



Figure 1. Over 1000 publications have used ALDEFLUOR™ to detect ALDH^{br} precursor cells in a variety of tissue types.



Scientists Helping Scientists™ | WWW.STEMCELL.COM DOCUMENT #28793 VERSION 2.0.0 MARCH 2014

TOLL FREE PHONE 1 800 667 0322 • PHONE +1 604 877 0713 • INFO@STEMCELL.COM • TECHSUPPORT@STEMCELL.COM FOR GLOBAL CONTACT DETAILS VISIT OUR WEBSITE

FOR RESEARCH USE ONLY. NOT INTENDED FOR HUMAN OR ANIMAL DIAGNOSTIC OR THERAPEUTIC USES. STEMCELL TECHNOLOGIES INC.'S QUALITY MANAGEMENT SYSTEM IS CERTIFIED TO ISO 13485 MEDICAL DEVICE STANDARDS.



The ALDEFLUOR™ fluorescent reagent system has been used in hundreds of publications for non-toxic detection of aldehyde dehydrogenase-bright (ALDH^{br}) cells in hematopoietic, breast, neural, colon, lung, pancreas, thyroid and other tissues.

Growing evidence indicates that malignant precursor cells in many tissues are ALDH^{br}. The following list, sorted by tissue type, is composed of recent, high-impact publications in oncology and cancer research where ALDEFLUOR™ has been used to detect cancer cells.

Cancer Stem Cells: Review Articles

- 1. Alison MR, et al. Cancer Stem Cells: Problems for Therapy? J Pathol 223(2): 147-161, 2011
- Alison MR, et al. Finding Cancer Stem Cells: Are Aldehyde Dehydrogenases Fit for Purpose? J Pathol 222(4): 335-44, 2010
- Ma I & Allan AL. The Role of Human Aldehyde Dehydrogenase in Normal and Cancer Stem Cells. Stem Cell Rev & Rep 7(2): 292-306, 2011

Hematopoietic Cancer Cells

- Boucher K, et al. Stemness of B-Cell Progenitors in Multiple Myeloma Bone Marrow. Clin Cancer Res 18(22): 6155-68, 2012
- Gerber JM, et al. A Clinically Relevant Population of Leukemic CD34⁺ CD38⁻ Cells in Acute Myeloid Leukemia. Blood 119(15): 3571-77, 2012
- Hanke M, et al. Differences Between Healthy Hematopoietic Progenitors and Leukemia Cells with Respect to CD44 Mediated Rolling Versus Adherence Behavior on Hyaluronic Acid Coated Surfaces. Biomaterials 35(5): 1411-19, 2014
- de Leeuw C, et al. Attenuation of MicroRNA-126 Expression That Drives CD34⁺ 38⁻ Stem/Progenitor Cells in Acute Myeloid Leukemia Leads to Tumor Eradication. Cancer Res Jan 2014 [epub]
- Man CH, et al. Sorafenib Treatment of FLT3-ITD⁺ Acute Myeloid Leukemia: Favorable Initial Outcome and Mechanisms of Subsequent Nonresponsiveness Associated with the Emergence of a D835 Mutation. Blood 119(22): 5133-43, 2012

- Nakamura S, et al. The FOXM1 Transcriptional Factor Promotes the Proliferation of Leukemia Cells Through Modulation of Cell Cycle Progression in Acute Myeloid Leukemia. Carcinogenesis 31(11): 2012-21, 2010
- Yang Y, et al. RARα2 Expression Confers Myeloma Stem Cell Features. Blood 122(8): 1437-47, 2013

Breast Cancer Cells

- Alam M, et al. MUC1-C Oncoprotein Activates ERK→ C/EBPβ Signaling and Induction of Aldehyde Dehydrogenase 1A1 in Breast Cancer Cells. J Biol Chem 288(43): 30892-903, 2013
- Atkinson RL, et al. Cancer Stem Cell Markers Are Enriched in Normal Tissue Adjacent to Triple Negative Breast Cancer and Inversely Correlated with DNA Repair Deficiency.
 Breast Cancer Res 15(5): R77, 2013
- Azzam DJ, et al. Triple Negative Breast Cancer Initiating Cell Subsets Differ in Functional and Molecular Characteristics and in γ–Secretase Inhibitor Drug Responses. EMBO Mol Med 5(10): 1502-22, 2013
- Buckley NE, et al. BRCA1 Is a Key Regulator of Breast Differentiation Through Activation of Notch Signalling with Implications for Anti-Endocrine Treatment of Breast Cancers. Nucl Acids Res 41(18): 8601-14, 2013
- Buijs JT, et al. The BMP2/7 Heterodimer Inhibits the Human Breast Cancer Stem Cell Subpopulation and Bone Metastases Formation. **Oncogene** 31(17): 2164-74, 2011

FOR RESEARCH USE ONLY. NOT INTENDED FOR HUMAN OR ANIMAL DIAGNOSTIC OR THERAPEUTIC USES.

