting with anti-chINFγ monoclonal antibodies. Using this approach, INFγ was detected in feathers of chickens with active vitiligo but not in chickens with stable vitiligo or chickens without vitiligo (non-vitiliginous SL chickens and normally pigmented parental Brown line controls). Based on flow cytometry, the INFγ producing cells in the feather included CD4+ lymphocytes. Taken together, these observations support a role of a Th1 dominated cell-mediated immune response in the loss of melanocytes in SL vitiligo.

In her second presentation, **Ms. Xiaoli Wang** showed data on *in situ* TUNEL and immunohistochemical staining of feather tissue obtained from SL chickens at various times prior to and throughout the development of visible vitiligo. In vitiliginous SL chickens, the numbers of apoptotic cells in the feather, especially in the epithelial barb ridge where melanocyte cell bodies are located, were higher than in non-vitiliginous SL and control chickens. The increased incidence of apoptosis was first observed at onset of vitiligo and was highest in active vitiligo, suggesting a close association between apoptosis and the disappearance of melanocytes. The number of CD8+ cells and MHC class II+ cell (including MART-1+ cells) increased two weeks prior to onset of vitiligo. Considering the temporal relationship and the close physical location between CD8+ feather infiltrating lymphocyte and TUNEL+ cells suggests that the apoptosis in vitiliginous feathers was induced by cytotoxic T cells.

Dr. Gisela Erf presented data on studies examining the role of turkey herpesvirus (HVT) in the expression of vitiligo in SL chickens. Using a time course approach, flow cytometry and virus reisolation techniques, it was found that HVT vaccination of SL chickens at hatch greatly increased the proportions of CD4+ splenocytes at 3 days of age and those of CD8+ splenocytes between 14 and 42 days of age. These changes in T cell profiles were suggestive of cell-mediated immune activity. Although HVT could be isolated from the thymus at 3, 6, and 9 days of age, the proportions among thymocyte populations were not affected by HVT. HVT did not affect lymphocyte profiles in the thymus and spleen of BL controls. However, HVT could be reisolated from thymus, spleen, bursa and blood at the same time points and at comparable amounts in both HVT-vaccinated SL and BL chickens. These observations suggest that SL chickens may have a heightened/inappropriate immune response to HVT that may play a role in triggering vitiligo.

Dr. Roger Bowers completed the session by presenting data from his research on other avian models for vitiligo, the Barred Plymouth Rock (BPR) and White Leghorn (WL) chickens. Premature death of melanocytes in BPR and WL chickens is due in part to low antioxidant superoxide dismutase (SOD) activity (50% and 75% of SOD activity in the wild type Jungle Fowl (JF), respectively). Molecular characterization studies of the CT Cu/Zn SOD gene, revealed 99% homology in cDNA sequence between the three types of chickens. A missense mutation observed in BPR may affect protein structure and, hence, SOD activity. SOD mRNA levels were lower in WL chickens compared to BPR and JF chickens, with SOD mRNA levels being highest in BPR chickens. It appears that the low SOD activity in WL chickens may be due to reduced transcription of the SOD gene. Whereas, the reduced BPR SOD activity must be due to post-transcriptional control of the SOD enzyme, because of the elevated levels of SOD mRNA in BPR compared to JF. SOD gene transcription may be increased in BPR in response to the reduced activity of SOD. Considering that WL chickens have both the barring gene (associated with a post-transcriptional decrease in SOD activity) and the dominant white gene (associated with reduced SOD gene transcription), Dr. Bowers suggested that this could explain why WL melanocytes are much more susceptible to premature cell death than BPR melanocytes.

Slide Session VI: Model Systems and Late Breaking Research
By William Oetting

The search for genes associated with albinism started in 1986 with the cloning of the tyrosinase gene, and has not shown any signs of ending. This session included two papers, one from Dr. Murray Brilliant, at the University of Arizona, and Dr. William Gahl, at the N.I.H. identifying two new genes in which mutations result in albinism in humans.

Dr Murray Brilliant presented a paper showing that the human homologue of the mouse *underwhite* locus, *underwhite-dominant brown* (UW^{db}) is responsible for a fourth type of albinism in humans, oculocutaneous albinism type 4 (OCA4). The UW^{db} phenotype looks like the *pink-eyed dilution* (*p*) locus in the mouse, the

human homologue of which is associated with OCA2. This UW^{db} allele is dominant; the heterozygote is less hypopigmented than the homozygote. The gene was cloned from both the mouse (chromosome 15) and the human (chromosome 5p). The protein has 12 membrane spanning regions and appears to be a membrane spanning transport protein that has some homology to a plant proton-sucrose transporter. One possible role for the protein is to balance the osmolarity in either the melanosome or the melanocyte. The human gene has been tentatively termed membrane spanning transport protein-1 (MSTP1). The human sequence is highly conserved to the mouse coding sequence. Two individuals with albinism, with residual pigmentation, were identified as having mutations in MSTP1 locus. One individual was homozygous for a splice site acceptor at exon 2, and the second individual had an in-frame deletion, that was thought to alter the protein structure. Sequencing of the tyrosinase gene (OCA1) and the P gene (OCA2) in individuals with albinism has shown that a significant percentage have no identifiable mutations in either of these two genes, showing that other genes associated with albinism most likely exist. TYRP1 associated with OCA3 and now MSTP1, associated with OCA4, have provided an explanation for the albinism in these individuals. It could be that this is only the beginning of an expanding list of genes associated with albinism.

A long list of genes associated with albinism is highly evident in genes associated with the Hermansky-Pudlak Syndrome (HPS). To date, two genes, HPS1 and ADTB3A (HPS2) have been identified. Dr. William Gahl now reported a third locus associated with HPS, HPS3. Individuals with HPS have albinism, along with platelet storage pool deficiency resulting in a bleeding disorder, and in some cases lysosomal ceroid lipofuscinosis, pulmonary fibrosis and granulomatous colitis. This newly identified gene is part of the very interesting story of HPS in Puerto Rico. The initial HPS gene, HPS1, was identified in a founder population in the Northwest corner of Puerto Rico. Affected individuals all shared a 16 bp duplication in the HPS1 gene. Although this mutation explained the HPS in some individuals in Puerto Rico, it was also known that there was a population of individuals in Central Puerto Rico that had HPS but did not have this mutation, or any other mutation in the HPS1 gene. Analysis of these individuals showed that their HPS mapped to another location. For these individuals a candidate gene was identified and cloned. The gene contains 17 exons and the coding sequence coded for a protein containing 1004 amino acids (113.7 kDa). No homology was found to other proteins. The HPS3 protein contains a clathrin binding site, an ER retention signal and a dileucine motif associated with protein trafficking to the melanosome. In the HPS population in Central Puerto Rico, a 3,904 bp deletion, including exon 1, was found in this gene. This deletion was found to be flanked by Alu repeats, which may describe the mechanism for the deletion. The deletion was thought to occur about 5.3 generation ago, or about 110 to 120 years. There are 15 known mouse loci that present with a HPS like phenotype, yet this gene was not any of the known mouse HPS loci. The HPS3 mouse homologue is the *subtle grey* locus. There is every reason to assume that other individuals with HPS will have mutations in these other genes, making the work of understanding the molecular basis of HPS a continuing story.

Symposium V: Phenoloxidases, Melanogenesis and Evolution
By Vincent Hearing

This Symposium was obviously scheduled to see who really, really couldn't get enough of pigmentation. It was held early on a Sunday morning, starting at 8 am on the final day of the meeting. Despite that, there was a good turnout and those who had the energy to attend were in for a treat. **Prof. Heinz Decker** (Univ of Mainz, Germany) was an invited lecturer who spoke on the structure, function and evolution of hemocyanin in the context of its relationship to tyrosinase. He notes that the enzymes tyrosinase, catechol oxidase and hemocyanin all share similar active sites (utilizing copper as the ligand), although their physiological functions are quite distinct. Tyrosinases in lower species (such as amphibians) are activated in vivo by proteolytic cleavage, which might open up substrate access to the catalytic site, and he made the interesting finding that if hemocyanin (typically found in arthropods) is subjected to similar proteolytic treatment in vitro, it shows a catechol oxidase activity reminiscent of that of lower forms of tyrosinase. Characterizing the structure of hemocyanin is an important model to understand the substrate active-site interactions of tyrosinases. Want more detail? Check out his recent reviews published in J Biol Chem (2001;276:15563-9) and Trends in Biochem Sci (2000;25:392-7). **Prof. Manickam Sugumaran** (Univ of Massachusetts, USA) moved up the evolutionary ladder to insects and discussed the role of phenol oxidases which play important roles in sclerotin formation, wound healing and defense reactions. It turns out that in addition to tyrosinase, insects also have a tyrosinase-related protein, called dopachrome isomerase. That latter enzyme is distinct from our favorite enzyme, dopachrome tautomerase, since the catalytic reaction in insects eliminates the carboxyl group rather than keeping it. Sugumaran's studies confirm the presence of a melanogenic complex between the phenol oxidase and dopachrome isomerase, and by forming that complex, the enzymes regulate each other's activity and control the levels of endogenous quinones produced. The complex is critically

important for the defense strategies of insects. Need to know more? Check out his recent paper in Adv Exp Med Biol (2001;484:289098) or wait for any early issue of Pigment Cell Research next year in which Prof Sugumaran will review this field.

Slide Session VII: Gene Regulation
By Vincent Hearing

The morning Symposium then continued with 6 talks selected from the submitted abstracts. **Dr. Brian Potterf** discussed Sox10, a transcription factor that activates expression of Mitf, another transcription factor that we all know regulates at least some of the melanogenic genes. Both Sox10 and Mitf play important roles during melanoblast development, and then reprise their roles to regulate melanocyte differentiation in later stages of life. Potterf and colleagues examined the effects of mutations in Sox10 on the development of neural-crest derived melanocytes; their evidence suggests that Sox10 is an transcriptional activator of Dct expression, which is consistent with the early expression patterns of Dct in mouse embryos. **Dr. Dong Fang** then reported on his work on the regulation of expression of Tyrp1; they found an upstream enhancer element in the Tyrp1 promoter and their results suggest that transcription of Tyrp1 is regulated not only by the M-box, but also by 2 novel elements in the Tyrp1 promoter. The Tbx2 transcription factor may function as an inhibitor of Tyrp1 expression, perhaps by blocking the binding of Mitf to the M-box of the Tyrp1 promoter. This repressor site is not found in the tyrosinase promoter, which may explain the coordinated but sometimes distinct expression patterns of those 2 genes. **Dr. James Lister** then discussed the duplicate Mitf genes that are found in zebrafish. There is a redundancy in their patterns of expression and they are expressed differentially in neural crest derived melanocytes and in the retinal pigment epithelium. One of them is similar to the mammalian 'A' form of Mitf, the other being similar to the 'M' form. These genes probably original from a single Mitf ancestor via duplication. **Dr. Thomas Hornyak** then discussed his work with Mash1 (a neurogenic transcription factor); it is a bHLH transcription factor that is involved in regulating neural crest development. Mash1 was found to negatively regulate Dct transcription. Expression of Mash1 in transgenic mice (regulated by the Dct promoter) led to the development of fewer neural crest-derived melanoblasts, although those did successfully localize in the hair follicles of adult mice. **Dr. S. Shriram** then presented the results of a study characterizing various mutations of the tyrosinase gene that are found in oculocutaneous albinism, but interestingly, focusing on cases of OCA1 in which no mutation has been identified, or only 1 allele is affected. They found (in a limited number of cases so far) that expression of only 1 allele (the known mutant) was found in the heterozygous cases, perhaps because of a mutation in the promoter region of the other allele which abrogates transcription of that other allele (which may encode a wild-type tyrosinase enzyme). It will be interesting to see how common this phenomenon is seen in such recessive diseases. And finally, **Dr. Caroline LePoole** presented a paper on the regulation of gp100 (sometimes called Pmel17, silver and/or HMB45) transcription. This completed the circuit of the known melanosomal-specific genes discussed in the Symposium. LePoole found that the gp100 promoter has a predicted upstream region (~ 1 kB upstream) that might bind CDK-2, and 3 upstream (~ 0.5 kB) potential E-box sites. However, Mitf was unable to activate the gp100 promoter. The sum of their results suggest that CDK2 is a negative regulatory element of gp100 expression and that Mitf is not involved in the regulation of expression of gp100.

