

Dermal Toxicology Specialty Section

Executive Council

President

James N. McDougal, Ph.D., ATS
Wright State University
james.mcdougal@wright.edu

President Elect

David W. Hobson, Ph.D., DABT
H&H Scientific Services, LLP
Dave@HH-LLP.net

Vice-President

Carol S. Auletta, MBA, DABT,
RAC
Huntingdon Life Sciences
aulettac@princeton.huntingdon.com

Secretary-Treasurer

AnneMarie Api, PhD
Research Institute for Fragrance
Materials, Inc.
amapi@rifm.org

Past President

Robert L. Bronaugh, Ph.D., ATS
U.S. FDA
robert.bronaugh@fda.hhs.gov

Councilors

Senior Councilor

Bill Reifenrath, Ph.D.
Stratacor Inc
wreifeinrath@cs.com

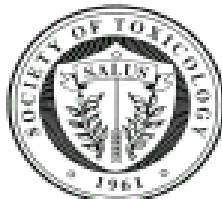
Junior Councilor

Jeffrey J. Yourick, PhD, DABT
U.S. FDA

Student Representative

Adrienne Black
Rutgers University
atblack@eden.rutgers.edu

The *Dermal Toxicology Specialty Section* newsletter is published 2 times/year (spring and fall) in electronic format. If you would like to share a book review, meeting report, web site, or any other item of general interest to the specialty section, please send it to the editor prior to the publication date. We also welcome any comments or suggestions pertaining to overall content or format. Carol S. Auletta (aulettac@princeton.huntingdon.com)



NOT TOO LATE...
...but will be SOON!!

Dear Colleagues,

I hope each of you has given some thought to preparing a proposal for a symposia, workshop, continuing education course, roundtable, etc for the 2008 Annual Meeting in Seattle, WA.



And is busy putting it together. Sponsoring a scientific session is one of the most important functions that an SOT Specialty Section can do.

BUT... Time is running out! The submission deadline is April 30 !!!

A proposal should be sufficiently detailed for SOT review and include:

1. A proposed title and forum (e.g., symposium, workshop, continuing education)
2. A brief description of the proposed content (a short paragraph will do)
3. Names of proposed speakers (3-5)
4. Proposed chairperson

You can submit your proposal at the SOT on-line submission site: <http://sot2008.abstractcentral.com>. Please submit your proposal to SOT by the **April 30, 2007 deadline** and e-mail a copy to me so the DTSS Executive committee can select a proposal from each of the above forums and forward them

Dave Hobson
Vice President DTSS
Program Committee Chair
Dave@HH-LLP.net
(210) 269-6169

History of DTSS Programs

To give you an idea of programs we have sponsored in the past, Jim McDougal has compiled the following list.

2000 - DTSS New – no sessions at this meeting

2001 - Phenolic compounds: Free radical mechanisms of toxicity, catalysis and protection (symposium)

2002 - Altered gene expression and cutaneous toxicity (symposium) (In the program only the Immunotox specialty section sponsored this symposium)

2003 – 1) Cutaneous Toxicity – current methods and concepts in safety evaluation: relevance to human exposure (continuing education)

2) Dermal exposure leading to respiratory tract sensitization and disease: A trivial or Critical Link? (workshop)

2004 - 1) Skin sensitization and allergic contact dermatitis (basic continuing education)

2) Current status and future considerations for the development of skin toxicology alternative methods (workshop)

3) Occupational skin exposure: Current trends and future directions from the field to genomics. (symposium)

2005 - 1) Conducting a comprehensive toxicological and safety evaluation of nanomaterials: current challenges and data needs (roundtable)

2) Skin model selection for safety assessment of topical drug products regulatory and industry perspectives (workshop) (DTSS is not listed in the program as endorsing this workshop)

2006 - 1) Screening methods for assessing skin toxicity of nanomaterials (workshop)

2) Regulatory application of the mouse LLNA: new challenges and opportunities (workshop – primary endorser immunology SS)

3) Dendritic cells and skin sensitization: Biological roles and uses in hazard identification (workshop)

2007 – 1) Methods for Investigating Skin Irritation (Workshop)

2) Alternative and Integrated Approaches to Skin Sensitization Testing (Workshop) Primary Sponsor: Animals in Research Committee.

