

CURRICULUM VITAE  
The Johns Hopkins University School of Medicine

Christopher B. Umbricht

09/30/2020

## DEMOGRAPHIC AND PERSONAL INFORMATION

### Current Appointments

#### University

2010-present Associate Professor, Department of Surgery, Division of Endocrine and Oncologic Surgery, The Johns Hopkins University School of Medicine, Baltimore, Maryland  
Associate Professor, Department of Pathology, The Johns Hopkins University School of Medicine, Baltimore, Maryland  
Associate Professor, Department of Oncology, The Johns Hopkins University School of Medicine, Baltimore, Maryland

### Personal Data

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### Education and Training

#### Undergraduate

1972 Baccalaureate type A (Classic Languages)/Humanistisches Gymnasium Basel, Switzerland.

#### Doctoral/Graduate

1982 M.D./University of Basel, Switzerland.  
1995 Ph.D./Molecular Biology & Genetics (BCMB)/Johns Hopkins University School of Medicine/Baltimore MD

#### Postdoctoral

1983-1984 Intern, Institute of Pathology of the University of Basel, Switzerland (P.U. Heitz)  
1983-1984 Intern, Medicine/St. Claraspital, Basel, Switzerland (H. Affolter)  
1985-1987 Resident, Internal Medicine/Johns Hopkins Hospital, Baltimore MD (J.D. Stobo)  
1996-1999 Postdoctoral Fellowship/Johns Hopkins Oncology Center, Baltimore MD (S. Sukumar)

### Professional Experience

2000-2011 Assistant Professor, Division of Endocrine and Oncologic Surgery, The Johns Hopkins University School of Medicine, Baltimore, Maryland  
2011-present Associate Professor, Division of Endocrine and Oncologic Surgery, The Johns Hopkins University School of Medicine, Baltimore, Maryland

## PUBLICATIONS

### Original Research [OR]

1. Diamond DA, Berry SJ, **Umbricht CB**, Jewett HJ, Coffey DS. Computerized Image Analysis of Nuclear Shape as a Prognostic Factor for Prostatic Cancer. *Prostate* 1982; 3:321-332. *Data analysis, manuscript writing.*
2. **Umbricht CB**, Gschwind R, Christen H, Oberholzer M, Torhorst J. Prognostic Significance of Nuclear Shape Parameters in Node Negative Invasive Breast Cancer. *Verh Dtsch Ges Path* 1985; 69:552-553.
3. Gschwind R, **Umbricht CB**, Torhorst J, Oberholzer M. Evaluation of Shape Descriptors for the Morphometric Analysis of Cell Nuclei. *Pathol Res Pract* 1986; 181:213-222. *Data analysis, manuscript writing.*

4. **Umbricht CB**, Oberholzer, M, Gschwind, R, Christen, H, Torhorst J. Prognostic significance (relapse, non-relapse) of nuclear shape parameters in lymph node negative breast cancer. *Anal Cell Pathol* 1989; 1:11-23.
5. **Umbricht CB**, Erdile LF, Jabs EW, Kelly TJ. Cloning, overexpression, and genomic mapping of the 14-kDa subunit of human replication protein A. *J Biol Chem* 1993; 268:6131-6138.
6. Henriksen LA, **Umbricht CB**, Wold MS. Recombinant replication protein A: expression, complex formation, and functional characterization. *J Biol Chem* 1994; 269:11121-11132. *Data analysis, manuscript writing, funding.*
7. **Umbricht CB**, Griffin CA, Hawkins AL, Grzeschik KH, O Connell P, Leach R, Green ED, Kelly TJ. High-resolution genomic mapping of the three human Replication Protein A genes (RPA1, RPA2, and RPA3). *Genomics* 1994; 20:249-257.
8. **Umbricht CB**, Saji M, Westra WH, Udelsman R, Zeiger MA, Sukumar S. Telomerase activity: a marker to distinguish follicular thyroid adenoma from carcinoma. *Cancer Res* 1997; 57:2144-47.
9. Saji M, Westra WH, Chen H, **Umbricht CB**, Tuttle RM, Box MF, Udelsman R, Sukumar S, Zeiger MA. Telomerase activity in the differential diagnosis of papillary carcinoma of the thyroid. *Surgery* 1997; 122:1137-40. *Data analysis, manuscript writing, funding.*