In sum, this was an exciting session that showed the distinct and independent regulation of 4 genes which encode melanosome-specific proteins (tyrosinase, Tyrp1, Dct and gp100). It is clear that all 4 genes are regulated by positive and by negative regulatory factors in distinctive and complex patterns.

Positions - Wanted and Available :

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
Tel/Fax: 0041 22 702 5735 / 5746
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:

Raymond E. Boissy, Ph.D.
Professor of Dermatology and Cell Biology, Neurobiology, & Anatomy
Department of Dermatology
University of Cincinnati College of Medicine
231 Albert Sabin Way, ML-0592
Cincinnati, OH, 45267-0592
TEL: 513-558-6242
FAX: 513-558-0198
E-mail: boissyre@email.uc.edu

Principal Scientist- Clinical Research - Skin Science Research

Unilever employs over 200 scientists at our New Jersey Laboratory who are dedicated to innovative and scientifically rigorous skin research programs. Our world sales exceed $40 billion so our programs have solid financial funding allowing for an innovative and challenging research culture. We currently have a full time opening that provides a unique opportunity to apply your basic science skills to human studies that impact the condition of skin for hundreds of millions people worldwide. We are seeking an expert in pigment biology or photobiology who can advance our knowledge and link laboratory research to clinically defined improvements of consumer skin problems. As a member of our skin research team, you will have an opportunity to work with other scientific experts in many fields including cell biology, biochemistry, measurement science and physical chemistry. You will also be encouraged to establish and maintain close ties to research in academic and government research communities.

We offer a competitive salary, benefits including tuition assistance and relocation, and a dynamic environment filled with learning and discovery beyond conventional scientific boundaries. Applicants must be authorized to work in the USA. For consideration please forward your CV to: Human Resources, Dept. CR-SID, Unilever Research US, 45 River Road, Edgewater, NJ 07020 or E-Mail: job.mca@unilever.com . Please place only the letters "CR-SID" as the subject of your e-mail. Unilever is an Equal Opportunity Employer m/f/d/v.

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 Research Associate - Position available to study the biology of human inherited disorders of pigmentation using gene transfer technology. The successful applicant will have a Ph.D. and/or M.D. with experience in cell biology and molecular biology. Experience in gene transfer/genome manipulation is preferred. Please send curriculum vitae along with the names of three references to Dr. Richard King, Division of Genetics, Department of Medicine, Box 485 Mayo, 420 Delaware St. S.E., University of Minnesota, Minneapolis, MN 55455. Equal Opportunity Employer.

Postdoctoral Position - Ph.D. in molecular biology, biophysics, genetics or biochemistry. Position available to conduct research on molecular mechanisms of cellular response to oxidative stress in human melanocytes and melanoma cells and its regulation for preventive and therapeutic indications. Contact Dr. Frank L. Meyskens Jr., Director, University of California-Irvine, Chao Family Clinical Cancer Research Center, 101 The City Drive, Orange, CA 92668, USA. Fax (714) 456-5039 Email flmeyske@uci.edu

Bibliography:

The Bibliography published in this issue covers the period June, 2001 through August, 2001. 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. We have attempted to highlight any publications which include a member of the PASPCR with a star (*sorry if we missed you but let us know and you'll get a free marked repeat in the next issue*).

MELANINS, MELANOGENS & MELANOGENESIS

Bertoldi M, Voltattorni CB: Dopa decarboxylase exhibits low pH half-transaminase and high pH oxidative deaminase activities toward serotonin (5-hydroxytryptamine). PROTEIN SCI 10:1178-1186 (2001).

Bertoldi M, Gonsalvi M, Voltattorni CB: Green tea polyphenols: Novel irreversible inhibitors of dopa decarboxylase. BIOCHEM BIOPHYS RES COMMUN 284:90-93 (2001).

Bertoldi M, Castellani S, Voltattorni CB: Mutation of residues in the coenzyme binding pocket of Dopa decarboxylase - Effects on catalytic properties. EUR J BIOCHEM 268:2975-2981 (2001).

Das D, Ata UR: A novel method for eliminating the melanin pigments from melanoma cells undergoing cytogenetic analysis in cases of uveal melanoma. CANCER GENET CYTOGENET 127:181-183 (2001).

Delori FC, Goger DG, Dorey CK: Age-related accumulation and spatial distribution of lipofuscin in RPE of normal subjects. INVEST OPHTHALMOL VISUAL SCI 42:1855-1866 (2001).

Fukamachi S, Shimada A, Shima A: Mutations in the gene encoding B, a novel transporter protein, reduce melanin content in medaka. NAT GENET 28:381-385 (2001).

❖ Ito S, Wakamatsu K, Matsunaga N, Hearing VJ, Carey KD, Anderson S, Dooley TP: Cyclic oscillations in melanin composition within hairs of baboons. PIGM CELL RES 14:180-184 (2001).

Mani I, Sharma V, Tamboli I, Raman G: Interaction of melanin with proteins - The importance of an acidic intramelanosomal pH. PIGM CELL RES 14:170-179 (2001).

Menni S, Boccardi D: Melanotic macules of the tongue in a newborn. J AMER ACAD DERMATOL 44:1048-1049 (2001).

Nair SS, Chaubal VA, Shioda T, Coser KR, Mojamdar M: Over-expression of MSG1 transcriptional co-activator increases melanin in B16 melanoma cells: A possible role for MSG1 in melanogenesis. PIGM CELL RES 14:206-209 (2001).

Nofsinger JB, Simon JD: Radiative relaxation of *Sepia* eumelanin is affected by aggregation. PHOTOCHEM PHOTOBIOL 74:31-37 (2001).

❖ Pawelek JM: Approaches to increasing skin melanin with MSH analogs and synthetic melanins. PIGM CELL RES 14:155-160 (2001).

Sever MJ, Wilker JJ: Synthesis of peptides containing DOPA (3,4-dihydroxyphenylalanine). TETRAHEDRON 57:6139-6146 (2001).

Surazynski A, Palka J, Wrzesniok D, Buszman E, Kaczmarczyk P: Melanin potentiates daunorubicin-induced inhibition of collagen biosynthesis in human skin fibroblasts. EUR J PHARMACOL 419:139-145 (2001).

Yamada T, Okuyama Y, Mukai H: In vitro melanin binding of NS-49, a phenethylamine class α(1A)-adrenoceptor agonist. ARZNEIM FORSCH DRUG RES 51:299-303 (2001).

MELANOCYTES & KERATINOCYTES

Alster TS, Bryan H, Williams CM: Long-pulsed Nd:YAG laser-assisted hair removal in pigmented skin - A clinical and histological evaluation. ARCH DERMATOL 137:885-889 (2001).

Ancans J, Tobin DJ, Hoogduijn MJ, Smit NP, Wakamatsu K, Thody AJ: Melanosomal pH controls rate of melanogenesis, eumelanin/phaeomelanin ratio and melanosome maturation in melanocytes and melanoma cells. EXP CELL RES 268:26-35 (2001).

Ancans J, Hoogduijn MJ, Thody AJ: Melanosomal pH, pink locus protein and their roles in melanogenesis. J INVEST DERMATOL 117:158-159 (2001).

Annessi G, Cattaruzza MS, Abeni D, Baliva G, Laurenza M, Macchini V, Melchi F, Ruatti P, Puddu P, Faraggiana T: Correlation between clinical atypia and histologic dysplasia in acquired melanocytic nevi. J AMER ACAD DERMATOL 45:77-85 (2001).

Bañuls J, Climent JM, Sánchez-Payá J, Botella R: The association between idiopathic scoliosis and the number of acquired melanocytic nevi. J AMER ACAD DERMATOL 45:35-43 (2001).

Brochez L, Verhaeghe E, Bleyen L, Naeyaert JM: Diagnostic ability of general practitioners and dermatologists in discriminating pigmented skin lesions. J AMER ACAD DERMATOL 44:979-986 (2001).

Chan J, Robinson ES, Atencio J, Wang ZQ, Kazianis S, DellaColetta L, Nairn RS, McCarrey JR: Characterization of the CDKN2A and ARF genes in UV-induced melanocytic hyperplasias and melanomas of an opossum (*Monodelphis domestica*). MOL CARCINOGEN 31:16-26 (2001).