3) Gene Expression and Immune System Susceptibility (Symposium) Primary Sponsor: Immunotoxicology.

Dave Hobson, Ph.D.
DTSS President-Elect
and Program Committee Chair

President's Message



I am honored to have served as DTSS President for the past year. All of your officers have spent numerous

hours behind the scenes volunteering to keep the machinery of the specialty section running and supportive to your needs. It is time consuming (I count over 270 DTSS-related e-mails received since May 1st last year) and each of your officers is a busy professional. We had very successful participation at the 46th annual meeting. We developed or

endorsed two workshops and one symposium that were presented in Charlotte, NC. They were very well attended. Our reception enjoyed the largest attendance ever. We inaugurated a "Paper of the Year" award and continue to give student/postdoc awards. We also provide a web site and an informational newsletter. I'd like to encourage each of you to participate in the activities of our specialty section by volunteering to run for office, serving on committees and developing workshops, continuing education courses and symposia.

Election of Officers

We had an excellent slate of officer candidates for this year. Newly elected officers will take office on 1 May 2007. George DeGeorge (MB Research Laboratories) was elected Vice-President and will move on to President elect and will be your President in 2009. Bob Osterberg was elected councilor and will serve a two-year term. Thomas Kannanayakal (Wright State University) will be our Student Representative and Adrienne Black (Rutgers), who has been an excellent student representative has consented to be our Post Doctoral Representative. Congratulations to all the new officers!

Jim McDougal
DTSS President

Special Reports

Report from Specialty Section Meeting at SOT

Dave Hobson and I attended this meeting, as Vice President and



President-Elect of DTSS. SOT President Jim Popp reviewed the SOT

Long-Range Plan activities. There are 3 committees, Communications, Membership Services and Science. Preliminary reports and recommendations have been submitted to the SOT membership for comment. The comments will be reviewed and new drafts submitted in December 2007. Please review these and comment if you have not

done so. Some of the recommendations suggest that SOT move in new and different directions. The members should make their voices heard.

Roger McClellan introduced the SOT Endowment Fund, newly formed and doing well initially.

The Student Advisory Committee (SAC) and Postdoctoral Assembly (PDA) gave updates. [See more in Adrienne's report.] One question that was asked was: Are student representatives to Specialty Sections (SS) elected or appointed? The answer was: It depends on the by-laws. It seems that the majority are appointed. It was also confirmed that student representative receive \$500 in travel costs to attend the annual meeting. This cost is shared by the SS and SOT (\$250 from the SS and \$250 from SOT).

The importance and value of Specialty Sections in submitting proposals for symposia, workshops and continuing education courses was once again emphasized. This is the core of the annual meeting. Proposal submission deadline (April 30) was confirmed. [See Dave's plea on the front page.]

General administrative procedures were reviewed. Marcia Lawson of the SOT office is our staff support liaison.

And, finally, everyone agreed that the Presidents/Vice Presidents conference (in Chicago in August) should continue. So look for a report in the fall.

Carol S. Auletta
Vice-President

Treasurer's Report

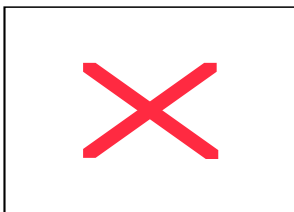
As of December 31, 2006



Based on the financial summary from December 31, 2006 for the year July 2006 – June 2007 the Dermal

Toxicology Specialty Section (DTSS) has net assets of \$8,667. Our income consisted of interest equalling \$413. The net assets from the beginning of the year were \$8,254. Our dues have not been

posted as of December 2006, but based on 2006 dues contributions; we can anticipate approximately \$1,700 from dues. No expenses have been incurred (as of December 31, 2006). It is anticipated that our expenses will be approximately \$2,300.



