

## **Michèl Schummer**

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### **Educational Background**

- 1995-1998 University of Washington, Seattle, WA, Post Doc, Molecular Biotechnology
- 1994 University of Heidelberg, Germany, PhD, Molecular Biology
- 1991 University of Heidelberg, Germany, Diploma, Biology

### **Professional Experience**

- 2005-present Staff Scientist, Translational Outcomes and Research Group, Fred Hutchinson Cancer Research Center, Seattle, Washington
- 2001-2005 Scientist 2, MacroGenics Inc. Rockville, Maryland (Seattle, Washington Facility)
- 2000-2001 Senior Scientist, Director of Cancer Diagnostics and Therapy, Institute for Systems Biology, Seattle, Washington
- 1998-2000 Research Associate, Department of Molecular Biotechnology, University of Washington, Seattle, Washington
- 1995-1998 Postdoctoral Fellow, Department of Molecular Biotechnology, University of Washington, Seattle Washington
- 1995 Trainee, Public Relations, German Cancer Research Center, Heidelberg, Germany
- 1994 Trainee, Public Relations Office, German Cancer Society, Frankfurt/Main, Germany
- 1993-1994 Visiting Scientist, Department of Zoology, University of Geneva, Switzerland
- 1991-1993 Research Associate, Centre of Molecular Neurobiology, University of Hamburg, Germany
- 1989 Research Student, Weizmann Institute of Science, Rehovot, Israel
- 1988-1991 Research Associate, Center of Molecular Biology, Heidelberg, Germany
- 1986-1988 Research Student, Department of Zoology, University of Heidelberg, Germany

### **Awards**

- 2000-2001 Marsha Rivkin Center Scholar Award, Marsha Rivkin Center for Ovarian Cancer Research
- 1995-96 Post-doctoral fellowship award of the Deutsche Forschungsgemeinschaft

## Research Papers in Refereed Journals

2011-2001

1. **Schummer M**, Drescher C, Forrest R, Gough S, Thorpe J, Hellström I, Hellström KE, Urban N (2011) Evaluation of ovarian cancer remission markers HE4, MMP7 and Mesothelin by comparison to the established marker CA125. Gynecol Oncol. 2011 Dec 6. [Epub ahead of print].
2. Ventura AP, Radhakrishnan S, Green A, Rajaram SK, Allen AN, O'Briant K, **Schummer M**, Karlan B, Urban N, Tewari M, Drescher C, Knudsen BS (2010) Activation of the MEK - S6 pathway in high-grade ovarian cancers. Applied Immunohistochemistry and Molecular Morphology 18: 499-508.
3. **Schummer M**, Green A, Beatty JD, Karlan BY, Karlan S, Gross J, Thornton S, McIntosh M, Urban N (2010) Comparison of Breast Cancer to Healthy Control Tissue Discovers Novel Markers with Potential for Prognosis and Early Detection. PLoS ONE 5: e9122.
4. Faça VM, Ventura AP, Fitzgibbon MP, Pereira-Faça SR, Pitteri SJ, Green AE, Ireton RC, Zhang Q, Wang H, O'Briant KC, Drescher CW, **Schummer M**, McIntosh MW, Knudsen BS, Hanash SM (2008) Proteomic Analysis Of Ovarian Cancer Cells Reveals Dynamic Processes Of Protein Secretion And Shedding Of Extra-Cellular Domains. PLoS ONE 3:e2425.
5. Hellström I, Raycraft J, Hayden-Ledbetter M, Ledbetter JA, **Schummer M**, McIntosh M, Drescher C, Urban N, Hellström KE (2003) The HE4 (WFDC2) protein is a biomarker for ovarian carcinoma. Cancer Res, 63: 3695-700.
6. Pepe MS, Longton G, Anderson G, **Schummer M** (2003) Selecting Differentially Expressed Genes from Microarray Experiments. Biometrics, 59: 133-42
7. Stone B, **Schummer M**, Paley PJ, Thompson L, Stewart J, Ford M, Crawford M, Urban N, O'Briant K, Nelson BH (2003) Serologic analysis of ovarian tumor antigens reveals a bias toward antigens encoded on 17q. Int J Cancer, 104: 73-84.
8. Fang X, **Schummer M**, Mao M, Yu S, Tabassam FH, Swaby R, Hasegawa Y, Tanyi JL, LaPushin R, Eder A, Jaffe R, Erickson J and Mills GB (2002) Lysophosphatidic acid is a bioactive mediator in ovarian cancer. Biochim Biophys Acta, 1582: 257-64.
9. Park I, He Y, Lin F, Lærum O, Tian Q, Bumgarner R, Klug C, Li K, Kuhr C, Doyle M, Xie X, **Schummer M**, Sun Y, Goldsmith A, Clarke M, Weissman I, Hood L, Li L (2002) Differential Gene Expression Profiling of Adult Murine Hematopoietic Stem Cells. Blood, 99: 488-98.