❖ Curry JL, Pinto W, Nickoloff BJ, Slominski AT: Human keratinocytes express functional α-MSH (MC1-R) receptors. IN VITRO CELL DEV BIOL ANIMAL 37:234-236 (2001).
❖ Das PK, VandenWijngaard RMJG, Wankowicz-Kalinska A, LePoole IC: A symbiotic concept of autoimmunity and tumour immunity: lessons from vitiligo. TRENDS IMMUNOL 22:130-136 (2001).
❖ Dunn KJ, Incao A, Watkins-Chow D, Li Y, Pavan WJ: In utero complementation of a neural crest-derived melanocyte defect using cell directed gene transfer. GENESIS 30:70-76 (2001).
Elshaw SR, Sisley K, Cross N, Murray AK, MacNeil SM, Wagner M, Nichols CE, Rennie IG: A comparison of ocular melanocyte and uveal melanoma cell invasion and the implication of α1β1, α4β1 and α6β1 integrins. BRIT J OPHTHALMOL 85:732-738 (2001).
❖ Fang D, Hallman J, Sangha N, Kute TE, Hammarback JA, White WL, Setaluri V: Expression of microtubule-associated protein 2 in benign and malignant melanocytes - Implications for differentiation and progression of cutaneous melanoma. AMER J PATHOL 158:2107-2115 (2001).
Giménez E, Giraldo P, Jeffery G, Montoliu L: Variegated expression and delayed retinal pigmentation during development in transgenic mice with a deletion in the locus control region of the tyrosinase gene. GENESIS 30:21-25 (2001).
Hachiya A, Kobayashi A, Ohuchi A, Kitahara T, Takema Y: The inhibitory effect of an extract of *Sanguisorba officinalis L.* on ultraviolet B-induced pigmentation via the suppression of endothelin-converting enzyme-1α. BIOL PHARM BULL 24:688-692 (2001).
❖ Hu DN, McCormick SA, Woodward DF: A functional study on prostanoid receptors involved in cultured human iridal melanocyte stimulation. EXP EYE RES 73:93-100 (2001).
Inomata H, Rao NA: Depigmented atrophic lesions in sunset glow fundi of Vogt-Koyanagi-Harada disease. AMER J OPHTHALMOL 131:607-614 (2001).
Jin EJ, Erickson CA, Takada S, Burrus LW: Wnt and BMP signaling govern lineage segregation of melanocytes in the avian embryo. DEVELOP BIOL 233:22-37 (2001).
Kawaguchi Y, Mori N, Nakayama A: Kit(+) melanocytes seem to contribute to melanocyte proliferation after UV exposure as precursor cells. J INVEST DERMATOL 116:920-925 (2001).
Kawai S, Vora S, Das S, Gachie E, Becker B, Neufeld AH: Modeling of risk factors for the degeneration of retinal ganglion cells after ischemia/reperfusion in rats: effects of age, caloric restriction, diabetes, pigmentation, and glaucoma. FASEB J 15:1285-1287 (2001).
Kemp EH, Waterman EA, Gawkrodger DJ, Watson PF, Weetman AP: Molecular mapping of epitopes on melanocyte-specific protein Pmel17 which are recognized by autoantibodies in patients with vitiligo. CLIN EXP IMMUNOL 124:509-515 (2001).
Lang KS, Caroli CC, Muhm A, Wernet D, Moris A, Schittek B, Knauss-Scherwitz E, Stevanovic S, Rammensee HG, Garbe C: HLA-A2 restricted, melanocyte-specific CD8(+) T lymphocytes detected in vitiligo patients are related to disease activity and are predominantly directed against MelanA/MART1. J INVEST DERMATOL 116:891-897 (2001).
Lee DY, Park KC, Cho KH: In a skin equivalent HaCaT cells have a preserved capacity to receive melanosomes but melanocytes do not remain in the basal location. ARCH DERMATOL RES 293:268-272 (2001).
Mackintosh JA: The antimicrobial properties of melanocytes, melanosomes and melanin and the evolution of black skin. J THEOR BIOL 211:101-113 (2001).
❖ Manga P, Boissy RE, Pifko-Hirst S, Zhou BK, Orlow SJ: Mislocalization of melanosomal proteins in melanocytes from mice with oculocutaneous albinism type 2. EXP EYE RES 72:695-710 (2001).
Massi D, Franchi A, Sardi I, Magnelli L, Paglierani M, Borgognoni L, Reali UM, Santucci M: Inducible nitric oxide synthase expression in benign and malignant cutaneous melanocytic lesions. J PATHOL 194:194-200 (2001).
❖ Meyskens FL, Farmer P, Fruehauf JP: Redox regulation in human melanocytes and melanoma. PIGM CELL RES 14:148-154 (2001).
❖ Minwalla L, Zhao Y, Cornelius J, Babcock GF, Wickett RR, LePoole IC, Boissy RE: Inhibition of melanosome transfer from melanocytes to keratinocytes by lectins and neoglycoproteins in an in vitro model system. PIGM CELL RES 14:185-194 (2001).
Mouriaux F, Chahud F, Maurage CA, Malecaze F, Labalette P: Implication of stem cell factor in the proliferation of choroidal melanocytes. EXP EYE RES 73:151-157 (2001).
Nau-Staudt K, Nau WM, Haefliger IO, Flammer J: Lipid peroxidation in porcine irises: Dependence on pigmentation. CURR EYE RES 22:229-234 (2001).
Okumoto H: Establishment of three cell lines derived from frog melanophores. ZOOL SCI 18:483-496 (2001).
Oshima N, Nakamaru N, Araki S, Sugimoto M: Comparative analyses of the pigment-aggregating and -dispersing actions of MCH on fish chromatophores. COMP BIOCHEM PHYSIOL PT C 129:75-84 (2001).
Prasad ML, Jungbluth AA, Iversen K, Huvos AG, Busam KJ: Expression of melanocytic differentiation markers in malignant melanomas of the oral and sinonasal mucosa. AMER J SURG PATHOL 25:782-787 (2001).
Rawls JF, Johnson SL: Requirements for the kit receptor tyrosine kinase during regeneration of zebrafish fin melanocytes. DEVELOPMENT 128:1943-1949 (2001).
Restano L, Barbareschi M, Cambiaghi S, Gelmetti C, Ghislanzoni M, Caputo R: Heterochromia of the scalp hair: A result of pigmentary mosaicism? J AMER ACAD DERMATOL 45:136-139 (2001).
Richetta A, Ottini L, Falchetti M, Innocenzi D, Bottoni U, Faiola R, Mariani-Costantini R, Calvieri S: Instability at sequence repeats in melanocytic tumours. MELANOMA RES 11:283-289 (2001).
Rocha IM, Guillo LA: Lipopolysaccharide and cytokines induce nitric oxide synthase and produce nitric oxide in cultured normal human melanocytes. ARCH DERMATOL RES 293:245-248 (2001).
Selgrade MK, Smith MV, Oberhelman-Bragg LJ, LeVee GJ, Koren HS, Cooper KD: Dose response for UV-induced immune suppression in people of color: Differences based on erythemal reactivity rather than skin pigmentation. PHOTOCHEM PHOTOBIOL 74:88-95 (2001).
Soyer HP, Argenziano G, Chimenti S, Ruocco V: Dermoscopy of pigmented skin lesions. EUROPEAN J DERMATOLOGY 11:270-276 (2001).

❖ Sviderskaya EV, Hill SP, Balachandar D, Barsh GS, Bennett DC: Agouti signaling protein and other factors modulating differentiation and proliferation of immortal melanoblasts. DEVELOP DYNAM 221:373-379 (2001).

Tkatchenko AV, Visconti RP, Shang LJ, Papenbrock T, Pruett ND, Ito T, Ogawa M, Awgulewitsch A: Overexpression of Hoxc13 in differentiating keratinocytes results in downregulation of a novel hair keratin gene cluster and alopecia. DEVELOPMENT 128:1547-1558 (2001).

VonStrandmann EP, Senkel S, Ryffel G, Hengge UR: Dimerization co-factor of hepatocyte nuclear factor 1/pterin-4α-carbinolamine dehydratase is necessary for pigmentation in *Xenopus* and overexpressed in primary human melanoma lesions. AMER J PATHOL 158:2021-2029 (2001).

West TP, Strohfus B: Polysaccharide production by a reduced pigmentation mutant of *Aureobasidium pullulans* NYS-1. LETT APPL MICROBIOL 33:169-172 (2001).

Xu CX, Green A, Parisi A, Parsons PG: Photosensitization of the sunscreen octyl p-dimethylaminobenzoate by UVA in human melanocytes but not in keratinocytes. PHOTOCHEM PHOTOBIOL 73:600-604 (2001).

MELANOMA & METASTASIS

Acland KM, Healy C, Calonje E, O'Doherty M, Nunan T, Page C, Higgins E, Russell-Jones R: Comparison of positron emission tomography scanning and sentinel node biopsy in the detection of micrometastases of primary cutaneous malignant melanoma. J CLIN ONCOL 19:2674-2678 (2001).

Adám Z, Adány R, Ladányi A, Tímár J, Balázs M: Liver metastatic ability of human melanoma cell line is associated with losses of chromosomes 4, 9p21-pter and 10p. CLIN EXP METASTAS 18:295-302 (2000).

Ahrens T, Sleeman JP, Schempp CM, Howells N, Hofmann M, Ponta H, Herrlich P, Simon JC: Soluble CD44 inhibits melanoma tumor growth by blocking cell surface CD44 binding to hyaluronic acid. ONCOGENE 20:3399-3408 (2001).

Albertini MR, King DM, Newton MA, Vacek PM: In vivo mutant frequency of thioguanine-resistant T-cells in the peripheral blood and lymph nodes of melanoma patients. MUTAT RES FUNDAM MOL MECH MUT 476:83-97 (2001).

Andrawiss M, Maron A, Beltran W, Opolon P, Connault E, Griscelli F, Yeh P, Perricaudet M, Devauchelle P: Adenovirus-mediated gene transfer in canine eyes: a preclinical study for gene therapy of human uveal melanoma. J GENE MED 3:228-239 (2001).

Baker JKL, Elshaw SR, Mathewman GEL, Nichols CE, Murray AK, Parsons MA, Rennie IG, Sisley K: Expression of integrins, degradative enzymes and their inhibitors in uveal melanoma: differences between in vitro and in vivo expression. MELANOMA RES 11:265-273 (2001).

Benelli C, Roscetti E, DalPozzo V: Reproducibility of the clinical criteria (ABCDE rule) and dermatoscopic features (7FFM) for the diagnosis of malignant melanoma. EUROPEAN J DERMATOLOGY 11:234-239 (2001).

Benlalam H, Labarrière N, Linard B, Derré L, Diez E, Pandolfino MC, Bonneville M, Jotereau F: Comprehensive analysis of the frequency of recognition of melanoma-associated antigen (MAA) by CD8 melanoma infiltrating lymphocytes (TIL): implications for immunotherapy. EUR J IMMUNOL 31:2007-2015 (2001).

Biggs MW, Eiselein JE: Suppression of immune surveillance in melanoma. MED HYPOTHESES 56:648-652 (2001).

Biroccio A, Benassi B, Amodei S, Gabellini C, DelBufalo D, Zupi G: C-myc down-regulation increases susceptibility to cisplatin through reactive oxygen species-mediated apoptosis in M14 human melanoma cells. MOL PHARMACOL 60:174-182 (2001).

Botella-Estrada R, Malet G, Revert F, Dasí F, Crespo A, Sanmartín O, Guillén C, Aliño SF: Antitumor effect of B16 melanoma cells genetically modified with the angiogenesis inhibitor RNasin. CANCER GENE THERAPY 8:278-284 (2001).

Böhm M, Schulte U, Funk JO, Raghunath M, Behrmann I, Kortylewski M, Heinrich PC, Kues T, Luger TA, Schwarz T: Interleukin-6-resistant melanoma cells exhibit reduced activation of STAT3 and lack of inhibition of cyclin E-associated kinase activity. J INVEST DERMATOL 117:132-140 (2001).

Borkowski LM, Grover S, Fishman GA, Jampol LM: Retinal findings in melanoma-associated retinopathy. AMER J OPHTHALMOL 132:273-275 (2001).

Brochez L, Verhaeghe E, Bleyen L, Naeyaert JM: Time delays and related factors in the diagnosis of cutaneous melanoma. EUR J CANCER 37:843-848 (2001).

Burd R, Wachsberger PR, Biaglow JE, Wahl ML, Lee I, Leeper DB: Absence of crabtree effect in human melanoma cells adapted to growth at low pH: Reversal by respiratory inhibitors. CANCER RES 61:5630-5635 (2001).

Busam KJ, Hester K, Charles C, Sachs DL, Antonescu CR, Gonzalez S, Halpern AC: Detection of clinically amelanotic malignant melanoma and assessment of its margins by in vivo confocal scanning laser microscopy. ARCH DERMATOL 137:923-929 (2001).

Busam KJ, Antonescu CR, Marghoob AA, Nehal KS, Sachs DL, Shia J, Berwick M: Histologic classification of tumor-infiltrating lymphocytes in primary cutaneous malignant melanoma - A study of interobserver agreement. AMER J CLIN PATHOL 115:856-860 (2001).

Cameron DA, Cornbleet MC, Mackie RM, Hunter JAA, Gore M, Hancock B, Smyth JF: Adjuvant interferon α2b in high risk melanoma - the Scottish study. BRIT J CANCER 84:1146-1149 (2001).

Cannavo SP, Vaccaro M, Guarneri B: Multiple papulonodular lesions on the arm - Metastatic melanoma of unknown primary origin. ARCH DERMATOL 137:960-+ (2001).

Carlson KW, Nawy SS, Wei ET, Sadée W, Filov VA, Rezsova VV, Slominski A, Quillan JM: Inhibition of mouse melanoma cell proliferation by corticotropin-releasing hormone and its analogs. ANTICANCER RES 21:1173-1179 (2001).

Carr A, Mazorra Z, Alonso DF, Mesa C, Valiente O, Gomez DE, Perez R, Fernandez LE: A purified GM3 ganglioside conjugated vaccine induces specific, adjuvant-dependent and non-transient antitumour activity against B16 mouse melanoma in vitro and in vivo. MELANOMA RES 11:219-227 (2001).