10. Varon D, Jiang C, Hedican C, Dome JS, **Umbricht CB**, Carey LA, Thompson HJ, Sukumar S. Telomerase activity in the normal and neoplastic rat mammary gland. *Cancer Res* 1997; 57:5605-09. *Data analysis, manuscript writing, funding.*
11. Carey LA, Hedican CA, Henderson GS, **Umbricht CB**, Dome JS, Varon D, Sukumar S. Careful histological confirmation and microdissection reveal telomerase activity in otherwise telomerase-negative breast cancers. *Clin Cancer Res* 1998; 4:435-40. *Data analysis, manuscript writing, funding.*
12. Smilenov LB, Mellado W, Rao PH, Sawant SG, **Umbricht CB**, Sukumar S, Pandita TK. Molecular cloning and chromosomal localization of Chinese hamster telomeric protein chTRF1. Its potential role in chromosomal instability. *Oncogene* 1999; 17:2137-42. *Data analysis, manuscript writing, funding.*
13. Sawant SG, Gregiore V, **Umbricht CB**, Cvilic S, Sukumar S, Pandita TK. Telomerase Activity as a Measure for Monitoring Radiocurability of Tumor Cells. *FASEB J.* 1999; 13:1047-1054. *Data analysis, manuscript writing, funding.*
14. **Umbricht CB**, Sherman ME, Dome JS, Carey LA, Marks J, Kim NW, Sukumar S. Telomerase Activity in Ductal Carcinoma In Situ and Invasive Breast Cancer. *Oncogene* 1999; 18:3407-3414.
15. Saji M, Xydas S, Westra W, Liang CK, Clark DP, Udelsman R, **Umbricht CB**, Sukumar S, Zeiger MA. Human Telomerase Reverse Transcriptase (hTERT) Gene Expression in Thyroid Neoplasms. *Clin Ca Res* 1999; 5:1483-9. *Data analysis, manuscript writing, funding.*
16. Carey LA, Kim NW, Goodman S, Marks J, Henderson GS, **Umbricht CB**, Dome JS, Dooley W, Amshey SR, Sukumar S. Telomerase Activity and Prognosis in Primary Breast Cancer. *J Clin Oncol* 1999; 17:3075-3081. *Data analysis, manuscript writing, funding.*
17. Dome JS, Chung S, Bergemann T, **Umbricht CB**, Saji M, Carey LA, Grundy PE, Perlman EJ, Breslow NE, Sukumar S. Telomerase Reverse Transcriptase (hTERT) mRNA Level Correlates with Outcome in Patients with Wilms Tumor. *Cancer Res* 1999; 59:4301-7. *Data analysis, manuscript writing, funding.*
18. Ferguson AT, Evron E, **Umbricht CB**, Pandita T, Hermeking H, Marks J, Futreal A, Stampfer MR, Vogelstein B, Sukumar S. Aberrant Hypermethylation of the 14-3-3 Sigma Gene is Associated with Gene Silencing and Human Mammary Epithelial Cell Transformation. *Proc Natl Acad Sci U S A* 2000; 97:6049-6054. *Data analysis, manuscript writing.*
19. Evron E, **Umbricht CB**, Korz D, Raman V, Loeb DM, Niranjana B, Weitzman SA, Marks J, Sukumar S. Loss of cyclin D2 expression in the majority of breast cancers is associated with promoter hypermethylation. *Clin Ca Res* 2001; 61:2782-7. *Data analysis, manuscript writing.*
20. **Umbricht CB**, Evron E, Marks J, Gabrielson E, Sukumar S. Hypermethylation of 14.3.3 sigma (Stratifin) and tumor progression in preinvasive breast cancer. *Oncogene* 2001; 20:3348-53. *Data analysis, manuscript writing.*
21. Evron, E, Dooley, WC, **Umbricht CB**, Rosenthal, D, Sacchi, N, Gabrielson, E, Soito, AB, Hung, D T, Ljung, B, Davidson, NE, Sukumar, S. Detection of breast cancer cells in ductal lavage fluid by methylation-specific PCR. *Lancet* 2001; 357:1335-6. *Data analysis, manuscript writing.*
22. Cohen Y, Rosenbaum E, Clark DP, Zeiger MA, **Umbricht CB**, Tufano RP, Sidransky D, Westra WH. Mutational analysis of BRAF in fine needle aspiration biopsies of the thyroid: a potential application for preoperative assessment of thyroid nodules. *Clin Ca Res* 2004; 10:2761-2765. *Data analysis, manuscript writing, funding.*
23. Mazzanti C, Zeiger MA, Costourous N, **Umbricht CB**, Westra WH, Smith D, Somervell H, Bevilacqua G,