Anne Marie Api
DTSS Treasurer

Student Activities

The SOT Specialty Section Student Representatives have continued their efforts to increase student membership in the specialty sections. One proposal was that if a student did not choose a



specialty section when renewing their membership online, a dialog box would pop up, encouraging them to make a choice. As at past meetings, posters describing each specialty section were presented by their representative at the Student/Post-Doc Mixer at the just concluded 2007 SOT Annual Meeting. The DTSS poster was well attended with a greater number of students entering the drawing to win a memory stick. The winner was Xi Yang from Penn State University.

The reorganization of student representation in SOT has continued with the establishment of new by-laws governing the activities of both the Regional Chapter and Specialty Section representative groups. Specialty Section representatives elected as officers now have the opportunity to become involved in the entire student organization within SOT. In addition, the newly formed Special Interest groups would each have student representatives and these positions would be included in the

Regional Chapter representative group.

As of May 2007, the DTSS will have a new student representative, Thomas Kannanayakal of Wright State University.

Adrienne Black
DTSS Student Representative

!! Awards !!

Graduate Student Awards

DTSS gave two awards for Graduate Student Best Abstract presented at the 2007 Society of Toxicology Annual Meeting:

J.G. Rouse, J.P. Ryman-Rasmussen, J. Yang, A.R. Barron and N.A. Monteiro-Riviere, Center for Chemical Toxicology Research and Pharmacokinetics, North Carolina State University, Raleigh, NC for "Effects of mechanical flexion on the penetration of amino acid derivatized nanoparticles in skin"

Matius Rauma and Gunnar Johanson, Work Environment Toxicology, Karolinska Institute, Stockholm, Sweden for "Assessment of dermal absorption by thermal gravimetric analysis – development of a 2-compartment diffusion model"



Jeffrey J. Yourick, PhD,
DABT
U.S. FDA

Best Paper Award

DTSS also selected a Best Paper Award from dermal toxicology publications in 2006. This was the first year of the award and the winners were Matius Rauma, Tina S. Isaksson and Gunnar Johanson, Karolinska Institute, Stockholm, Sweden for "A new technique to assess dermal absorption of volatile chemicals in vitro by thermal gravimetric analysis," published in *Toxicology In Vitro*, 20: 1183-1189, 2006.

Taylor and Francis sponsored an award for the Best Dermatological Paper in Cutaneous and Ocular Toxicology. The winners for 2006

were Chou CC, Yang JH, Chen SD, Monteiro-Riviere NA, Li HN, Chen JJ. Expression profiling of human epidermal keratinocyte response following 1-minute JP-8 exposure. *Cutan Ocul Toxicol.* 2006; 25(2): 141-53.



William Reifenrath
DTSS Senior
Councilor

Meetings and Conferences of Interest

2nd World Congress on Work-Related and Environmental Allergy
6th International Symposium on Irritant Contact Dermatitis
June 13-16, 2007, Weimar, Germany, www.woreal.org

OEESC -2007
Occupational and Environmental Exposures of Skin to Chemicals-2007
June 17-20, 2007
Golden, Colorado USA

March 26-28, 2008 - Eleventh Perspectives in Percutaneous Penetration Conference in the Palais de Congres, La Grande Motte, France

New Book

Nancy Monteiro-Riviere, a former President of DTSS, is co-editor of a new book on nanotoxicology:

Nanotoxicology Characterization, Dosing and Health Effects. Edited by **Nancy A. Monteiro-Riviere**, Center for Chemical Toxicology Research and Pharmacokinetics, North Carolina State University, Raleigh, NC and C. Lang Tran, Institute of Occupational Medicine, Edinburgh, UK. November 2007 / ISBN-10: 1420045148 / ISBN-13: 9781420045147 60 B&W Illustrations / 400pp. / Price: \$199.95

Nanomaterials...exhibit a variety of unique ... chemical and physical properties that have made engineered nanoparticles central components in an array of emerging technologies. The use of nanotechnology is increasing, however its potential adverse effects on human health are not well

understood. In order to accurately conduct hazard assessments, scientists need to understand the broad concepts that apply to pathways of dermal, oral, and respiratory exposure. This title is designed to elucidate those concepts and to examine the interaction of nanomaterials with the biological system, including membrane transfer, screening methods, and impact on major organs.