Carretero J, Obrador E, Esteve JM, Ortega A, Pellicer JA, Sempere FV, Estrela JM: Tumoricidal activity of endothelial cells - Inhibition of endothelial nitric oxide production abrogates tumor cytotoxicity induced by hepatic sinusoidal endothelium in response to B16 melanoma adhesion in vitro. J BIOL CHEM 276:25775-25782 (2001).

Certa U, Seiler M, Padovan E, Spagnoli GC: High density oligonucleotide array analysis of interferon-α2a sensitivity and transcriptional response in melanoma. BRIT J CANCER 85:107-114 (2001).

Chehade F, DeLabriolle-Vaylet C, Michelot J, Moins N, Moreau MF, Hindié E, Papon J, Escaig F, Galle P, Veyre A: Distribution of I-BZA (N-2-diethylaminoethyl-4-iodobenzamide) in grafted melanoma and normal skin: A study by secondary ion mass spectroscopy. CELL MOL BIOL 47:529-534 (2001).

Chomez P, DeBacker O, Bertrand M, DePlaen E, Boon T, Lucas S: An overview of the MAGE gene family with the identification of all human members of the family. CANCER RES 61:5544-5551 (2001).

Clarijs R, Schalkwijk L, Ruiter DJ, deWaal RMW: Lack of lymphangiogenesis despite coexpression of VEGF-C and its receptor Flt-4 in uveal melanoma. INVEST OPHTHALMOL VISUAL SCI 42:1422-1428 (2001).

Cockburn M, Hamilton A, Mack T: Recall bias in self-reported melanoma risk factors. AMER J EPIDEMIOL 153:1021-1026 (2001).

Conway RM, Chua WCT, Qureshi C, Billson FA: Primary iris melanoma: diagnostic features and outcome of conservative surgical treatment. BRIT J OPHTHALMOL 85:848-854 (2001).

Cresswell AC, Sisley K, Laws D, Parsons MA, Rennie IG, Murray AK: Reduced expression of TAP-1 and TAP-2 in posterior uveal melanoma is associated with progression to metastatic disease. MELANOMA RES 11:275-281 (2001).

D'Agnano I, Valentini A, Fornari C, Bucci B, Starace G, Felsani A, Citro G: Myc down-regulation induces apoptosis in M14 melanoma cells by increasing p27(kip1) levels. ONCOGENE 20:2814-2825 (2001).

D'Angelo S, Ingrosso D, Perfetto B, Baroni A, Zappia M, Lobianco LL, Tufano MA, Galletti P: UVA irradiation induces L-isoaspartyl formation in melanoma cell proteins. FREE RADICAL BIOL MED 31:1-9 (2001).

Deichmann M, Benner A, Kuner N, Wacker J, Waldmann V, Näher H: Are responses to therapy of metastasized malignant melanoma reflected by decreasing serum values of S100β or melanoma inhibitory activity (MIA)? MELANOMA RES 11:291-296 (2001).

DelBello B, Valentini MA, Zunino F, Comporti M, Maellaro E: Cleavage of Bcl-2 in oxidant- and cisplatin-induced apoptosis of human melanoma cells. ONCOGENE 20:4591-4595 (2001).

Demary K, Wong L, Liou JS, Faller DV, Spanjaard RA: Redox control of retinoic acid receptor activity: A novel mechanism for retinoic acid resistance in melanoma cells. ENDOCRINOLOGY 142:2600-2605 (2001).

Demunter A, Ahmadian MR, Libbrecht L, Stas M, Baens M, Scheffzek K, Degreef H, DeWolf-Peeters C, vandenOord JJ: A novel N-ras mutation in malignant melanoma is associated with excellent prognosis. CANCER RES 61:4916-4922 (2001).

Devi PU, Guruprasad K: Influence of clamping-induced ischemia and reperfusion on the response of a mouse melanoma to radiation and hyperthermia. INT J HYPERTHER 17:357-367 (2001).

Diener-West M, Earle JD, Fine SL, Hawkins BS, Moy CS, Reynolds SM, Schachat AP, Straatsma BR: The COMS randomized trial of iodine 125 brachytherapy for choroidal melanoma, II: Characteristics of patients enrolled and not enrolled. ARCH OPHTHALMOL 119:951-965 (2001).

Diener-West M, Earle JD, Fine SL, Hawkins BS, Moy CS, Reynolds SM, Schachat AP, Straatsma BR: The COMS randomized trial of iodine 125 brachytherapy for choroidal melanoma, III: Initial mortality findings. ARCH OPHTHALMOL 119:969-982 (2001).

Dong CH, Hemminki K: Multiple primary cancers of the colon, breast and skin (melanoma) as models for polygenic cancers. INT J CANCER 92:883-887 (2001).

El Shabrawi Y, Ardjomand N, Radner H, Ardjomand N: MMP-9 is predominantly expressed in epithelioid and not spindle cell uveal melanoma. J PATHOL 194:201-206 (2001).

Elia G, Ren Y, Lorenzoni P, Zarnegar R, Burger MM, Rusciano D: Mechanisms regulating c-met overexpression in liver-metastatic B16-LS9 melanoma cells. J CELL BIOCHEM 81:477-487 (2001).

Fabrizi G, Massi G: Spitzoid malignant melanoma in teenagers: an entity with no better prognosis than that of other forms of melanoma. HISTOPATHOLOGY 38:448-453 (2001).

Fan SF, Gu WZ, Zhang JM: MR findings of malignant melanoma of the vagina. BRIT J RADIOL 74:445-447 (2001).

Flaherty LE, Atkins M, Sosman J, Weiss G, Clark JI, Margolin K, Dutcher J, Gordon MS, Lotze M, Mier J, Sorokin P, Fisher RI, Appel C, Du W: Outpatient biochemotherapy with interleukin-2 and interferon α2b in patients with metastatic malignant melanoma: Results of two phase II cytokine working group trials. J CLIN ONCOL 19:3194-3202 (2001).

Gazzaniga S, Bravo A, Goldszmid SR, Maschi F, Martinelli J, Mordoh J, Wainstok R: Inflammatory changes after cryosurgery-induced necrosis in human melanoma xenografted in nude mice. J INVEST DERMATOL 116:664-671 (2001).

❖ Gershenwald JE, Sumner W, Calderone T, Wang Z, Huang SY, Bar-Eli M: Dominant-negative transcription factor AP-2 augments SB-2 melanoma tumor growth in vivo. ONCOGENE 20:3363-3375 (2001).

Gombos DS, Meldrum ML, Smith JH, Lee C, O'Brien JM: The disappearing "melanoma". BRIT J OPHTHALMOL 85:759-760 (2001).

Goodwin BL, Xi HK, Tejiram R, Eason DD, Ghosh N, Wright KL, Nagarajan U, Boss JM, Blanck G: Varying functions of specific major histocompatibility class II transactivator promoter III and IV elements in melanoma cell lines. CELL GROWTH DIFFER 12:327-335 (2001).

Goydos JS, Patel M, Shih WC: NY-ESO-1 and CTp11 expression may correlate with stage of progression in melanoma. J SURG RES 98:76-80 (2001).

Gray CP, Franco AV, Arosio P, Hersey P: Immunosuppressive effects of melanoma-derived heavy-chain ferritin are dependent on stimulation of IL-10 production. INT J CANCER 92:843-850 (2001).

Griffioen M, Borghi M, Schrier PI, Osanto S: Detection and quantification of CD8(+) T cells specific for HLA-A*0201-binding melanoma and viral peptides by the IFN-γ-elispot assay. INT J CANCER 93:549-555 (2001).

Grostern RJ, Shternfeld IS, Bacus SS, Gilchrist K, Zimbric ML, Albert DM: Absence of type I estrogen receptors in choroidal melanoma: Analysis of Collaborative Ocular Melanoma Study (COMS) eyes. AMER J OPHTHALMOL 131:788-791 (2001).

Gütgemann A, Golob M, Müller S, Buettner R, Bosserhoff AK: Isolation of invasion-associated cDNAs in melanoma. ARCH DERMATOL RES 293:283-290 (2001).

Gutman H, Laish-Farkash A, Risin D, Pellis NR: Locomotion of lymphocytes towards melanoma cells treated with tumor necrosis factor in a syngeneic in vitro model. INT J MOL MED 8:199-203 (2001).

Hattori T, Itoh S, Hayashi H, Chiba T, Takii T, Yoshizaki K, Onozaki K: CHOP, a basic leucine zipper transcriptional factor, contributes to the antiproliferative effect of IL-1 on A375 human melanoma cells through augmenting transcription of IL-6. J INTERFERON CYTOKINE RES 21:323-332 (2001).

Hattori T, Hayashi H, Chiba T, Onozaki K: Activation of two distinct anti-proliferative pathways, apoptosis and p38 MAP kinase-dependent cell cycle arrest, by tumor necrosis factor inhuman melanoma cell line A375. EUR CYTOKINE NETW 12:244-252 (2001).

Hauschild A, Garbe C, Stolz W, Ellwanger U, Seiter S, Dummer R, Ugurel S, Sebastian G, Nashan D, Linse R, Achtelik W, Mohr P, Kaufmann R, Fey M, Ulrich J, Tilgen W: Dacarbazine and interferon α with or without interleukin 2 in metastatic melanoma: a randomized phase III multicentre trial of the Dermatologic Cooperative Oncology Group (DeCOG). BRIT J CANCER 84:1036-1042 (2001).

Hegyesi H, Somlai B, Varga VL, Toth G, Kovacs P, Molnar EL, Laszlo V, Karpati S, Rivera E, Falus A, Darvas Z: Suppression of melanoma cell proliferation by histidine decarboxylase specific antisense oligonucleotides. J INVEST DERMATOL 117:151-153 (2001).

Hehlgans T, Männel DN: Recombinant, soluble LIGHT (HVEM ligand) induces increased IL-8 secretion and growth arrest in A375 melanoma cells. J INTERFERON CYTOKINE RES 21:333-338 (2001).

Helmbach H, Rossmann E, Kern MA, Schadendorf D: Drug-resistance in human melanoma. INT J CANCER 93:617-622 (2001).

Helsing P, Hoyheim B: The Asp84Glu variant of the MC1R gene in Norwegian melanoma patients. ACTA DERMATO VENEREOL 81:68-69 (2001).

Hendrix MJC, Seftor EA, Meltzer PS, Gardner LMG, Hess AR, Kirschmann DA, Schatteman GC, Seftor REB: Expression and functional significance of VE-cadherin in aggressive human melanoma cells: Role in vasculogenic mimicry. PROC NAT ACAD SCI USA 98:8018-8023 (2001).

Hildebrandt T, VanDijk MCRF, vanMuijen GNP, Weidle UH: Loss of heterozygosity of gene THW is frequently found in melanoma metastases. ANTICANCER RES 21:1071-1080 (2001).

Hofbauer GFL, Geertsen R, Laine E, Burg G, Dummer R: Impact of interferons on the expression of melanoma-associated antigens in melanoma short-term cell cultures. MELANOMA RES 11:213-218 (2001).

Hosooka T, Noguchi T, Nagai H, Horikawa T, Matozaki T, Ichihashi M, Kasuga M: Inhibition of the motility and growth of B16F10 mouse melanoma cells by dominant negative mutants of Dok-1. MOL CELL BIOL 21:5437-5446 (2001).

Huang SY, Pettaway CA, Uehara H, Bucana CD, Fidler IJ: Blockade of NF-kappaB activity in human prostate cancer cells is associated with suppression of angiogenesis, invasion, and metastasis. ONCOGENE 20:4188-4197 (2001).

Huang XJ, Orucevic A, Li MF, Gorelik E: Nitric oxide (NO), methylation and TIMP-1 expression in BL6 melanoma cells transfected with MHC class I genes. CLIN EXP METASTAS 18:329-335 (2000).