- Alexander HR, Libutti SK. Using gene expression profiling to differentiate benign vs malignant thyroid tumors. *Ca Res* 2004; 64:2898-2903. *Data analysis, manuscript writing, funding.*
24. **Umbricht CB**, Conrad G, Clark D, Westra W, Smith D, Zahurak M, Saji M, Smallridge C, Goodman S, Zeiger MA. The Role of Human Telomerase Reverse Transcriptase (hTERT) Gene Expression in the Surgical Management of Suspicious Thyroid Neoplasm. *Clin Ca Res* 2004; 10:5762-5768. *Data analysis, manuscript writing, funding.*
25. Hoque M, Rosenbaum E, Smith D, Xing M, Ladenson P, Zeiger MA, Sidransky D, **Umbricht CB**. Methylation Profiles in Thyroid Neoplasms. *J Clin Endocrinol Metab* 2005; 90:4011-4018.
26. Xing M, Westra WH, Tufano RP, Cohen Y, Rosenbaum E, Rhoden KJ, Carson KA, Vasko V, Larin A, Tallini G, Tolaney S, Holt EH, Hui P, **Umbricht CB**, Basaria S, Ewertz M, Tufano AP, Califano JA, Ringel MD, Zeiger MA, Sidransky D, Ladenson PW. BRAF Mutation Predicts a Poorer Clinical Prognosis for Papillary Thyroid Cancer. *J Clin Endocrinol Metab* 2005; 90:6373-6379. *Data analysis, manuscript writing, funding.*
27. Rosen J, He M, **Umbricht CB**, Alexander HR, Dackiw AP, Zeiger MA, Libutti SK. A six-gene model for differentiating benign from malignant thyroid tumors on the basis of gene expression. *Surgery* 2005; 138:1050-1056. *Data analysis, manuscript writing, funding.*
28. Hu S, Liu D, Tufano RP, Carso KA, Rosenbaum E, Cohen Y, Holt EH, Kiseljak-Vassiliades K, Rhoden KJ, Tolaney S, Condouris S, Tallini G, Westra WH, **Umbricht CB**, Zeiger MA, Califano JA, Vasko V, Xing M. Association of aberrant methylation of tumor suppressor genes with tumor aggressiveness and BRAF mutation in papillary thyroid cancer. *Int J Cancer* 2006; 119:2322-9. *Data analysis, manuscript writing, funding.*
29. Prasad NB, Somervell H, Tufano RP, Dackiw APB, Marohn MR, Califano JA, Wang Y, Westra WH, Clark DP, **Umbricht CB**, Libutti SK, Zeiger MA. Identification of Genes Differentially Expressed in Benign versus Malignant Thyroid Tumors. *Clin Ca Res* 2008; 14:3327-3337. *Data analysis, manuscript writing, funding.*
30. Banks ND, Kowalski J, Tsai HL, Somervell H, Tufano R, Dackiw APB, Marohn MR, Clark DP, **Umbricht CB**, Zeiger MA. A Diagnostic Predictor Model for Indeterminate or Suspicious Thyroid FNA Samples. *Thyroid* 2008; 18:933-941. *Data analysis, manuscript writing, funding.*
31. Morita SY, Somervell H, **Umbricht CB**, Dackiw APB, Zeiger MA. Evaluation for Concomitant Thyroid Nodules and Primary Hyperparathyroidism in Patients Undergoing Parathyroidectomy or Thyroidectomy. *Surgery* 2008; 144:862-867. *Data analysis, manuscript writing.*
32. Wang Y, Kowalski J, Tsai HJ, Marik R, Prasad N, Somervell H, Lo PK, Sangenario LE, Dyrskjot L, Orntoft TF, Westra WH, Meeker AK, Eshleman JR, **Umbricht CB**, Zeiger MA. Differentiating Alternative Splice Variant Patterns of Human Telomerase Reverse Transcriptase in Thyroid Neoplasms. *Thyroid* 2008; 18:1055-1063. *Data analysis, manuscript writing, funding.*
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34. Marik R, Fackler M, Gabrielson E, Zeiger MA, Sukumar S, Stearns V, **Umbricht CB**. DNA methylation-related vitamin D receptor insensitivity in breast cancer. *Cancer Biol Ther* 2010; 10:44-53.
35. Pesce CE, Tsai HL, Kowalski J, **Umbricht CB**, Tufano RP, Dackiw APB, Zeiger MA. Postoperative hypocalcemia after Thyroidectomy for graves' disease. *Thyroid* 2010; 20:1279-1283. *Data analysis, manuscript writing.*
36. Neychev VK, Kouniavsky G, Shiue Z, Udall DN, Somervell H, **Umbricht CB**, Zeiger MA. Chasing "Shadows": Discovering the Subtleties of Sestamibi Scans to Facilitate Minimally Invasive Parathyroidectomy. *World J Surg* 2011; 35:140-146. *Data analysis, manuscript writing.*
37. Marik R, Allu M, Anchoori R, Stearns V, **Umbricht CB**, Khan S. Potent genistein derivatives as inhibitors of estrogen receptor alpha-positive breast cancer. *Cancer Biol Ther* 2011; 11:44-53. *Data analysis, manuscript writing, funding.*
38. Hung T, Wang Y, Lin MF, Koegel AK, Kotake Y, Grant GD, Horlings HM, Shah N, **Umbricht CB**, Wang P, Kong B, Langerod A, Borresen-Dale AL, Kim SK, van de Vijver M, Sukumar S, Whitfield ML, Kellis M, Xiong Y, Wong DJ, Chang HY. Extensive and coordinated transcription of noncoding RNAs within cell-cycle promoters. *Nat Genetics* 2011; 43:621-629. PMID: 3652667. *Data analysis, manuscript writing.*
39. Wang Y, Meeker AK, Kowalski J, Tsai HL, Somervell H, Heaphy C, Sangenario LE, Prasad N, Westra WH, Zeiger MA, **Umbricht CB**. Telomere length is related to alternative splice patterns of telomerase in thyroid tumors. *Am J Pathol* 2011; 179:1415-1424. PMID: 3157225
40. Fackler M, **Umbricht CB**, Williams D, Argani P, Cruz L, Merino VF, Teo WW, Zhang Z, Huang P, Visvanathan K, Marks J, Gray JW, Ethier S, Wolff AC, Cope L, Sukumar S. Genome-Wide Methylation Analysis Identifies Genes Specific to Breast Cancer Hormone Receptor Status and Risk of Recurrence. *Ca Res* 2011; 71:6195-207, PMID:

3308629. *Data analysis, manuscript writing.*

41. Prasad N, Kowalski J, Tsai HL, Talbot K, Somervell H, Kouniavsky G, Wang Y, Dackiw AP, Westra WH, Clark D, Libutti SK, **Umbricht CB**, Zeiger MA. Three-gene molecular diagnostic model for thyroid cancer. *Thyroid* 2012; 22:275-84. PMID: 3286810 *Data analysis, manuscript writing, funding.*
42. Brait M, Loyo M, Rosenbaum E, Ostrow KL, Markova A, Papagerakis S, Zahurak M, Goodman SM, Zeiger MA, Sidransky D, **Umbricht CB\***, Hoque MO\* (\*corresp.Au.). Correlation between BRAF mutation and promoter methylation of TIMP3, RARBeta 2 and RASSF1A in thyroid cancer. *Epigenetics* 2012; 7:710-719. PMID: 3414391 *Data analysis, manuscript writing, funding.*
43. Lee KC, Li C, Schneider EB, Wang Y, Somervell H, Krafft M, **Umbricht CB**, Zeiger MA. Is BRAF mutation associated with lymph node metastasis in patients with papillary thyroid cancer? *Surgery* 2012; 152:977-83. PMID: 23062653. *Data analysis, manuscript writing, funding.*
44. Liu Y, Cope LM, Sun W, Wang Y, Prasad N, Sengenaro L, Talbot K, Somervell H, Westra W, Bishop J, Califano J, Zeiger M, and **Umbricht CB**. DNA Copy Number Variations Characterize Benign and Malignant Thyroid Tumors. *J Clin Endocrinol Metab* 2013; 98 (3): E558-66. PMID:3590464
45. Olson MT, Boonyaarunnate T, Aragon Han P, **Umbricht CB**, Ali SZ, Zeiger MA. A Tertiary Center's Experience With Second Review of 3885 Thyroid Cytopathology Specimens. *J Clin Endocrinol Metab* 2013; 98:1450-7. PMID: 23436916 *Data analysis, manuscript writing.*
46. Shah N, Jin K, Cruz LA, Park S, Sadik H, Cho S, Goswami CP, Nakshatri H, Gupta R, Chang HY, Zhang Z, Cimino-Mathews A, Cope LM, **Umbricht CB**, Sukumar, S. HOXB13 Mediates Tamoxifen Resistance and Invasiveness in Human Breast Cancer by Suppressing ERalpha and Inducing IL-6 Expression. *Cancer Res* 2013; 73:5449-58. PMID: 23832664 *Data analysis, manuscript writing.*
47. Li C, Aragon Han P, Lee KC, Lee LC, Fox AC, Beninato T, Thiess M, Dy BM, Sebo TJ, Thompson GB, Grant CS, Giordano TJ, Gauger PG, Doherty GM, Fahey TJ 3rd, Bishop J, Eshleman JR, **Umbricht CB**, Schneider EB, Zeiger MA. Does BRAF V600E mutation predict aggressive features in papillary thyroid cancer? Results from four endocrine surgery centers. *J Clin Endocrinol Metab.* 2013; 98:3702-12. PMID: 23969188 *Data analysis, manuscript writing.*
48. Daemen A, Griffith OL, Heiser LM, Wang NJ, Enache OM, Sanborn Z, Pepin F, Durinck S, Korkola JE, Griffith M, Hur JS, Huh N, Chung J, Cope LM, Fackler MJ, **Umbricht CB**, Sukumar S, Seth P, Sukhatme VP, Jakkula LR, Lu Y, Mills GB, Cho RJ, Collisson EA, van't Veer LJ, Spellman PT, Gray JW. Modeling precision treatment of breast cancer. *Genome Biol.* 2013;14(10):R110. PMID: 24176112 *Manuscript writing.*
49. Fackler MJ, Lopez Bujanda Z, **Umbricht CB**, Teo WW, Cho S, Zhang Z, Visvanathan K, Jeter S, Argani P, Wang C, Lyman JP, de Brot M, Ingle JN, Boughey J, McGuire K, King TA, Carey LA, Cope LM, Wolff AC, Sukumar S. Novel methylated biomarkers and a robust assay to detect circulating tumor DNA in metastatic breast cancer. *Cancer Res.* 2014 Apr 15;74(8):2160-70. PMID: 24737128. *Data analysis, manuscript writing.*
50. Lindeman BM, Pesce CE, Tsai HL, Somervell H, **Umbricht CB**, Kowalski J, Zeiger MA. Lower Vitamin D Levels in Surgical Hyperparathyroidism versus Thyroid Patients. *American Surgeon* 2014; 80:505-10. *Data analysis, manuscript writing.*
51. Cope LM, Fackler MJ, Lopez-Bujanda Z, Wolff AC, Visvanathan K, Gray JW, Sukumar S, **Umbricht CB**. Do breast cancer cell lines provide a relevant model of the patient tumor methylome? *PLoS ONE* 2014; 9:e105545.
52. Timp W, Bravo HC, McDonald OG, Goggins M, **Umbricht CB**, Zeiger MA, Feinberg AP, Irizarry RA. Large hypomethylated blocks as a universal defining epigenetic alteration in human solid tumors. *Genome Med* 2014; 6:61. PMID:4154522 *Data analysis, manuscript writing.*
53. The Cancer Genome Atlas Research Network. Integrated genomic characterization of papillary thyroid carcinoma. *Cell* 2014; 159:676-90. PMID:4243044 *Data analysis, manuscript writing.*
54. Gage MM, Rosman M, Mylander WC, Giblin E, Kim HS, Cope LM, **Umbricht CB**, Wolff AC, Tafra L. A Validated Model for Identifying Patients Unlikely to Benefit From the 21-Gene Recurrence Score Assay. *Clin Breast Cancer.* 2015; 15(6):467-72. NIHMSID: NIHMS780626 PubMed PMID: 26072275. *Data analysis, manuscript writing.*
55. Aragon-Han P, Weng CH, Khawaja HT, Nagarajan N, Schneider EB, **Umbricht CB**, Witwer KW, Zeiger MA. MicroRNA Expression and Association with Clinicopathologic Features in Papillary Thyroid Cancer: A Systematic Review. *Thyroid* 2015; 25(12):1333-9. PMID: 26414548 *Data analysis, manuscript writing.*
56. Aragon-Han P, Kim HS, Cho S, Fazeli R, Najafian A, Khawaja H, Dy B, Sorensen M, Aronova A, Sebo TJ, Giordano TJ, Fahey TJ, Thompson GB, Gauger PG, Bishop JA, Eshleman JR, Schneider EB, Witwer KW, **Umbricht CB**, Zeiger MA. Association of BRAF V600E Mutation and MicroRNA Expression with Central Lymph Node