The publisher, Informa Healthcare, formerly Taylor and Francis, has previously offered discounts to DTSS members. We will provide updated ordering and discount information in our next newsletter or on our web site. Stay tuned...

DTSS Member Publications in 2006

The following is a listing of publications by DTSS members that appeared in 2006. Once a year we feature a listing of peer-reviewed publications by specialty section members (with skin as a keyword) that are available on PubMed. While the editors do their very best to find relevant publications based on the current membership list, it is likely that mistakes will occur and we apologize if we have left any publications out.

Politano VT, Isola DA, Lalko J, **Api AM**. The effects of vehicles on the human dermal irritation potentials of allyl esters. *Int J Toxicol*. 2006 May-Jun;25(3):183-93.

Peters L, Marriott M, Mukerji B, Indra P, Iyer JV, Roy A, Rowson M, Ahmed S, Cooper K, **Basketter D**. The effect of population diversity on skin irritation. *Contact Dermatitis*. 2006 Dec;55(6):357-63.

Langton K, Patlewicz GY, Long A, Marchant CA, **Basketter DA**. Structure-activity relationships for skin sensitization: recent improvements to Derek for Windows. *Contact Dermatitis*. 2006 Dec;55(6):342-7.

Basketter DA, McFadden J, Evans P, Andersen KE, Jowsey I. Identification and classification of skin sensitizers: identifying false positives and false negatives.

Contact Dermatitis. 2006 Nov;55(5):268-73.

Basketter DA, Jefferies D, Safford BJ, Gilmour NJ, Jowsey IR, McFadden J, Chansinghakul W, Duangdeeden I, Kullavanijaya P. The impact of exposure variables on the induction of skin sensitization. *Contact Dermatitis*. 2006 Sep;55(3):178-85.

Corea NV, **Basketter DA**, Clapp C, Van Asten A, Marty JP, Pons-Guiraud A, Laverdet C. Fragrance allergy: assessing the risk from washed fabrics. *Contact Dermatitis*. 2006 Jul;55(1):48-53. Review.

Jowsey JR, **Basketter DA**, Westmoreland C, **Kimber I**. A future approach to measuring relative skin sensitizing potency: a proposal. *J Appl Toxicol*. 2006 Jul-Aug;26(4):341-50.

Flecher ST, **Basketter DA**. Proteomic analysis of the response of EpiDerm cultures to sodium lauryl sulphate. *Toxicol In Vitro*. 2006 Sep;20(6):975-85. Epub 2006 Feb 15.

Biagini RE, MacKenzie BA, Sammons DL, Smith JP, Krieg EF, Robertson SA, Hamilton RG. Latex specific IgE: performance characteristics of the IMMULITE 2000 3gAllergy assay compared with skin testing. *Ann Allergy Asthma Immunol*. 2006 Aug;97(2):196-202.

Brand RM, Jendrzewski JL, Henery EM, Charron AR. A single oral dose of ethanol can alter transdermal absorption of topically applied chemicals in rats. *Toxicol Sci*. 2006 Aug;92(2):349-55. Epub 2006 May 5.

Betts CJ, **Dearman RJ**, Heylings JR, **Kimber I**, **Basketter DA**. Skin sensitization potency of methyl methacrylate in the local lymph node assay: comparisons with guinea-pig data and human experience. *Contact Dermatitis*. 2006 Sep;55(3):140-7.