❖ Iida J, Pei D, Kang T, Simpson MA, Herlyn M, Furcht LT, McCarthy JB: Melanoma chondroitin sulfate proteoglycan regulates matrix metalloproteinase-dependent human melanoma invasion into type I collagen. J BIOL CHEM 276:18786-18794 (2001).

Iscovich J, Abdulrazik M, Pe'er J: Posterior uveal malignant melanoma: Temporal stability and ethnic variation in rates in Israel. ANTICANCER RES 21:1449-1454 (2001).

Janik JE, Miller LL, Kom EL, Stevens D, Curti BD, Smith JW, Sznol M, Conlon KC, Sharfman W, Urba WJ, Gause BL, Longo DL: A prospective randomized phase II trial of GM-CSF priming to prevent topotecan-induced neutropenia in chemotherapy-naive patients with malignant melanoma or renal cell carcinoma. BLOOD 97:1942-1946 (2001).

Jordana AM, Khan TH, Malkin H, Osborn HMI, Photiou A, Riley PA: Melanocyte-directed enzyme prodrug therapy (MDEPT): Development of second generation prodrugs for targeted treatment of malignant melanoma. BIOORGAN MED CHEM 9:1549-1558 (2001).

Kageshita T, Funasaka Y, Ichihashi M, Wakamatsu K, Ito S, Ono T: Tissue factor expression and serum level in patients with melanoma does not correlate with disease progression. PIGM CELL RES 14:195-200 (2001).

Kanetsky PA, Holmes R, Walker A, Najarian D, Swoyer J, Guerry D, Halpern A, Rebbeck TR: Interaction of glutathione S-transferase M1 and T1 genotypes and malignant melanoma. CANCER EPIDEM BIOMARKER PREV 10:509-513 (2001).

Kanzler MH, Mraz-Gernhard S: Depth of excision of melanomas - Reply. JAMA J AM MED ASSN 286:168 (2001).

Kanzler MH, Mraz-Gernhard S: Primary cutaneous malignant melanoma and its precursor lesions: Diagnostic and therapeutic overview. J AMER ACAD DERMATOL 45:260-276 (2001).

Karvat A, Duzenli C, Ma R, Paton K, Pickles T: The treatment of choroidal melanoma with Au-198 plaque brachytherapy. RADIOTHER ONCOL 59:153-156 (2001).

Kato T, Wang Y, Yamaguchi K, Milner CM, Shineha R, Satomi S, Miyagi T: Overexpression of lysosomal-type sialidase leads to suppression of metastasis associated with reversion of malignant phenotype in murine B16 melanoma cells. INT J CANCER 92:797-804 (2001).

Kaufman HL, DeRaffele G, Divito J, Hörig H, Lee D, Panicali D, Voulo M: A phase I trial of intralesional rV-Tricom vaccine in the treatment of malignant melanoma. HUM GENE THER 12:1459-1480 (2001).

Khalbuss WE, Hossain M, Elhosseiny A: Primary malignant melanoma of the urinary bladder diagnosed by urine cytology - A case report. ACTA CYTOL 45:631-635 (2001).

Kirkwood: High-dose interferon α2b significantly prolongs relapse-free and overall survival compared with the GM2-KLH/QS-21 vaccine in patients with resected stage IIB-III melanoma: Results of intergroup trial E1694/S9512/C509801 (vol 19, pg 2370, 2001). J CLIN ONCOL 19:3443 (2001).

Kivelä T: Iris melanomas in children. ARCH OPHTHALMOL 119:925 (2001).

Koenig A, Wojcieszyn J, Weeks BR, Modiano JF: Expression of S100a, vimentin, NSE, and Melan A/MART-1 in seven canine melanoma cell lines and twenty-nine retrospective cases of canine melanoma. VET PATHOL 38:427-435 (2001).

Konduri SD, Tasiou A, Chandrasekar N, Nicolson GL, Rao JS: Role of tissue factor pathway inhibitor-2 (TFPI-2) in amelanotic melanoma (C-32) invasion. CLIN EXP METASTAS 18:303-308 (2000).

Konjevic G, Jovic V, Radulovic S, Jelic S, Dzodic R, Spuzic I: Therapeutic implications of the kinetics of immunomodulation during single or combined treatment of melanoma patients with dacarbazine and interferon-α. NEOPLASMA 48:175-181 (2001).
Korabiowska M, Viehöver M, Schlott T, Berger H, Droese M, Brinck U: Relationship between DNA ploidy-related parameters and the deletions in mismatch repair genes MLH1 and MSH2 in lentigo maligna and malignant melanomas. ARCH DERMATOL RES 293:219-225 (2001).
Kortylewski M, Heinrich PC, Kauffmann ME, Böhm M, Mackiewicz A, Behrmann I: Mitogen-activated protein kinases control p27/Kip1 expression and growth of human melanoma cells. BIOCHEM J 357:297-303 (2001).
Kozlowski L, Stoklosa T, Omura S, Wójcik C, Wojtukiewicz MZ, Worowski K, Ostrowska H: Lactacystin inhibits cathepsin A activity in melanoma cell lines. TUMOR BIOL 22:211-215 (2001).
Krähn G, Kaskel P, Sander S, Waizenhöfer JPY, Wortmann S, Leiter U, Peter RU: S100β is a more reliable tumor marker in peripheral flood for patients with newly occurred melanoma metastases compared with MIA, albumin and lactate-dehydrogenase. ANTICANCER RES 21:1311-1316 (2001).
Krähn G, Leiter U, Udart M, Kaskel P, Peter RU: UVB-induced decrease of p16/CDKN2A expression in skin cancer patients. PIGM CELL RES 14:201-205 (2001).
Kretschmer L: Adjuvant chemotherapy in patients with palpable lymph node metastases in cutaneous malignant melanoma. MELANOMA RES 11:315-318 (2001).
Kurdoglu M, Güllü IH, Akalin I: Is there a relationship between tissue inhibitor of metalloproteinase-1 and transforming growth factor-β 1 with respect to malignant melanoma progression? MED HYPOTHESES 57:238-240 (2001).
Lang R, Berger A, Hermann A, Kofler B: Biphasic response to human galanin of extracellular acidification in human Bowes melanoma cells. EUR J PHARMACOL 423:135-141 (2001).
LaPorta CAM, Comolli R: Different levels of TGFβ, IL-10, IFNγ and gelatinase A occur in experimental white and black metastases induced by bryostatin 1 or by phorbol ester-treated BL6T murine melanoma cells. CLIN EXP METASTAS 18:361-369 (2001).
Lee FT, Rigopoulos A, Hall C, Clarke K, Cody SH, Smyth FE, Liu ZQ, Brechbiel MW, Hanai N, Nice EC, Catimel B, Burgess AW, Welt S, Ritter G, Old LJ, Scott AM: Specific localization, γ camera imaging, and intracellular trafficking of radiolabelled chimeric anti-G(D3) ganglioside monoclonal antibody KM871 in SK-MEL-28 melanoma xenografts. CANCER RES 61:4474-4482 (2001).
Leonetti C, Biroccio A, Benassi B, Stringaro A, Stoppacciaro A, Semple SC, Zupi G: Encapsulation of c-myc antisense oligodeoxynucleotides in lipid particles improves antitumoral efficacy in vivo in a human melanoma line. CANCER GENE THERAPY 8:459-468 (2001).
Li XW, Regezi J, Ross FP, Blystone S, Ilic D, Leong SPL, Ramos DM: Integrin αvβ3 mediates K1735 murine melanoma cell motility in vivo and in vitro. J CELL SCI 114:2665-2672 (2001).
Licato LL, Prieto VG, Grimm EA: A novel preclinical model of human malignant melanoma utilizing bioreactor rotating-wall vessels. IN VITRO CELL DEV BIOL ANIMAL 37:121-126 (2001).
Litynska A, Przybylo M, Pochec E, Hoja-Lukowicz D, Ciolczyk D, Laidler P, Gil D: Comparison of the lectin-binding pattern in different human melanoma cell lines. MELANOMA RES 11:205-212 (2001).
Loggini B, Rinaldi I, Pingitore R, Cristofani R, Castagna M, Barachini P: Immunohistochemical study of 49 cutaneous melanomas: p53, PCNA, Bcl-2 expression and multidrug resistance. TUMORI 87:179-186 (2001).
Lorentzen HF, Weismann K, Larsen FG: Dermatoscopic prediction of melanoma thickness using latent trait analysis and likelihood ratios. ACTA DERMATO VENEREOL 81:38-41 (2001).
Lougheed JC, Holton JM, Alber T, Bazan JF, Handel TM: Structure of melanoma inhibitory activity protein, a member of a recently identified family of secreted proteins. PROC NAT ACAD SCI USA 98:5515-5520 (2001).
López-Castilla JD, Díaz-Fernández F, Soult JA, Muñoz M, Barriga R: Primary leptomeningeal melanoma in a child. PEDIAT NEUROL 24:390-392 (2001).
Lucci A, Citro HW, Wilson L: Assessment of knowledge of melanoma risk factors, prevention, and detection principles in Texas teenagers. J SURG RES 97:179-183 (2001).
Macaulay VM, Salisbury AJ, Bohula EA, Playford MP, Smorodinsky NI, Shiloh Y: Downregulation of the type 1 insulin-like growth factor receptor in mouse melanoma cells is associated with enhanced radiosensitivity and impaired activation of Atm kinase. ONCOGENE 20:4029-4040 (2001).
Macht SD: Depth of excision of melanomas. JAMA J AM MED ASSN 286:167-168 (2001).
Madeja Z, Szymkiewicz I, Zaczek A, Sroka J, Miekus K, Korohoda W: Contact-activated migration of melanoma B16 and sarcoma XC cells. BIOCHEM CELL BIOL 79:425-440 (2001).
Margenthaler JA, Virgo KS, Johnson DY, Sugarbaker EM, Handler BS, Johnson FE: How surgeon age affects post-treatment surveillance strategies for melanoma patients. INT J ONCOL 19:175-180 (2001).
Margolin K, Longmate J, Synold TW, Gandara DR, Weber J, Gonzalez R, Johansen MJ, Newman R, Baratta T, Doroshow JH: Dolastatin-10 in metastatic melanoma: A phase II and pharmokinetic trial of the california cancer consortium. INVEST NEW DRUG 19:335-340 (2001).
Martínez-Lorenzo MJ, Méresse S, deChastellier C, Gorvel JP: Unusual intracellular trafficking of *Salmonella typhimurium* in human melanoma cells. CELL MICROBIOL 3:407-416 (2001).
Mäkitie T, Summanen P, Tarkkanen A, Kivelä T: Tumor-infiltrating macrophages (CD68(+) cells) and. prognosis in malignant uveal melanoma. INVEST OPHTHALMOL VISUAL SCI 42:1414-1421 (2001).
McClay EF, McClay MET, Monroe L, Jones JA, Winski PJ: A phase II study of high dose tamoxifen and weekly cisplatin in patients with metastatic melanoma. MELANOMA RES 11:309-313 (2001).
McMasters KM, Reintgen DS, Ross MI, Gershenwald JE, Edwards MJ, Sober A, Fenske N, Glass F, Balch CM, Coit DG: Sentinel lymph node biopsy for melanoma: Controversy despite widespread agreement. J CLIN ONCOL 19:2851-2855 (2001).
Mellado M, deAna AM, Moreno MC, Martínez C, Rodríguez-Frade JM: A potential immune escape mechanism by melanoma cells through the activation of chemokine-induced T cell death. CURR BIOL 11:691-696 (2001).