- Metastases in Papillary Thyroid Cancer: A Prospective Study from Four Endocrine Surgery Centers. *Thyroid* 2016; 26(4):532-42. PMID: 4827320 *Data analysis, manuscript writing.*
57. Olson MT, Baxi A, ElNaggar M, **Umbrecht CB**, Yergev AL, Clarke W. Morphologically compatible mass spectrometric analysis of lipids in cytological specimens. *J American Soc Cytopathology* 2016; 5(1):3-8. *Data analysis, manuscript writing.*
58. O'Sullivan CC, Wang Z, Zhang Z, **Umbrecht CB**, Jeter SC, Rosner GL, Stearns V, Smith KL. Characteristics, treatment and outcomes of breast cancer diagnosed during pregnancy and the year after delivery. *Cancer Res* 2016;76(4 Suppl):Abstract nr P1-07-01. *Data analysis, manuscript writing.*
59. **Kim HS**, **Umbrecht CB**, Illei PB, Cimino-Mathews A, **Cho S**, **Chowdhury N**, et al. Optimizing the Use of Gene Expression Profiling in Early-Stage Breast Cancer. *J Clin Oncol.* 2016; 34(36):4390-4397 PMID: PMC5455310 *Data analysis, manuscript writing, funding.*
60. Visvanathan K, Fackler MS, Zhang Z, Lopez-Bujanda ZA, Jeter SC, Sokoll LJ, Garrett-Mayer E, Cope LM, **Umbrecht CB**, Euhus DM, et al. Monitoring of Serum DNA Methylation as an Early Independent Marker of Response and Survival in Metastatic Breast Cancer: TBCRC 005 Prospective Biomarker Study. *J Clin Oncol.* 2017; 35(7):751-758. PMID: PMC5455421 *Data analysis, manuscript writing.*
61. Lai X, **Umbrecht CB**, Fisher K, Bishop J, Shi Q, Chen S. Identification of novel biomarker and therapeutic target candidates for diagnosis and treatment of follicular carcinoma. *J Proteomics.* 2017; S1874-3919(17)30237-3. PMID: 28709933 *Manuscript writing.*
62. Harris CK, Tran HT, Lee K, Mylander C, Pack D, Rosman M, Tafra L, **Umbrecht CB**, Andrade R, Liang W, Jackson RS. Positive Ultrasound-guided Lymph Node Needle Biopsy in Breast Cancer may not Mandate Axillary Lymph Node Dissection. *Ann Surg Oncol.* 2017; 24:3004-3010. PMID: 28766210 *Data analysis, manuscript writing.*
63. Chowdhury M, Euhus D, Arun B, **Umbrecht CB**, Biswas S, Choudhary P. Validation of a personalized risk prediction model for contralateral breast cancer. *Breast Cancer Res Treat.* 2018;170:415-423. PMID:6331647. *Data analysis, manuscript writing.*
64. Ganly I, Makarov V, Deraje S, Dong Y, Reznik E, Seshan V, Nanjangud G, Eng S, Bose P, Kuo F, Morris LGT, Landa I, Carrillo Alborno PB, Riaz N, Nikiforov YE, Patel K, **Umbrecht CB**, Zeiger M, Kebebew E, Sherman E, Ghossein R, Fagin JA, Chan TA. Integrated Genomic Analysis of Hürthle Cell Cancer Reveals Oncogenic Drivers, Recurrent Mitochondrial Mutations, and Unique Chromosomal Landscapes. *Cancer Cell.* 2018;34:256-270. PMID: 6247912. *Manuscript writing.*
65. **Liu Z**, **Sahli Z**, **Wang Y**, Wolff AC, Cope LM, **Umbrecht CB**. Young age at diagnosis is associated with worse prognosis in the Luminal A breast cancer subtype: a retrospective institutional cohort study. *Breast Cancer Res Treat.* 2018;172:689-702. doi: 10.1007/s10549-018-4950-4. PubMed PMID: 30225619.
66. **Avin BA**, **Wang Y**, Gilpatrick T, Workman RE, Lee I, Timp W, **Umbrecht CB** (corresponding), Zeiger MA. Characterization of Human Telomerase Reverse Transcriptase Promoter Methylation and Transcription Factor Binding in Differentiated Thyroid Cancer Cell Lines. *Genes Chromosomes Cancer.* 2019;58:530-540. PMID:6621557
67. **Cho S**, Zeiger MA, **Umbrecht CB** (corresponding), Cope LM. Measuring DNA copy number variation using high-density methylation microarrays. *J Comp Biol.* 2019; 26:295-304. PMID:6786966.
68. Downs BM, Mercado-Rodriguez C, Cimino-Mathews A, Chen C, Yuan JP, van den Berg E, Cope LM, Schmitt F, Tse G, Ali SZ, Meir-Levi D, Sood R, Richardson A, Tulac S, Kocmond KJ, de Guzman T, Lai EW, Rhee B, Bates M, Wolff AC, Harvey SC, **Umbrecht CB**, Visvanathan K, Fackler MJ, Sukumar S. DNA Methylation Markers for Breast Cancer Detection in the Developing World. *Clin Ca Res.* 2019; 25:6357-6367. PMID:6825533 *Manuscript writing.*
69. ICGC/TCGA Pan-Cancer Analysis of Whole Genomes Consortium. Pan-cancer analysis of whole genomes. *Nature.* 2020;578:82-93. doi:10.1038/s41586-020-1969-6 *Manuscript writing.*
70. Weng CH, Okawa ER, Roberts MB, Park SK, **Umbrecht CB**, Manson JE, Eaton CB. Breast Cancer Risk in Postmenopausal Women with Medical History of Thyroid Disorder in the Women's Health Initiative. *Thyroid.* 2020;30:519-530. PMID:7187984 *Data analysis, manuscript writing.*
71. Fackler MJ, **Cho S**, Cope LM, Gabrielson E, Visvanathan K, **Wilsbach K**, Meir-Levi D, Lynch CF, Marks J, Geradts J, Regan MM, Viale G, Wolff AC, Sukumar S, **Umbrecht CB**. DNA Methylation Markers Predict Recurrence-Free Interval in Triple-Negative Breast Cancer. *NPJ Breast Cancer.* 2020;6:1-6. doi: 10.1038/s41523-020-0145-3.
72. O'Sullivan CC, Irshad S, Wang Z, Tang Z, **Umbrecht CB**, Rosner GL, Christianson MS, Stearns V, Smith KL.

Clinico-pathologic features, treatment and outcomes of breast cancer during pregnancy or the post-partum period. *Breast Cancer Res Treat.* 2020;180:695-706. PMID:7398490 *Data analysis, manuscript writing.*

73. **McKelvey BA**, Gilpatrick T, **Wang Y**, Timp W, **Umbrecht CB** (corresponding), Zeiger MA. Characterization of Allele-Specific Regulation of Telomerase Reverse Transcriptase in Promoter Mutant Thyroid Cancer Cell Lines. [published online ahead of print, 2020 May 4]. *Thyroid.* 2020; 30:1470–1481. PMID: 32228178; doi:10.1089/thy.2020.0055

74. Tan J, Liu R, Zhu G, **Umbrecht CB**, Xing M. BRAF and MEK Inhibitors Preferentially Induce Apoptosis of 2 Cancer Cells and Suppression of Tumors Harboring both BRAF 3 V600E and TERT Promoter Mutations. *PNAS* 2020; 117(27):15846-15851. doi.org/10.1073/pnas.2004707117 *Data analysis, manuscript writing.*

75. Jacobs MA, **Umbrecht CB**, Parekh VS, El Khouli R, Cope LM, Macura KJ, Harvey S, Wolff AC. Integrated multiparametric radiomics and informatics system for characterizing breast tumor characteristics with the OncotypeDX gene assay. *Cancers* 2020; 12:2772. https://doi.org/10.3390/cancers12102772 *Data analysis, manuscript writing.*

76. **McKelvey BA**, Zeiger MA, **Umbrecht CB**. Characterization of TERT and BRAF copy number variation in papillary thyroid carcinoma: An analysis of the cancer genome atlas study. *Genes Chromosomes Cancer* 2021; 60:403-409; doi: 10.1002/gcc.22928.