Cumberbatch M, Singh M, **Dearman RJ**, Young HS **Kimber I**, Griffiths CE. Impaired Langerhans cell migration in psoriasis. *J Exp Med*. 2006 Apr 17;203(4):953-60. Epub 2006 Mar 27.

Kandarova H, Liebsch M, Schmidt E, Genschow E, Traue D, Spielmann H, Meyer K, Steinhoff C, Tornier C, **De Wever B**, Rosdy M. Assessment of the skin irritation potential of chemicals by using the SkinEthic reconstructed human epidermal model and the common skin irritation protocol evaluated in the ECVAM skin irritation validation study. *Altern Lab Anim*. 2006 Aug;34(4):393-406.

Kandarova H, Liebsch M, Spielmann H, Genschow E, Schmidt E, Traue D, Guest R, Whittingham A, Warren N, Gamer AO, Remmele M, Kaufmann T, Wittmer E, **De Wever B**, Rosdy M. Assessment of the human epidermis model SkinEthic RHE for in vitro skin corrosion testing of chemicals according to new OECD TG 431. *Toxicol In Vitro*. 2006 Aug;20(5):547-59. Epub 2006 Feb 7.

Gopee NV, Howard PC. A time course study demonstrating RNA stability in postmortem skin. *Exp Mol Pathol*. 2006 Dec 15; [Epub ahead of print]

Engel E, Santarelli F, Vasold R, Ulrich H, Maisch T, König B, Landthaler M, **Gopee NV**, Howard PC, Baumler W. Establishment of an extraction method for the recovery of tattoo pigments from human skin using HPLC diode array detector technology. *Anal Chem*. 2006 Sep 15;78(18):6440-7.

Rauma M, Isaksson TS, **Johanson G**. A new technique to assess dermal absorption of volatile chemicals in vitro by thermal gravimetric analysis. *Toxicol In Vitro*. 2006 Oct;20(7):1183-9. Epub 2006 Mar 13.

Kim DJ, Prabhu KS, Gonzalez FJ, Peters JM. Inhibition of chemically induced skin carcinogenesis by sulindac is independent of peroxisome proliferator-activated receptor-beta/delta (PPARbeta/delta). *Carcinogenesis*. 2006 May;27(5):1105-12. Epub 2006 Jan 16.

Kim D, Andersen ME, **Nvlander-French LA**. A dermatotoxicokinetic model of human exposures to jet fuel. *Toxicol Sci*. 2006 Sep;93(1):22-33. Epub 2006 June 26.

Kim D, Andersen ME, Nylander-French LA. Dermal absorption and penetration of jet fuel components in humans. *Toxicol Lett.* 2006 Aug 1;165(1):11-21. Epub 2006 Feb 23.

Kinber I, Dearman RJ, Betts CJ, Gerberick GF, Ryan CA, Kern PS, Patlewicz GY, Basketter DA. The local lymph node assay and skin sensitization: a cut-down screen to reduce animal requirements? *Contact Dermatitis.* 2006 Apr;54(4):191-5.

Takeyoshi M, Noda S, Yamasaki K, **Kimber I.** Advantage of using CBA/N strain mice in a non-radioisotopic modification of the local lymph node assay. *J Appl Toxicol.* 2006 Jan-Feb;26(1):5-9.

Loretz L, Api AM, Barraj L, Burdick J, Davis de A, Dressler W, Gilberti E, Jarrett G, Mann S, Laurie Pan YH, Re T, Renskers K, Scrafford C, Vater S. Exposure data for personal care products: hairspray, spray perfume, liquid foundation, shampoo, body wash, and solid antiperspirant. *Food Chem Toxicol.* 2006 Dec;44(12):2008-18. Epub 2006 July 18.

Xing MM, Sun Z, Pan N, Zhong W, **Mailbach HI.** An EFE model on skin-sleeve interactions during arm rotation. *J Biomech Eng.* 2006 Dec;128(6):872-8.