2001 and Earlier

10. Stone B, **Schummer M**, Paley PJ, Crawford M, Ford M, Urban N and Nelson BH (2001) MAGE-F1, a novel ubiquitously expressed member of the MAGE superfamily. Gene, 267: 173-82.
11. Furey TS, Cristianini N, Duffy N, Bednarski DW, **Schummer M**, Haussler D (2000) Support vector machine classification and validation of cancer tissue samples using microarray expression data. Bioinformatics, 16: 906-14.
12. Ben-Dor A, Bruhn L, Friedman N, Nachman I, **Schummer M** and Yakhini Z (2000) Tissue Classification with Gene Expression Profiles. The Forth Annual International Conference on Computational Molecular Biology – Recombinant *DNA technical bulletin* 2000, pp 54-64
13. Keller A, **Schummer M**, Hood L, Ruzzo WL (2000) Bayesian Classification of DNA Array Expression Data. Technical Report, UW-CSE-2000-08-01, August, 2000.

14. Ben-Dor A, Bruhn L, Friedman N, Nachman I, **Schummer M** and Yakhini, Z (2000) Tissue classification with gene expression profiles. Journal of Computational Biology, 7: 559-84.
15. **Schummer M**, Kiviat N, Bednarski D, Crumb GK, Ben-Dor A, Drescher C and Hood L (2000) Hybridisation of an array of 100,000 cDNAs with 32 tissues finds potential ovarian cancer marker genes, Int. J. Biol. Markers, 15 suppl. 1: 35.
16. Gauchat D, Mazet F, Berney C, **Schummer M**, Kreger S, Pawolowski J and Galliot B (2000) Evolution of Antp class genes and differential expression of Hydra Hox/paraHox genes in anterior patterning, Proc. Natl. Acad. Sci. USA, 97: 4493-8.
17. Nelson PS, Ng WL, **Schummer M**, Bumgarner R, Ferguson C, and Hood L (1999) Negative selection: a method for obtaining low-abundance cDNAs using high-density cDNA clone arrays. Genet. Anal. 15: 209-15.
18. Zong Q, **Schummer M**, Hood L, Morris DR (1999) Messenger RNA Translation State: The Second Dimension of High-Throughput Expression Screening, Proc. Natl. Acad. Sci. USA, 96: 10632-6.
19. **Schummer M**, Ng WL, Bumgarner RE, Nelson PS, Schummer B, Hassell L, Rae Baldwin L, Karlan BY, and Hood L (1999) Comparative hybridization of an array of 21,500 ovarian cDNAs for the discovery of genes overexpressed in ovarian carcinomas. Gene 238: 375-85.
20. Wang K, Gan L, Jeffrey E, Gayle M, Gown AM, Skelly M, Nelson PS, Ng W, **Schummer M**, Hood L and Mulligan J (1999) Monitoring gene expression profile changes in ovarian carcinomas using cDNA microarray, Gene, 229: 101-8.
21. Schummer B, Hauptfleisch S, Siegsmund M, **Schummer M** and Lemmer B (1998) Highly Accurate Quantification of mRNA Expression by Means of Titan™ One Tube RT-PCR and Capillary Electrophoresis, Biochemica, 2: 31-3.
22. Ng W-L, Goo YA, **Schummer M**, Schuder L, Baldwin RL, Karlan BY and Hood L (1998) Identification of ovarian tumor-related genes using a combination of high-throughput technologies, Proc. Am. Assoc. Cancer Res. 39: 453.
23. Nelson PS, Ng WL, **Schummer M**, True L, Liu AL, Bumgarner R, Ferguson C, Dimak A, and Hood L. (1998) An Expressed-Sequence-Tag Database of the Human Prostate: Sequence Analysis of 1,168 cDNA Clones, Genomics, 47: 12-25.
24. Schummer B, Petroianu G, **Schummer M**, Maleck W, Rüfer R (1997) The efficiency of placental protection against foetal cell passage into the maternal circulation: A PCR based study for the male ZFY gene in maternal blood of minipig, Scandinavian J of Lab Animal Sci. 25 Suppl. 1: 225-9.
25. **Schummer M**, Ng WL, Nelson PS, Bumgarner RB and Hood L (1997) A simple high-performance DNA arraying device for comparative expression analysis of a large number of genes, BioTechniques, 23: 1087-92.
26. Galliot B, Kreger S, Rungger D, Schummer M and Gauchat D (1997) Regulatory genes involved in Hydra pattern formation and nerve differentiation, Proceedings of the 6th International Conference on Coelenterate Biology, 1995: 167-75.
27. Ng W-L, **Schummer M**, Cirisano, F, Baldwin RL, Karlan BY and Hood L (1996) High-Throughput Plasmid Minipreparations Facilitated By Micro-Mixing, Nucl. Acids Res, 24: 5045-7.
28. Galliot B and **Schummer M** (1993) "Guessmer" screening strategy applied to species with A/T rich coding sequences, Trends Genet, 9: 3-4.