### Review Articles [RA]

1. Erdile, L.F., Collins, K.L., et al. Initiation of SV40 DNA replication: mechanism and control. (Review) *Cold Spring Harb Symp Quant Biol* 1991; 56:303-313. *Manuscript writing.*

2. McKenzie K.E., **Umbrecht CB**, Sukumar S. Applications of telomerase research in the fight against cancer. (Review) *Mol Med Today* 1999; 5:114-22. *Manuscript writing.*

3. **Umbrecht CB**, Sukumar S. 2000 Telomerase in Breast Cancer. *J Womens Cancer* 2:115-120.

4. Segev D, **Umbrecht CB**, Zeiger MA. Molecular Pathogenesis of Thyroid Cancer. (Review) *Surg Oncology* 2003; 12:69-90. *Manuscript writing.*

5. Segev D, Clark D, Zeiger MA, **Umbrecht CB**. Molecular markers in thyroid FNA samples. (Review) *Acta Cytologica* 2003; 47:709-722.

6. **Diehl S**, **Umbrecht CB**, Dackiw APB, Zeiger M. Modern Approaches to Age-Old Questions about Thyroid Tumors. (Review) *Thyroid* 2005; 15:575-582. *Manuscript writing.*

7. Liu T, **Marti A**, **Umbrecht CB**. Molecular diagnosis of thyroid tumors. (Review) *Otorinolaringologia* 2013; 63:39-52.

8. **Avin BA**, **Umbrecht CB**, Zeiger MA. Human telomerase reverse transcriptase regulation by DNA methylation, transcription factor binding and alternative splicing (Review). *Int J Oncol.* 2016; 49:2199-2205. PMID: 6903903. *Data analysis, manuscript writing, funding.*

9. Sahli ZT, **Umbrecht CB**, Schneider EB, Zeiger MA. Thyroid Nodule Diagnostic Markers in the Face of the New Diagnosis, NIFT-P: Time for a Reset? (Review) *Thyroid.* 2017;27:1393-1399. PMID: 28859553. *Manuscript writing.*

10. Sahli ZT, Smith PW, **Umbrecht CB**, Zeiger MA. Preoperative Molecular Markers in Thyroid Nodules. *Front Endocrinol (Lausanne).* 2018;9:179. Review. PMID: PMC5915469. *Manuscript writing.*

11. **McKelvey BA**, **Umbrecht CB**, Zeiger MA. Telomerase Reverse Transcriptase (TERT) Regulation in Thyroid Cancer: A Review. *Front Endocrinol (London).* 2020;11:485. PMID:7412884 *Data analysis, manuscript writing, funding.*

12. **McKelvey BA**, Zeiger MA, **Umbrecht CB**. Commentary: Exploring the epigenetic regulation of telomerase reverse transcriptase (TERT) in human cancer cell lines. *Molecular Oncology.* 2020: epub ahead of print. doi.org/10.1002/1878-0261.12786 PMID:3290953

### Case Reports [CR]

N/A

### Book Chapters, Monographs [BC]

1. **Umbrecht CB** 1984 Prognostic Significance of Morphometric Nuclear Shape Analysis in Nodal Negative Invasive Breast Cancer. M.D. Thesis, Department of Pathology, University of Basel.

2. **Umbrecht CB** 1995 Cloning and characterization of recombinant human Replication Protein A. Ph.D. Thesis, Department of Molecular Biology & Genetics, The Johns Hopkins University School of Medicine.

3. **Umbrecht CB** 2010 Chapter 2: Invasion. Book chapter in: Kuerer H, ed. *Kuerer's Breast Surgical Oncology.*



New York, NY: McGraw-Hill.

## Books, Textbooks [BK]

N/A

## FUNDING

### EXTRAMURAL FUNDING

#### Research Extramural Funding -

##### Current

9/18-8/23	Discovery and validation of early molecular breast cancer risk markers in benign breast disease. R01CA222779 NIH/NCI \$1,958,309 Role: PI: 33%
2/18-1/21	Automation of a Blood Test for Methylation Markers to Reliably Predict Response to Therapy and Prognosis of Outcome in Patients with Metastatic Breast Cancer DOD W81XWH-18-1-0018 \$1,227,813 Role: Co-I: 10%

##### Pending

12/21-11/26	Molecular Taxonomy of Metastatic vs Indolent Follicular Neoplasia. R01 NIH/NCI \$4,047,351 Role: PI: 33%
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##### Previous

9/00-9/01	Oligonucleotide Analysis of Thyroid Neoplasms. Institutional Research grant Genelogic Corporation \$10,000 Role: Co-I: 2%
4/00-3/02	hTERT Gene Expression in Suspicious Thyroid FNA Samples. R21 NIH/NCI \$150,000 Role: Co-I: 40%
4/00-3/02	cDNA Microarrays in the Differential Diagnosis of Suspicious Thyroid Lesions. Thyroid Research Advisory Council Research Grant Knoll Pharmaceutical \$84,514 Role: Co-I: 20%
4/02-3/05	Alternative Fixation of Breast and Prostate Cancer Tissue. R21 NIH/NCI \$200,000 Role: PI: 20%
5/03-4/05	Microarray analysis of thyroid neoplasms. R21 NIH/NCI \$200,000 Role: Co-I: 20%
8/02-6/05	Methylation-induced gene silencing in papillary thyroid cancer. SPORE in Head and Neck Cancer. NIH/NCI \$1,888,925 Role: Career Development Award: 40%
12/00-11/05	Project I: Differential gene expression patterns in human breast cancer.