Mhashilkar AM, Schrock RD, Hindi M, Liao J, Sieger K, Kourouma F, Zou-Yang XH, Onishi E, Takh O, Vedvick TS, Fanger G, Stewart L, Watson GJ, Snary D, Fisher PB, Saeki T, Roth JA, Ramesh R, Chada S: Melanoma differentiation associated gene-7 (mda-7): A novel anti-tumor gene for cancer gene therapy. MOL MED 7:271-282 (2001).
Middleton MR, Thatcher N: Adjuvant interferon in melanoma - a resurrection? BRIT J CANCER 84:1141-1142 (2001).
Miracco C, Palummo N, Lavergne D, Nyongo A, Tosi P, deVilliers EM: Malignant melanomas: Search for human papillomaviruses. ARCH DERMATOL 137:826-827 (2001).
Mocellin S, Ohnmacht GA, Wang E, Marincola FM: Kinetics of cytokine expression in melanoma metastases classifies immune responsiveness. INT J CANCER 93:236-242 (2001).
Molnar EL, Cricco G, Martin G, Darvas Z, Hegyesi H, Fitzsimons C, Bergoc R, Falus A, Rivera E: Histamine as a potential autocrine regulator of melanoma. INFLAMM RESEARCH 50:S102-S103 (2001).
Morris KT, Stevens JS, Pommier RF, Fletcher WS, Vetto JT: Usefulness of preoperative lymphoscintigraphy for the identification of sentinel lymph nodes in melanoma. AMER J SURG 181:423-426 (2001).
Moshari A, McLean IW: Uveal melanoma: Mean of the longest nucleoli measured on silver-stained sections. INVEST OPHTHALMOL VISUAL SCI 42:1160-1163 (2001).
Moy CS, Albert DM, Diener-West M, McCaffrey LD, Scully RE, Willson JKV: Cause-specific mortality coding: Methods in the Collaborative Ocular Melanoma Study COMS report no. 14. CONTR CLIN TRIAL 22:248-262 (2001).
Muller MGS, vanLeeuwen PAM, deLange-deKlerk ESM, vanDiest PJ, Pijpers R, Ferwerda CC, Vuylsteke RJCL, Meijer S: The sentinel lymph node status is an important factor for predicting clinical outcome in patients with stage I or II cutaneous melanoma. CANCER 91:2401-2408 (2001).
Muller MGS, vanLeeuwen PAM, vanDiest PJ, Vuylsteke RJCL, Pijpers R, Meijer S: No indication for performing sentinel node biopsy in melanoma patients with a Breslow thickness of less than 0.9 mm. MELANOMA RES 11:303-307 (2001).
Munzenrider JE: Uveal melanomas - Conservation treatment. HEMATOL ONCOL CLIN N AMER 15:389-+ (2001).
Müskens RPHM, vanBest JA, Bleeker JC, Keunen JEE: Corneal autofluorescence in choroidal melanoma or in choroidal naevus. BRIT J OPHTHALMOL 85:662-665 (2001).
Naama HA, McCarter MD, Mack VE, Evoy DA, Hill AD, Shou J, Daly JM: Suppression of macrophage nitric oxide production by melanoma: mediation by a melanoma-derived product. MELANOMA RES 11:229-238 (2001).
Naama HA, Mack VE, Smyth GP, Stapleton PP, Daly JM: Macrophage effector mechanisms in melanoma in an experimental study. ARCH SURG 136:804-809 (2001).
Nagashima H, Mori M, Sadanaga N, Mashino K, Yoshikawa Y, Sugimachi K: Expression of Fas ligand in gastric carcinoma relates to lymph node metastasis. INT J ONCOL 18:1157-1162 (2001).
Nemunaitis J, Fong T, Shabe P, Martineau D, Ando D: Comparison of serum interleukin-10 (IL-10) levels between normal volunteers and patients with advanced melanoma. CANCER INVEST 19:239-247 (2001).
Neubauer S, Mena I, Iglesis R, Schwartz R, Acevedo JC, Leon A, Gomez L: Sentinel lymph node mapping in melanoma with technetium-99m Dextran. CANCER BIOTHER RADIOPHARM 16:265-267 (2001).
Négrier S, Fervers B, Bailly C, Beckendorf V, Cupissol D, Doré JF, Dorval T, Garbay JR, Vilmer C: Cutaneous melanoma. BRIT J CANCER 84:81-85 (2001).
Nguyen NP, Sallah S, Childress C, Salehpour MR, Karlsson U: Interferon-α combined with radiotherapy in the treatment of unresectable melanoma. CANCER INVEST 19:261-265 (2001).
Noël G, Proudhom MA, Valery CA, Cornu P, Boisserie G, Hasboun D, Simon JM, Feuvret L, Duffau H, Tep B, Delattre JY, Marsault C, Philippon J, Fohanno D, Baillet F, Mazeron JJ: Radiosurgery for re-irradiation of brain metastasis: results in 54 patients. RADIOTHER ONCOL 60:61-67 (2001).
Omholt K, Platz A, Ringborg U, Hansson J: Cytoplasmic and nuclear accumulation of β-catenin is rarely caused by CTNNB1 exon 3 mutations in cutaneous malignant melanoma. INT J CANCER 92:839-842 (2001).
Pandolfino MC, Labarrière N, Tessier MH, Cassidanius A, Bercegeay S, Lemarre P, Dehaut F, Dréno B, Jotereau F: High-scale expansion of melanoma-reactive TIL by a polyclonal stimulus: predictability and relation with disease advancement. CANCER IMMUNOL IMMUNOTHER 50:134-140 (2001).
Paridaens D, Beekhuis H, vandenBosch W, Remeyer L, Melles G: Amniotic membrane transplantation in the management of conjunctival malignant melanoma and primary acquired melanosis with atypia. BRIT J OPHTHALMOL 85:658-661 (2001).
Parrella P, Caballero OL, Sidransky D, Merbs SL: Detection of c-myc amplification in uveal melanoma by fluorescent in situ hybridization. INVEST OPHTHALMOL VISUAL SCI 42:1679-1684 (2001).
Pe'er J: Iris melanoma in a 6-year-old girl. ARCH OPHTHALMOL 119:780-781 (2001).
Pethiyagoda CL, Welch DR, Fleming TP: Dipeptidyl peptidase IV (DPPIV) inhibits cellular invasion of melanoma cells. CLIN EXP METASTAS 18:391-400 (2001).
Petronzelli F, Sollima D, Coppola G, Martini-Neri ME, Neri G, Genuardi M: CDKN2A germline splicing mutation affecting both P16(ink4) and P14(arf) RNA processing in a melanoma/neurofibroma kindred. GENE CHROMOSOME CANCER 31:398-401 (2001).
Phan GQ, Attia P, Steinberg SM, White DE, Rosenberg SA: Factors associated with response to high-dose interleukin-2 in patients with metastatic melanoma. J CLIN ONCOL 19:3477-3482 (2001).
Poetsch M, Dittberner T, Woenckhaus C: Does the PITSLRE gene complex contribute to the pathogenesis of malignant melanoma of the skin? A study of patient-derived tumor samples. CANCER GENET CYTOGENET 128:181-182 (2001).
Poser I, Domínguez D, deHerreros AG, Varnai A, Buettner R, Bosserhoff AK: Loss of E-cadherin expression in melanoma cells involves up-regulation of the transcriptional repressor snail. J BIOL CHEM 276:24661-24666 (2001).
Printz C: Spontaneous regression of melanoma may offer insight into cancer immunology. J NAT CANCER INST 93:1047-1048 (2001).
Rásó E, Tóvári J, Tóth K, Paku S, Trikha M, Honn KV, Tímár J: Ectopic αIIbβ3 integrin signaling involves 12-lipoxygenase- and PKC-mediated serine phosphorylation events in melanoma cells. THROMB HAEMOST 85:1037-1042 (2001).
Redondo P, Solano T, Bauza A, Lloret P: Amelanotic, melanoma presenting as a scar. ARCH INTERN MED 161:1912-1913 (2001).