Remane Y, Leopold CS, **Mailbach HI.** Percutaneous penetration of methyl nicotinate from ointments using the laser Doppler technique: bioequivalence and enhancer effects. *J Pharmacokinetic Pharmacodyn.* 2006 Dec;33(6):719-35. Epub 2006 Sep 28.

Lee IA, **Mailbach HI.** Pharmionics in dermatology: a review of topical medication adherence. *Am J Clin Dermatol.* 2006;7(4):231-6. Review.

Moody RP, **Mailbach HI.** Skin decontamination: Importance of the wash-in effect. *Food Chem Toxicol.* 2006 Nov;44(11):1783-8. Epub 2006 Jun 6. Review.

Marrakchi S, **Mailbach HI.** Functional map and age-related differences in the human face: nonimmunologic contact urticaria induced by hexyl nicotinate. *Contact Dermatitis.* 2006 Jul;55(1):15-9.

Farage MA, Katsarou A, **Mailbach HI.** Sensory, clinical and physiological factors in sensitive skin: a review. *Contact Dermatitis.* 2006 Jul;55(1):1-14. Review.

Hall AH, **Mailbach HI.** Water decontamination of chemical skin/eye splashes: a critical review. *Cutan Ocul Toxicol.* 2006;25(2):67-83.

Waller JM, **Mailbach HI.** Age and skin structure and function, a quantitative approach (II): protein, glycosaminoglycan, water, and lipid content and structure. *Skin Res Technol.* 2006 Aug;12(3):145-54. Review.

Wester RC, Hui X, **Mailbach HI.** In vivo human transfer of topical bioactive drug between individuals: estradiol. *J Invest Dermatol.* 2006 Oct;126(10):2190-3. Epub 2006 Jun 15.

Hostynek JJ, Dreher F, **Mailbach HI.** Human stratum corneum penetration by copper: in vivo study after occlusive and semi-occlusive application of the metal as powder. *Food Chem Toxicol.* 2006 Sep;44(9):1539-43. Epub 2006 Apr 25.

Lee CM, **Mailbach HI.** Deep percutaneous penetration into muscles and joints. *J Pharm Sci.* 2006 Jul;95(7):1405-13. Review.

Zhong W, Xing MM, Pan N, **Mailbach HI.** Textiles and human skin, microclimate, cutaneous reactions: an overview. *Cutan Ocul Toxicol.* 2006;25(1):23-39. Review.

Netti VW, Sanders S, Staskin DR, Dmochowski RR, Sand PK, MacDiarmid S, **Mailbach HI.** Transdermal delivery of drugs for urologic applications: Basic principles and applications. *Urology.* 2006 Apr;67(4):657-64. Review. No abstract available.

Choi MJ, Kim JH, **Mailbach HI.** Topical DNA vaccination with SNA/Lipid based complex. *Curr Drug Deliv.* 2006 Jan;3(1):37-45. Review.

Tornier C, Rosdy M, **Mailbach HI.** In Vitro skin irritation testing on reconstituted human epidermis: reproducibility for 50 chemicals tested with two protocols. *Toxicol*

In Vitro. 2006 Jun;20(4):401-16. Epub 2005 Oct 17.

Arfsten DP, Garrett CM, Jederberg WW, Wilfong ER, **McDougal JN.** Characterization of the skin penetration of a hydrocarbon-based weapons maintenance oil. *J Occup Environ Hyg.* 2006 Sep;3(9): 457-64.

Witzmann FA, **Monteiro-Riviere NA.** Multi-walled carbon nanotube exposure alters protein expression in human keratinocytes. *Nanomedicine.* 2006 Sep;2(3):158-68.

Monteiro-Riviere NA, Inman AO, Barlow BM, Bavnes RE. Dermatotoxicity of cutting fluid mixtures: in vitro and in vivo studies. *Cutan Ocul Toxicol.* 2006;25(4):235-47.