	SPORE in Breast Cancer.	NIH/NCI
	\$2,699,321	
	Role: Co-I: 20%	
5/05-4/07	Value of molecular markers in predicting long-term outcome in ductal carcinoma in situ of the breast.	
	Komen Foundation Research Grant.	Susan S. Komen Foundation
	\$200,000	
	Role: PI: 20%	
9/03-8/07	Gene Expression Profile of Cancer Progression in Human Breast Cancer.	
	Department of Defense Idea Award	DOD
	\$400,000	
	Role: PI: 20%	
9/04-8/09	Molecular Targeting of Breast Cancer Metastasis.	
	Department of Defense Center of Excellence Grant	DOD
	\$7,022,505	
	Role: Director, Bioinformatics Core: 10%	
4/05-3/10	Molecular Classification of Suspicious Thyroid Tumors.	
	R01	NIH/NCI
	\$1,225,528	
	Role: Co-I: 10%	
9/06-8/11	Project 1: Molecular Markers in Breast Cancer.	
	SPORE in Breast Cancer.	NIH/NCI
	\$1,154,355	
	Role: Co-I: 20%	
1/08-12/11	Genetic and Epigenetic Analysis of Thyroid Cancer.	
	Research Scholar Grant	American Cancer Society
	\$800,000	
	Role: PI: 30%	
10/08-9/11	The Contralateral Breast as a Model for Chemoprevention.	
	BCRF Research Grant	Breast Cancer Research Foundation
	\$300,000	
	Role: Co-I: 5%	
1/12-12/14	Molecular markers for predicting progression to invasive cancer.	
	Avon Foundation research grant	Avon Foundation
	\$600,000	
	Role: Co-I: 5%	
5/11-9/15	Molecular marker signature prognostic of metastatic disease in node-negative ER-negative Breast Cancer with no systemic therapy.	
	Komen Investigator-Initiated Research Grant	Susan S. Komen Foundation
	\$479,238	
	Role: PI: 20%	
8/10-9/15	Contract Acquisitions for NCI's The Cancer Genome Atlas Program (Thyroid).	
	NCI-10009-AS	NIH/NCI
	\$155,000	
	Role: PI: 5%	
10/16-09/17	Novel Thyroid Cancer-Specific Biomarker panel.	
	Maryland Innovation Initiative	Maryland Technology Development Corporation
	\$115,000	
	Role: PI: 30%	
4/11-3/18	Multicentric Genetic, Epigenetic and Expression Analysis of DCIS outcome predictors.	
	R01	NIH/NCI
	\$2,713,218	
	Role: PI: 33%	



9/14-8/18 Total RNA Sequencing Analysis of DCIS Progressing to Invasive Breast Cancer.  
 DOD Breakthrough Award Level 2 DOD/USAMRAMC-CDMRP  
 \$2,100,000  
 Role: PI: 25%

### **Educational Extramural Funding**

Previous

1987-88 Characterization of human DNA helicases.  
 Barry Wood Fellowship Barry Wood Foundation  
 Role: PI: 100%

1989-94 Role of Mammalian Helicases in DNA Replication.  
 K11 Physician Scientist Award NIH/NCI  
 Role: PI: 100%

1996-99 Telomerase as marker of early breast cancer.  
 Postdoctoral Research Grant Susan S. Komen Foundation  
 Role: PI: 100%

### **INTRAMURAL**

#### **Research Intramural Funding**

Previous

7/00-12/00 Alcohol Fixation of Breast Cancer Tissue for Simultaneous  
 Histopathological, Immunohistochemical, and Molecular Analysis.  
 Pilot Project Johns Hopkins Fund for Medical Discovery  
 \$21,918  
 Role: PI: 100%

### **CLINICAL ACTIVITIES**

#### **Clinical Focus**

N/A

#### **Certification**

##### **Medical, other state/government licensure**

8/86 - present Maryland Board of Physicians (#D34121)

##### **Boards, other specialty certification**

1988-Present Board Certified, American Board of Internal Medicine #123207

### **EDUCATIONAL ACTIVITIES**

#### **Educational Focus**

N/A

#### **Teaching**

1998 Department of Biochemistry, University of Maryland: Molecular Biology course, lecturer.

2001-2003 Department of Pathology, Johns Hopkins University School of Medicine: Molecular Biology of Disease course, lecturer.

2009- Department of Pathology, Johns Hopkins University School of Medicine: Faculty, Pathobiology Graduate Program.

2011- Department of Surgery, Johns Hopkins University School of Medicine: Faculty, Surgical Research Conferences

2013- SKCC Breast Center Annual Retreat: Coordinator & Judge, Poster Session Competition  
 2015- Department of Surgery, Johns Hopkins University School of Medicine: Faculty, Surgical Intern Lectures  
 2019- Cellular & Molecular Medicine, Johns Hopkins University: Faculty, CMM Graduate Program.

**Classroom instruction**

N/A

**Clinical instruction**

N/A

**CME instruction**

N/A

**Workshops / seminars**

N/A

**Mentoring****Pre-doctoral Advisees / Mentees**

2011-2016 Sean Cho, Graduate Student (CMM), Bioinformatics Scientist at Arcus Biosciences, Hayward, California; PhD, OR #46,48,49,56,59,67,71  
 2016-2020 Brittany McKelvey-Avin, Graduate Student (BCMB), TBD; PhD, OR #66,73 RA #8,11,12  
 2019- Marija Debeljak, MS, 2019-, Graduate Student (CMM)

**Post-doctoral Advisees / Mentees**

2000-2002 George Conrad, MD, Postdoctoral Fellow; Surgeon, Capitol Surgeons LLC, Silver Spring, MD; OR #24  
 2002-2004 Nijaguna Prasad, PhD, Postdoctoral Fellow; Health Scientist Administrator, Scientific Review Branch (SRB) NIH; OR #29,32,33,39,41,44  
 2002-2003 Siddhika Senaratne, PhD, Postdoctoral Fellow; Director General/Chief Executive Officer of the Sri Lanka Standards Institution (SLSI), Colombo, Sri Lanka  
 2003-2004 Lubov Ostrovskaya, PhD, Postdoctoral Fellow  
 2004-2005 Susanne Diehl, PhD, Postdoctoral Fellow; RA #6  
 2005-2010 Radharani Marik, PhD, Postdoctoral Fellow; Senior research scientist at Institute of Post-Graduate Medical Education and Research (IPGMER) Kolkata, India. OR #32,34,37  
 2008-2012 Yan Liu, MD, PhD, Postdoctoral Fellow; Biostatistician at George Washington University, Washington DC OR #44,65, RA #7  
 2012-2015 Brandon Kim, M.D., MPH, Postdoctoral Fellow; Gastroenterology Fellow at Baylor College of Medicine, PhD student in Epidemiology at Baylor. OR #54,56,59  
 2004- Yongchun Wang, MD, PhD, Postdoctoral Fellow/Research Associate. OR #29,32,38,39,41,43,44,65,66,72,73  
 2011-2016 Kathleen Wilsbach, PhD, Research Associate; Sr. Research Specialist JHUSOM  
 2017-2018 Zhiyang Liu, MD, Visiting Scholar (Sabbatical). Surgeon, Qingdao Municipal Hospital, China. OR #65