29. **Schummer M**, Scheurlen I, Schaller C and Galliot B (1992) HOX/HOM homeogenes are present in Hydra (*Chlorohydra viridissima*) and are differentially expressed during regeneration, EMBO J, 11: 1815-23.

### Other Publications

1. **Schummer M**, Beatty JD, Urban N (2010) Breast Cancer Genomics: Normal Tissue and Cancer Markers. Annals NY Acad Sci 1210: 78-85.
2. Wall Street Journal article (2004) about progress in early detection of ovarian cancer

### Books

1. **Schummer M**, Ng WL, Nelson PS, Bumgarner RB and Hood L (1999) Inexpensive Handheld Device for the Construction of High-Density Nucleic Acid Arrays, in: Expression Genetics: Accelerated and High-Throughput Methods, ed. M McClelland and A. Pardee, BioTechniques Books, Natick, MA. 1999; 3-11.
2. Zong Q, **Schummer M** and Morris D (1998) Analysis of translationally controlled genes by DNA array, Cold Spring Harbor Laboratory, New York.

### Invited Presentations (Speaker)

1. "Breast Cancer Genomics: Normal Tissue and Cancer Markers", Conference Towards Personalized Medicine", NY Academy of Sciences and Talència, Catalanian Research Organization, Barcelona, Spain, May 2010
2. "Breast Cancer Genomics: Normal Tissue and Cancer Markers", German Cancer Research Center, Heidelberg, Germany, May 2010
3. "Discovery of potential breast cancer markers by measuring transcript in tissue", qPCR Symposium USA, Clarion Hotel San Francisco Airport, Millbrae, CA, November 2009
4. "Systemic approach to the discovery of cancer markers for the ovary and prostate", University Hospital Eppendorf, University of Hamburg, Germany, June 2002
5. "Multiple approaches lead to the discovery of new cancer markers", Huntsman Cancer Institute, University of Utah, Salt Lake City, UT, May 2001
6. "Discovery of new ovarian cancer markers by microarray hybridisation", Institute of Pathology, Cambridge, UK, June 2000 and Pasteur, Institute Paris, France in June 2000
7. "Discovery of new ovarian cancer markers by microarray hybridization", Southwest Oncology Group, Seattle, June 2000
8. "Using High Density Array Hybridization to Discover Potential Marker Genes for Ovarian Cancer", Corixa Corp., Seattle, February 1999 and ZymoGenetics Inc., Seattle, April 1999
9. Schummer M and Anderson G "A Net for Fishing in a Sea of Genes - Using Statistical Methods to Screen DNA Chip Hybridization Output", Marsha Rivkin Center, Seattle, August 1998
10. "Using high-density cDNA arrays for detection of differentially expressed genes in ovarian cancer tissues", Fred Hutchinson Cancer Research Center, Seattle, June 1996