Retsas S: Prognostic factors in therapeutic lymphadenectomy in melanoma. MELANOMA RES 11:315 (2001).
Retsas S, Christofyllakis C: Melanoma involving the gastrointestinal tract. ANTICANCER RES 21:1503-1507 (2001).
Richardson DR: Iron and gallium increase iron uptake from transferrin by human melanoma cells: further examination of the ferric ammonium citrate-activated iron uptake process. BBA MOL BASIS DIS 1536:43-54 (2001).
Riley JP, Rosenberg SA, Parkhurst MR: Identification of a new shared HLA-A2.1 restricted epitope from the melanoma antigen tyrosinase. J IMMUNOTHER 24:212-220 (2001).
Riteau B, Moreau P, Menier C, Khalil-Daher I, Khosrotehrani K, Bras-Goncalves R, Paul P, Dausset J, Rouas-Freiss N, Carosella ED: Characterization of HLA-G1,-G2,-G3, and-G4 isoforms transfected in a human melanoma cell line. TRANSPLANT PROC 33:2360-2364 (2001).
Roguedas AM, Lonceint J, Sassolas B, deSaintMartin L, Guillet G: Acute pancreatitis after high-dose interferon in a patient with melanoma. PRESSE MEDICALE 30:1105 (2001).
Rose DM, Essner R, Hughes TMD, Tang PCY, Bilchik A, Wanek LA, Thompson JF, Morton DL: Surgical resection for metastatic melanoma to the liver - The John Wayne Cancer Institute and Sydney Melanoma Unit Experience. ARCH SURG 136:950-955 (2001).
Sasaki M, Nakahira K, Kawano Y, Katakura H, Yoshimine T, Shimizu K, Kim SU, Ikenaka K: MAGE-E1, a new member of the melanoma-associated antigen gene family and its expression in human glioma. CANCER RES 61:4809-4814 (2001).
❖ Satyamoorthy K, Bogenrieder T, Herlyn M: No longer a molecular black box - new clues to apoptosis and drug resistance in melanoma. TRENDS MOL MED 7:191-194 (2001).
❖ Satyamoorthy K, Muyrers J, Meier F, Patel D, Herlyn M: Mel-CAM-specific genetic suppressor elements inhibit melanoma growth and invasion through loss of gap junctional communication. ONCOGENE 20:4676-4684 (2001).
Schaeppi H, Bauer JW, Hametner R, Metze D, Ortiz-Urda S, Salmhofer W, Rappersberger K, Hintner H: A localized variant of paraneoplastic pemphigus: acantholysis associated with malignant melanoma. BRIT J DERMATOL 144:1249-1254 (2001).
Shields CL, Materin MA, Shields JA, Gershenbaum E, Singh AD, Smith A: Factors associated with elevated intraocular pressure in eyes with iris melanoma. BRIT J OPHTHALMOL 85:666-669 (2001).
Schneider PD: Surgical resection for metastatic melanoma to the liver - The John Wayne Cancer Institute and Sydney Melanoma Unit experience - Invited critique. ARCH SURG 136:955 (2001).
Shidham VB, Qi DY, Acker S, Kampalath B, Chang CC, George V, Komorowski R: Evaluation of micrometastases in sentinel lymph nodes of cutaneous melanoma - Higher diagnostic accuracy with Melan-A and MART-1 compared with S-100 protein and HMB-45. AMER J SURG PATHOL 25:1039-1046 (2001).
Sieving PA, Arbor A: Fifteen years of work - The COMS outcomes for medium-sized choroidal melanoma. ARCH OPHTHALMOL 119:1067-1068 (2001).
Singh AD, Shields CL, Shields JA: Prognostic factors in uveal melanoma. MELANOMA RES 11:255-263 (2001).
Singh AD, Shields CL, Shields JA, Sato T: Iris melanomas in children - In reply. ARCH OPHTHALMOL 119:925-926 (2001).
Sondak VK: Adjuvant therapy for melanoma. CANCER J 7:S24-S27 (2001).
Starz H, Balda BR, Krämer KU, Büchels H, Wang HJ: A micromorphometry-based concept for routine classification of sentinel lymph node metastases and its clinical relevance for patients with melanoma. CANCER 91:2110-2121 (2001).
Stebbing J, Thomas M, Gore M: Necrosis in melanoma metastases with treatment. ANN ONCOL 12:873-874 (2001).
Straume O, Akslen LA: Expresson of vascular endothelial growth factor, its receptors (FLT-1, KDR) and TSP-1 related to microvessel density and patient outcome in vertical growth phase melanomas. AMER J PATHOL 159:223-235 (2001).
Taback B, Fujiwara Y, Wang HJ, Foshag LJ, Morton DL, Hoon DSB: Prognostic significance of circulating microsatellite markers in the plasma of melanoma patients. CANCER RES 61:5723-5726 (2001).
Tatlidil R, Mandelkern M: FDG-PET in the detection of gastrointestinal metastases in melanoma. MELANOMA RES 11:297-301 (2001).
Trask PC, Paterson AG, Hayasaka S, Dunn RL, Riba M, Johnson T: Psychosocial characteristics of individuals with non-stage IV melanoma. J CLIN ONCOL 19:2844-2850 (2001).
Tronnier M, Müller C: Relationship between season and diagnoses of melanocytic tumours. ACTA DERMATO VENEREOL 81:112-115 (2001).
Ugurel S, Rebmann V, Ferrone S, Tilgen W, Grosse-Wilde H, Reinhold U: Soluble human leukocyte antigen-G serum level is elevated in melanoma patients and is further increased by interferon-α immunotherapy. CANCER 92:369-376 (2001).
Vajdic CM, Kricker A, Giblin M, McKenzie J, Aitken J, Giles GG, Armstrong BK: Eye color and cutaneous nevi predict risk of ocular melanoma in Australia. INT J CANCER 92:906-912 (2001).
vanderVelden PA, Metzelaar-Blok JAW, Bergman W, Hurks HMH, Frants RR, Gruis NA, Jager MJ: Promoter hypermethylation: A common cause of reduced p16(INK4a) expression in uveal melanoma. CANCER RES 61:5303-5306 (2001).
Villa R, DellaPorta C, Folini M, Daidone MG, Zaffaroni N: Possible regulation of telomerase activity by transcription and alternative splicing of telomerase reverse transcriptase in human melanoma. J INVEST DERMATOL 116:867-873 (2001).
Volt C, Mayer T, Kron M, Schoengen A, Sterry W, Weber L, Proebstle TM: Efficacy of ultrasound B-scan compared with physical examination in follow-up of melanoma patients. CANCER 91:2409-2416 (2001).
Wack C, Becker JC, Bröcker EB, Lutz WK, Fischer WH: Chemoimmunotherapy for melanoma with dacarbazine and 2,4-dinitrochlorobenzene: results from a murine tumour model. MELANOMA RES 11:247-253 (2001).
Wade N, Bryant NJ, Connolly LM, Simpson RJ, Luzio JP, Piper RC, James DE: Syntaxin 7 complexes with mouse Vps10p tail interactor 1b, Syntaxin 6, vesicle-associated membrane protein (VAMP)8, and VAMP7 in B16 melanoma cells. J BIOL CHEM 276:19820-19827 (2001).
Wang CJ: Followup of primary malignant melanoma of the prostate. J UROL 166:214 (2001).
Wang Z, Atencio J, Robinson ES, McCarrey JR: Ultraviolet B-induced melanoma in *Monodelphis domestica* occurs in the absence of alterations in the structure or expression of the p53 gene. MELANOMA RES 11:239-245 (2001).
Weiss L: Heterogeneity of cancer cell populations and metastasis. CANCER METAST REV 19:351-379 (2000).

Whitehead RP, Unger JM, Flaherty LE, Eckardt JR, Taylor SA, Didolkar MS, Samlowski W, Sondak VK: Phase II trial of CI-980 in patients with disseminated malignant melanoma and no prior chemotherapy - A Southwest Oncology Group study. INVEST NEW DRUG 19:239-243 (2001).
Willson JKV, Albert DM, Diener-West M, McCaffrey L, Moy CS, Scully RE: Assessment of metastatic disease status at death in 435 patients with large choroidal melanoma in the Collaborative Ocular Melanoma Study (COMS). ARCH OPHTHALMOL 119:670-676 (2001).
Wrightson WR, Wong SL, Edwards MJ, Chao C, Conrad AJ, Albrecht J, Viar V, McMasters KM: Reverse transcriptase-polymerase chain reaction (RT-PCR) analysis of nonsentinel nodes following completion lymphadenectomy for melanoma. J SURG RES 98:47-51 (2001).
Yang FC, Merlino G, Chin L: Genetic dissection of melanoma pathways in the mouse. SEMIN CANCER BIOL 11:261-268 (2001).
Yang JM, Richmond A: Constitutive IkappaB kinase activity correlates with nuclear factor-kappaB activation in human melanoma cells. CANCER RES 61:4901-4909 (2001).
Zhang XM, Xu Q, Saiki I: Quercetin inhibits the invasion and mobility of murine melanoma B16-BL6 cells through inducing apoptosis via decreasing Bcl-2 expression. CLIN EXP METASTAS 18:415-421 (2001).

MSH, POMC, GROWTH FACTORS & RECEPTORS

An SZ, Cutler G, Zhao JJ, Huang SG, Tian H, Li WB, Liang LM, Rich M, Bakleh A, Du J, Chen JL, Dai K: Identification and characterization of a melanin-concentrating hormone receptor. PROC NAT ACAD SCI USA 98:7576-7581 (2001).
Arvaniti K, Huang OL, Richard D: Effects of leptin and corticosterone on the expression of corticotropin-releasing hormone, agouti-related protein, and proopiomelanocortin in the brain of ob/ob mouse. NEUROENDOCRINOLOGY 73:227-236 (2001).
Audinot V, Lahaye C, Suply T, Beauverger P, Rodriguez M, Galizzi JP, Fauchere JL, Boutin JA: [I-125]-S36057: a new and highly potent radioligand for the melanin-concentrating hormone receptor. BRIT J PHARMACOL 133:371-378 (2001).
Bazzani C, Guarini S, Botticelli AR, Zaffe D, Tomas A, Bini A, Cainazzo MM, Ferrazza G, Mioni C, Bertolini A: Protective effect of melanocortin peptides in rat myocardial ischemia. J PHARMACOL EXP THER 297:1082-1087 (2001).
Bicknell AB, Lomthaisong K, Woods RJ, Hutchinson EG, Bennett HPJ, Gladwell RT, Lowry PJ: Characterization of a serine protease that cleaves pro-γ-melanotropin at the adrenal to stimulate growth. CELL 105:903-912 (2001).
Chavatte P, Yous S, Lesieur D, Hénichart JP: Conformational analysis of tripeptide Ac-Lys-Pro-Val-NH2, COOH-terminal sequence of α-MSH. J PHARM PHARMACOL 53:949-953 (2001).
Chiba A: Marked distributional difference of α-melanocyte-stimulating hormone (α-MSH)-like immunoreactivity in the brain between two elasmobranchs (*Scyliorhinus torazame* and *Etmopterus brachyurus*): An immunohistochemical study. GEN COMP ENDOCRINOL 122:287-295 (2001).
Haskell-Luevano C, Cone RD, Monck EK, Wan YP: Structure activity studies of the melanocortin-4 receptor by in vitro mutagenesis: Identification of agouti-related protein (AGRP), melanocortin agonist and synthetic peptide antagonist interaction determinants. BIOCHEMISTRY USA 40:6164-6179 (2001).
Haskell-Luevano C, Holder JR, Monck EK, Bauzo RM: Characterization of melanocortin NDP-MSH agonist peptide fragments at the mouse central and peripheral melanocortin receptors. J MED CHEM 44:2247-2252 (2001).
Hill J, Duckworth M, Murdock P, Rennie G, Sabido-David C, Ames RS, Szekeres P, Wilson S, Bergsma DJ, Gloger IS, Levy DS, Chambers JK, Muir AI: Molecular cloning and functional characterization of MCH2, a novel human MCH receptor. J BIOL CHEM 276:20125-20129 (2001).
Ito AS, deSouza ES, Barbosa SD, Nakaie CR: Fluorescence study of conformational properties of melanotropins labeled with aminobenzoic acid. BIOPHYS J 81:1180-1189 (2001).
Jiménez-Cervantes C, Olivares C, González P, Morandini R, Ghanem G, García-Borrón JC: The Pro162 variant is a loss-of-function mutation of the human melanocortin 1 receptor gene. J INVEST DERMATOL 117:156-158 (2001).
Kennedy AR, Todd JF, Stanley SA, Abbott CR, Small CJ, Ghatei MA, Bloom SR: Melanin-concentrating hormone (MCH) suppresses thyroid stimulating hormone (TSH) release, in vivo and in vitro, via the hypothalamus and the pituitary. ENDOCRINOLOGY 142:3265-3268 (2001).
Kijas JMH, Moller M, Plastow G, Andersson L: A frameshift mutation in MC1R and a high frequency of somatic reversions cause black spotting in pigs. GENETICS 158:779-785 (2001).
Kilduff TS, deLecea L: Mapping of the mRNAs for the hypocretin/orexin and melanin-concentrating hormone receptors: Networks of overlapping peptide systems. J COMP NEUROL 435:1-5 (2001).
Kovács J, Julesz J, Mogyoróssy MV, Deli MA, Abrahám CS, Vecsernyés M: Asphyxia-induced release of α-melanocyte-stimulating hormone in newborn pigs. PEPTIDES 22:1049-1053 (2001).
Liu JX, Lin CJ, Gleiberman A, Ohgi KA, Herman T, Huang HP, Tsai MJ, Rosenfeld MG: Tbx19, a tissue-selective regulator of POMC gene expression. PROC NAT ACAD SCI USA 98:8674-8679 (2001).
Makova KD, Ramsay M, Jenkins T, Li WH: Human DNA sequence variation in a 6.6-kb region containing the melanocortin 1 receptor promoter. GENETICS 158:1253-1268 (2001).
Schiöth HB: The physiological role of melanocortin receptors. VITAMINS AND HORMONES - ADVANCES IN RESEARCH AND APPLICATIONS, VOL 63. 195-232 (2001).
Smith MA, Pallister CJ, Smith JG: Stem cell factor: Biology and relevance to clinical practice. ACTA HAEMATOL 105:143-150 (2001).
Tachibana T, Sugahara K, Ohgushi A, Ando R, Kawakami SI, Yoshimatsu T, Furuse M: Intracerebroventricular injection of agouti-related protein attenuates the anorexigenic effect of α-melanocyte stimulating hormone in neonatal chicks. NEUROSCI LETT 305:131-134 (2001).
Theron E, Hawkins K, Bermingham E, Ricklefs RE, Mundy NI: The molecular basis of an avian plumage polymorphism in the wild: A melanocortin-1- receptor point mutation is perfectly associated with the melanic plumage morph of the bananaquit, *Coereba flaveola*. CURR BIOL 11:550-557 (2001).

DEVELOPMENTAL BIOLOGY

❖ Anikster Y, Huizing M, White J, Shevchenko YO, Fitzpatrick DL, Touchman JW, Compton JG, Bale SJ, Swank RT, Gahl WA, Toro JR: Mutation of a new gene causes a unique form of Hermansky-Pudlak syndrome in a genetic isolate of central Puerto Rico. NAT GENET 28:376-380 (2001).