**Thesis committees**

2016 Sean Cho, PhD, CMM; Scarcity and sparsity: Multiomic studies in a low resource setting. Thesis Advisor.  
 2020 Brittany McKelvey-Avin, PhD, BCMB; Telomerase Reverse Transcriptase (TERT) Regulation by Activating Promoter Mutations and Allele-Specific Transcriptional Regulation in Thyroid Cancer Cells. Thesis Advisor.  
 2019- Marija Debeljak, CMM; TBD. Thesis Advisor.

**Educational Program Building / Leadership****RESEARCH ACTIVITIES****Research Focus**

Dr. Umbricht has a broad background in the fields of pathology, medicine, molecular biology and genetics, and has had a particular interest in bringing molecular and genetic approaches to bear on specific clinical problems, such as typically overtreated conditions such as ductal carcinoma in situ of the breast, node-negative breast cancer, and follicular neoplasia of the thyroid. In order to facilitate the study of difficult to identify longitudinal cohorts with long-term follow information and similarly challenging investigations, he developed an integrated clinical-pathological relational database of all breast and thyroid disease-related data available at this institution over the last 25 years.

**Research Program Building / Leadership**

N/A

**Research Demonstration Activities**

N/A

**Inventions, Patents, Copyrights**

1. Cloning & Expression of the 14 kD subunit of human replication protein A. JHU Ref.: C09577
2. Alternative Splice Variant Patterns of Human Telomerase Reverse Transcriptase (hTERT) in Thyroid Tumors Distinguish Benign from Malignant. JHU Ref.: C05018
3. Seventy Two Gene Model for 8 Thyroid Tumor Types. JHU Ref.: C10073
4. Diagnostic tool for diagnosing benign versus malignant thyroid lesions. JHU Ref.: C04567
5. DNA Copy Number Variation Characterizes Subsets of Follicular Thyroid Tumors. JHU Ref.: C11784
6. Novel Thyroid Cancer-Specific Biomarker Panel. JHU Ref.: C13553

**Technology Transfer Activities**

N/A

**SYSTEM INNOVATION AND QUALITY IMPROVEMENT ACTIVITIES**

N/A

**ORGANIZATIONAL ACTIVITIES****Institutional Administrative Appointments**

N/A

**Editorial Activities****Editorial Board appointments**

N/A

**Journal Peer review activities**

(Dates N/A)

Breast Cancer Research & Treatment, Cancer, Cancer Research, Carcinogenesis, Cancer Biology & Therapy, Clinical Cancer Research, Histopathology, J Clinical Investigation, J Clinical Pathology, J Molecular Diagnostics, Molecular Carcinogenesis, Oncology, Thyroid, Trends in Genetics, Tumor Biology

**Other peer review activities [non medico-legal]****Advisory Committees, Review Groups / Study Sections**

11/00

Reviewer, NIH PAR 00-025, Cancer Prevention Research Small Grant Program: Title: Biomarker analysis of breast cancer field disease as a tool for early detection.

2006 -

Reviewer, Johns Hopkins Surgery Pilot Study Awards.

11/08 Reviewer, Komen Foundation: 2009- KOMEN Epidemiology and Risk Assessment.  
 2013 - Co-Director, NCI T32 JHUSOM Department of Surgery Training grant  
 2014 - Reviewer, Integrative and Clinical Endocrinology and Reproduction Study Section [ICER]  
 NIH  
 2015 - Member, ATA Research Committee; Reviewer, ATA research grants  
 2016 Reviewer, Center for Scientific Review Special Emphasis Panel ZRG1 F06-S

### Professional Societies

(Dates N/A)

American Association of Microbiology  
 American Association of Cancer Research  
 American Association for Molecular Pathology  
 American Thyroid Association

### Conference Organizer

#### Session Chair

National

10/2015

15<sup>th</sup> International Thyroid Congress, Lake Nuena Vista FL:  
 Short Oral Communications 7, Session chair

### RECOGNITION

#### Awards, Honors

N/A

#### Invited Talks

JHMI/Regional

9/1996

Telomerase in the Differential Diagnosis of Thyroid Nodules  
 Pathology Grand Rounds, Johns Hopkins University, Baltimore, MD

11/2000

Telomerase and thyroid cancer: from bench to bedside.  
 Hematology Grand Rounds, Johns Hopkins University, Baltimore, MD

National

9/2005

Ethanol-based fixation as an alternative to formaldehyde.  
 Tissue Preservation Workshop, Department of Veterans Affairs, Biomedical  
 Laboratory Research and Development, Washington, DC.

4/2007

Ethanol-based fixation as an alternative to formaldehyde.  
 Workshop on Tissue Fixation for Molecular Analysis in Pathology and Cell Biology,  
 Meetings of the Histochemical Society and American Society for Investigative  
 Pathology at Experimental Biology 2007, Washington DC.

6/2011

VDR Methylation & VDR Insensitivity in Breast Cancer.  
 ENDO 2011: The Endocrine Society's 93rd Annual Meeting & Expo.  
 Boston, Massachusetts.

2/2015

Thyroid Cancer Integrated Genomics: Therapy Implications.  
 6th Current Concepts in the Management of Thyroid and Parathyroid Neoplasms.  
 MD Anderson Cancer Center, Houston, Texas.