### Invited Presentations (Poster)

1. "Monitoring for ovarian cancer recurrence using HE4 and CA125", Marsha Rivkin Center for Ovarian Cancer Research Symposium, Seattle WA, October 2010

2. "HE4 (WFDC2) has strong translational potential as an early detection marker for ovarian cancer", NCI Translational Science Meeting, Washington, DC, November 2008
3. "Molecular profiling of tissue transcripts from invasive breast cancers and normal controls from breast reduction surgeries could yield novel breast markers", Era of Hope meeting, Baltimore, MD, July 2008
4. "Ovarian Cancer Early Screening Project (OCESP): Lower genital tract secretions for early screening of pelvic epithelial cancers", Canary Meeting, Stanford University, Palo Alto, CA, May 2008
5. "Validation of a Biomarker Panel for Early Detection of Breast Cancer in High Risk Women", NCI Meeting, Baltimore, MD, June 2007
6. "Use of Novel Technologies to Identify and Investigate Molecular Markers for Ovarian Cancer Screening and Prevention", Department of Defense Ovarian Cancer Investigators Forum, CDMRP, Herndon, VA, November 2000
7. "Finding Potential Ovarian Cancer Marker Genes through Interrogation of a 100,000+ Clone cDNA Array with 32 Specimens", 8th SPORE investigators' workshop, Chantilly, VA, June 2000
8. "ScienceArt - Display of cDNA array pictures", Gallery at JBohn Associates, Seattle, May 2000
9. "cDNA array hybridization (100,000 clones with 32 tissues) finds potential ovarian cancer marker genes", Human Genome Meeting 2000, Vancouver, BC, Canada, April 2000

## Teaching

- 2005-present Supervision of student interns, Fred Hutchinson Cancer Research Center, Seattle, Washington
- 2005-2006 Supervision of a post-doctoral fellow, Fred Hutchinson Cancer Research Center, Seattle, Washington
- 1998-2003 Instructor at the Institute for Science Training and Research, Seattle, Washington
- 2000-2001 Supervision of student interns, Institute for Systems Biology, Seattle, Washington
- 1997-2000 Supervision of student interns, University of Washington, Seattle, Washington
- 1995-1999 Summer Student Program, Dept. of Molecular Biotechnology, University of Washington, Seattle, Washington

## Institutional Service

- 2011-present Associate Editor, BMC Cancer
- 2009-2010 Reviewer, Breast Cancer Panel, Department of Defense, Washington, District of Columbia
- 2005-present Member, Specimen Review Committee for the Pacific Ovarian Cancer Research Consortium, Fred Hutchinson Cancer Research Center, Seattle, Washington
- 1987-1989 Founder and Editor-in-Chief, Student Newspaper, University of Heidelberg, Germany

## **Inventions/Patents**

- A hand-held arraying and replication device (ARD) for manual generation of high-density cDNA and colony arrays, licensed to V&P Scientific, San Diego, CA, USA.
- HE4 sandwich ELISA as a diagnostic marker for ovarian cancer. Filed for patent protection on 30 August 2001.

## **Current Projects**

- Markers for monitoring of ovarian cancer: discovery, validation and, funding pending, clinical trial
- Markers for breast cancer for early detection, prognosis and prediction. Finding markers complementing MRI imaging to increase its specificity. Some markers have been discovered and they await validation in breast specimens collected throughout the last 24 months.