Cauthen CA, Berdougo E, Sandler J, Burrus LW: Comparative analysis of the expression patterns of Wnts and Frizzleds during early myogenesis in chick embryos. MECH DEVELOP 104:133-138 (2001).

Demunter A, DeWolf-Peeters C, Degreef H, Stas M, vandenOord JJ: Expression of the endothelin-B receptor in pigment cell lesions of the skin - Evidence for its role as tumor progression marker in malignant melanoma. VIRCHOWS ARCHIV 438:485-491 (2001).

Franck D, Dikomey M, Schartl M: Selection and the maintenance of a colour pattern polymorphism in the green swordtail (*Xiphophorus helleri*). BEHAVIOUR 138:467-486 (2001).

Harding R: Interpreting patterns of diversity in the melanocortin 1 receptor gene. PATHOL BIOL 49:395-396 (2001).

Huizing M, Anikster Y, Gahl WA: Hermansky-Pudlak syndrome and Chediak-Higashi syndrome: Disorders of vesicle formation and trafficking. THROMB HAEMOST 86:233-245 (2001).

Kos R, Reedy MV, Johnson RL, Erickson CA: The winged-helix transcription factor FoxD3 is important for establishing the neural crest lineage and repressing melanogenesis in avian embryos. DEVELOPMENT 128:1467-1479 (2001).

Krisp A, Hoffmann R, Happle R, König A, Freyschmidt-Paul P: Hermansky-Pudlak syndrome. EUROPEAN J DERMATOLOGY 11:372-373 (2001).

Machado AF, Martin LJ, Collins MD: Pax3 and the splotch mutations: Structure, function, and relationship to teratogenesis, including gene-chemical interactions. CURR PHARM DESIGN 7:751-785 (2001).

Mansouri A, Pla P, Larue L, Gruss P: Pax3 acts cell autonomously in the neural tube and somites by controlling cell surface properties. DEVELOPMENT 128:1995-2005 (2001).

McCallion AS, Chakravarti A: EDNRB/EDN3 and Hirschsprung disease Type II. PIGM CELL RES 14:161-169 (2001).

❖ Parichy DM, Johnson SL: Zebrafish hybrids suggest genetic mechanisms for pigment pattern diversification in Danio. DEV GENES EVOL 211:319-328 (2001).

Price T, Bontrager A: Evolutionary genetics: The evolution of plumage patterns. CURR BIOL 11:R405-R408 (2001).

Riffenburgh RH, Johnstone PAS: Survival patterns of cancer patients. CANCER 91:2469-2475 (2001).

Sham MH, Lui VCH, Fu M, Chen B, Tam PKH: SOX10 is abnormally expressed in aganglionic bowel of Hirschsprung's disease infants. GUT 49:220-226 (2001).

Smith SC, Bashir NS, Armstrong JB: Redneck, a new mutant of the axolotl (Ambystoma mexicanum) likely affects the development of cranial neural crest. INT J DEV BIOL 45:685-688 (2001).

Stamataki D, Kastrinaki MC, Mankoo BS, Pachnis V, Karagogeos D: Homeodomain proteins Mox1 and Mox2 associate with Pax1 and Pax3 transcription factors. FEBS LETT 499:274-278 (2001).

Terry RR, Bailey E, Bernoco D, Cothran EG: Linked markers exclude KIT as the gene responsible for appaloosa coat colour spotting patterns in horses. ANIM GENET 32:98-101 (2001).

DIFFERENTIATION

Camacho-Hübner A, Beermann F: Increased transgene expression by the mouse tyrosinase enhancer is restricted to neural crest-derived pigment cells. GENESIS 29:180-187 (2001).

Espín JC, Soler-Rivas C, Cantos E, Tomás-Barberán FA, Wichers HJ: Synthesis of the antioxidant hydroxytyrosol using tyrosinase as biocatalyst. J AGR FOOD CHEM 49:1187-1193 (2001).

Fenoll LG, Rodríguez-López JN, García-Sevilla F, García-Ruiz PA, Varón R, García-Cánovas F, Tudela J: Analysis and interpretation of the action mechanism of mushroom tyrosinase on monophenols and diphenols generating highly unstable o-quinones. BBA PROTEIN STRUCT MOL ENZYM 1548:1-22 (2001).

❖ Furumura M, Potterf SB, Toyofuku K, Matsunaga J, Muller J, Hearing VJ: Involvement of ITF2 in the transcriptional regulation of melanogenic genes. J BIOL CHEM 276:28147-28154 (2001).

Gilly R, Mara D, Oded S, Zohar K: Resveratrol and a novel tyrosinase in Carignan grape juice. J AGR FOOD CHEM 49:1479-1485 (2001).

Gomez PF, Luo D, Hirosaki K, Shinoda K, Yamashita T, Suzuki J, Otsu K, Ishikawa K, Jimbow K: Identification of rab7 as a melanosome-associated protein involved in the intracellular transport of tyrosinase-related protein 1. J INVEST DERMATOL 117:81-90 (2001).

Gómez-Cordovés C, Bartolomé B, Vieira W, Virador VM: Effects of wine phenolics and sorghum tannins on tyrosinase activity and growth of melanoma cells. J AGR FOOD CHEM 49:1620-1624 (2001).

Harris RBS, Zhou J, Shi MX, Redmann S, Mynatt RL, Ryan DH: Overexpression of agouti protein and stress responsiveness in mice. PHYSIOL BEHAV 73:599-608 (2001).

Hasselmann DO, Rappl G, Tilgen W, Reinhold U: Extracellular tyrosinase mRNA within apoptotic bodies is protected from degradation in human serum. CLIN CHEM 47:1488-1489 (2001).

Ito A, Kataoka TR, Kim DK, Koma Y, Lee YM, Kitamura Y: Inhibitory effect on natural killer activity of microphthalmia transcription factor encoded by the mutant mi allele of mice. BLOOD 97:2075-2083 (2001).

Itoh S, Kumei H, Taki M, Nagatomo S, Kitagawa T, Fukuzumi S: Oxygenation of phenols to catechols by a (μ-eta(2):eta(2)-peroxo)dicopper(II) complex: Mechanistic insight into the phenolase activity of tyrosinase. J AM CHEM SOC 123:6708-6709 (2001).

Jiménez-Cervantes C, Martínez-Esparza M, Pérez C, Daum N, Solano F, García-Borrón JC: Inhibition of melanogenesis in response to oxidative stress: transient downregulation of melanocyte differentiation markers and possible involvement of microphthalmia transcription factor. J CELL SCI 114:2335-2344 (2001).

Kayserili H, Cox TC, Cox LL, Basaran S, Kiliç G, Ballabio A, Yüksel-Apak M: Molecular characterisation of a new case of microphthalmia with linear skin defects (MLS). J MED GENET 38:411-417 (2001).

Kuramoto T, Nomoto T, Sugimura T, Ushijima T: Cloning of the rat agouti gene and identification of the rat nonagouti mutation. MAMM GENOME 12:469-471 (2001).

Lehman DM, Sponsel WE, Stratton RF, Mensah J, Macdonald JC, Johnson-Pais TL, Coon H, Reveles XT, Cody JD, Leach RJ: Genetic mapping of a novel X-linked recessive colobomatous microphthalmia. AMER J MED GENET 101:114-119 (2001).

Ley JP, Bertram HJ: Hydroxy - or methoxy -substituted benzaldoximes and benzaldehyde-O-alkyloximes as tyrosinase inhibitors. BIOORGAN MED CHEM 9:1879-1885 (2001).

Lindsey JD, Jones HL, Hewitt EG, Angert M, Weinreb RN: Induction of tyrosinase gene transcription in human iris organ cultures exposed to latanoprost. ARCH OPHTHALMOL 119:853-860 (2001).

Moridani MY, Scobie H, Salehi P, O'Brien PJ: Catechin metabolism: Glutathione conjugate formation catalyzed by tyrosinase, peroxidase, and cytochrome p450. CHEM RES TOXICOL 14:841-848 (2001).

❖ Morii E, Ogihara H, Kim DK, Ito A, Oboki K, Lee YM, Jippo T, Nomura S, Maeyama K, Lamoreux ML, Kitamura Y: Importance of leucine zipper domain of mi transcription factor (MITF) for differentiation of mast cells demonstrated using mi(ce)/mi(ce) mutant mice of which MITF lacks the zipper domain. BLOOD 97:2038-2044 (2001).

Mosse CA, Hsu W, Engelhard VH: Tyrosinase degradation via two pathways during reverse translocation to the cytosol. BIOCHEM BIOPHYS RES COMMUN 285:313-319 (2001).

Motyckova G, Weilbaecher KN, Horstmann M, Rieman DJ, Fisher DZ, Fisher DE: Linking osteopetrosis end pycnodysostosis: Regulation of cathepsin K expression by the microphthalmia transcription factor family. PROC NAT ACAD SCI USA 98:5798-5803 (2001).

Nakamura K, Ozaki A, Akutsu T, Iwai K, Sakamoto T, Yoshizaki G, Okamoto N: Genetic mapping of the dominant albino locus in rainbow trout (*Oncorhynchus mykiss*). MOL GENET GENOMICS 265:687-693 (2001).

Paranjpe P, Dutta S, Karve M, Padhye S, Narayanaswamy R: A disposable optrode using immobilized tyrosinase films. ANAL BIOCHEM 294:102-107 (2001).

Pérez-Gilabert M, García-Carmona F: Dimethyl sulfide, a volatile flavor constituent, is a slow-binding inhibitor of tyrosinase. BIOCHEM BIOPHYS RES COMMUN 285:257-261 (2001).

Rieder S, Taourit S, Mariat D, Langlois B, Guérin G: Mutations in the agouti (ASIP), the extension (MC1R), and the brown (TYRP1) loci and their association to coat color phenotypes in horses (Equus caballus). MAMM GENOME 12:450-455 (2001).

Schmidtz BH, Buchanan FC, Plante Y, Schmutz SM: Linkage mapping of the tyrosinase gene to bovine chromosome 29. ANIM GENET 32:119-120 (2001).

Shiino M, Watanabe Y, Umezawa K: Synthesis of N-substituted N-nitrosohydroxylamines as inhibitors of mushroom tyrosinase. BIOORGAN MED CHEM 9:1233-1240 (2001).

Walton K, Coombs MM, Walker R, Ioannides C: The metabolism and bioactivation of agaritine and of other mushroom hydrazines by whole mushroom homogenate and by mushroom tyrosinase. TOXICOLOGY 161:165-177 (2001).

❖ Xu YQ, Bartido S, Setaluri V, Qin J, Yang G, Houghton AN: Diverse roles of conserved asparagine-linked glycan sites on tyrosinase family glycoproteins. EXP CELL RES 267:115-125 (2001).

MISCELLANEOUS

Anderson DH, Ozaki S, Nealon M, Neitz J, Mullins RF, Hageman GS, Johnson LV: Local cellular sources of apolipoprotein E in the human retina and retinal pigmented epithelium: Implications for the process of drusen formation. AMER J OPHTHALMOL 131:767-781 (2001).

Cao W, Tombran-Tink J, Elias R, Sezate S, Mrazek D, McGinnis JF: In vivo protection of photoreceptors from light damage by pigment epithelium-derived factor. INVEST OPHTHALMOL VISUAL SCI 42:1646-1652 (2001).

DellaValle AG, Piccaluga F, Potter HG, Salvati EA, Pusso R: Pigmented villonodular synovitis of the hip - 2-to 23-year followup study. CLIN ORTHOP RELATED RES:187-199 (2001).

Dürr HR, Stäbler A, Maier M, Refior HJ: Pigmented villonodular synovitis. Review of 20 cases. J RHEUMATOL 28:1620-1630 (2001).