Xia XR, **Monteiro-Riviere NA, Riviere JE.** Trace analysis of fullerenes in biological samples by simplified liquid-liquid extraction and high-performance liquid chromatography. *J Chromatogr A.* 2006 Oct 6;1129(2):216-22. Epub 2006 Aug 1.

Chou CC, Yang JH, Chen SD, **Monteiro-Riviere NA, Li HN, Chen JJ.** Expression profiling of human epidermal keratinocyte response following 1-minute JP-8 exposure. *Cutan Ocul Toxicol.* 2006;25(2):141-53.

Rouse JG, Yang J, Barron AR, **Monteiro-Riviere NA.** Fullerene-based amino acid nanoparticle interactions with human epidermal keratinocytes. *Toxicol In Vitro.* 2006 Dec;20(8):1313-20. Epub 2006 May 3.

Tournas JA, Lin FH, Burch JA, Selim MA, **Monteiro-Riviere NA, Zielinski JE, Pinnell SR.** Ubiquinone, idebenone, and kinetin provide ineffective photoprotection to skin when compared to a topical antioxidant combination of vitamins C and E with ferulic acid. *J Invest Dermatol.* 2006 May;126(5):1185-7. No abstract available.

Flynn MR, Koto Y, Fent K, **Nylander-French LA.** Modeling dermal exposure—an illustration for spray painting applications. *J Occup Environ Hyg* 2006 Sep;3(9):475-80.

Fent KW, Jayaraj K, Gold A, Ball LM, **Nylander-French LA**. Tape-strip sampling for measuring dermal exposure to 1,6-hexamethylene diisocyanate. *Scand J Work Environ Health*. 2006 Jun;32(3):225-40.

Chao YC, Kupper LL, Serday B, Egeghy PP, Rappaport SM, **Nylander-French LA**. Dermal exposure to jet fuel JP-8 significantly contributes to the production of urinary naphthols in fuel-cell maintenance workers. *Environ Health Perspect*. 2006 Feb;114(2):182-5.

Gildea LA, **Ryan CA**, Foertsch LM, Kennedy JM, **Dearman RJ**, **Kimber I**, **Gerberick GF**. Identification of gene expression changes induced by chemical allergens in dendritic cells: opportunities for skin sensitization testing. *J Invest Dermatol*. 2006 Aug;126(8):1813-22. Epub 2006 Apr 27.

Ryman-Rasmussen JP, **Riviere JE**, **Monteiro-Riviere NA**. Penetration of intact skin by quantum dots with diverse physicochemical properties. *Toxicol Sci*. 2006 May;91(1):159-65. Epub 2006 Jan 27.

Shakarjian MP, Ghatt P, Gordon MK, Chang YC, Casbohm SL, Rudge TL, Kiser RC, **Sabourin CL**, **Casillas RP**, Ohman-Strickland P, Riley DJ, Gerecke DR. Preferential expression of matrix metalloproteinase-9 in mouse skin after sulfur mustard exposure. *J Appl Toxicol*. 2006 May-Jun;26(3):239-46.

Gross CL, Nealley EW, Nipwoda MT, **Smith WJ**. Pretreatment of human epidermal keratinocytes with D,L-sulforaphane protects against sulfur mustard cytotoxicity. *Cutan Ocul Toxicol*. 2006;25(3):155-63.

Simbulan-Rosenthal CM, Ray R, Benton B, Soeda E, Daher A, Anderson D, **Smith WJ**. Calmodulin mediates sulfur mustard toxicity in human keratinocytes. *Toxicology* 2006 Oct 3;227(1-2):21-35. epub 2006 Jul 13.

Selgrade M, Boykin EH, Haykal-Coates N, **Woolhiser MR**, Wiscinski C, Andrews DL, Farraj

AK, Doerfler DL, Gavett SH. Inconsistencies between cytokine profiles, antibody responses, and respiratory hyperresponsiveness following dermal exposure to isocyanates. *Toxicol Sci*. 2006 Nov;94(1):108-17. Epub 2006 Aug 28.