- Chen D, et al. ANTXR1, a Stem Cell-Enriched Functional Biomarker, Connects Collagen Signaling to Cancer Stem-Like Cells and Metastasis in Breast Cancer. Cancer Res 73(18): 5821-33, 2013
- Conti L, et al. The Noninflammatory Role of High Mobility Group Box 1/Toll-Like Receptor 2 Axis in the Self-Renewal of Mammary Cancer Stem Cells. FASEB J 27(12): 4731-44, 2013
- Ithimakin S, et al. HER2 Drives Luminal Breast Cancer Stem Cells in the Absence of HER2 Amplification: Implications for Efficacy of Adjuvant Trastuzumab. Cancer Res 73(5): 1635-46, 2013
- Kundu N, et al. Prostaglandin E Receptor EP4 Is a Therapeutic Target in Breast Cancer Cells with Stem-Like Properties.
 Breast Cancer Res TR 143(1): 19-31, 2014
- 20. Liu S, et al. BRCA1 Regulates Human Mammary Stem/ Progenitor Cell Fate. **PNAS** 105(5): 1680-85, 2008
- Liu P, et al. Disulfiram Targets Cancer Stem-Like Cells and Reverses Resistance and Cross-Resistance in Acquired Paclitaxel-Resistant Triple-Negative Breast Cancer Cells.
 Brit J Cancer 109(7): 1876-85, 2013
- 22. Londoño-Joshi Al, et al. Effect of Niclosamide on Basal-Like Breast Cancers. **Mol Cancer Ther** Feb 2014 [epub]
- McClements L, et al. Targeting Treatment-Resistant Breast Cancer Stem Cells with FKBPL and its Peptide Derivative, AD-01, Via the CD44 Pathway. Clin Cancer Res 19(14): 3881-93, 2013
- 24. Piva M, et al. Sox2 Promotes Tamoxifen Resistance in Breast Cancer Cells. **EMBO Mol Med** 6(1): 66-79, 2014
- Rustighi A, et al. Prolyl-Isomerase Pin1 Controls Normal and Cancer Stem Cells of the Breast. EMBO Mol Med 6(1): 99-119, 2014
- Salvador MA, et al. The Histone Deacetylase Inhibitor Abexinostat Induces Cancer Stem Cells Differentiation in Breast Cancer with Low Xist Expression. Clin Cancer Res 19(23): 6520-31, 2013
- Vazquez-Martin A, et al. Reprogramming of Non-Genomic Estrogen Signaling by the Stemness Factor SOX2 Enhances the Tumor-Initiating Capacity of Breast Cancer Cells. Cell Cycle 12(22): 3471-77, 2013
- Wang X, et al. PPARγ Maintains ERBB2-Positive Breast Cancer Stem Cells. Oncogene 32: 5512-21, 2013
- Yamamoto M, et al. NF-κB Non-Cell-Autonomously Regulates Cancer Stem Cell Populations in the Basal-Like Breast Cancer Subtype. Nat Commun 4: 2299, 2013
- Yu F, et al. Kruppel-Like Factor 4 (KLF4) is Required for Maintenance of Breast Cancer Stem Cells and for Cell Migration and Invasion. **Oncogene** 30: 2161-2172, 2011
- Zhou Y, et al. The miR-106b~25 Cluster Promotes Bypass of Doxorubicin-Induced Senescence and Increase in Motility and Invasion by Targeting the E-Cadherin Transcriptional Activator EP300. Cell Death Differ 21: 462-74, 2013

Colon Cancer Cells

- Lotti F, et al. Chemotherapy Activates Cancer-Associated Fibroblasts to Maintain Colorectal Cancer-Initiating Cells by IL-17A. J Exp Med 210(13): 2851-72, 2013
- Lu J, et al. Endothelial Cells Promote the Colorectal Cancer Stem Cell Phenotype Through a Soluble Form of Jagged-1.
 Cancer Cell 23(2): 171-85, 2013
- Morris KT, et al. G-CSF and G-CSFR are Highly Expressed in Human Gastric and Colon Cancers and Promote Carcinoma Cell Proliferation and Migration. Brit J Cancer 110: 1211-20, 2014
- Ni C, et al. IFN-γ Selectively Exerts Pro-Apoptotic Effects on Tumor-Initiating Label-Retaining Colon Cancer Cells.
 Cancer Let 336(1): 174-84, 2013
- Swindall AF, et al. ST6Gal-I Protein Expression Is Upregulated in Human Epithelial Tumors and Correlates with Stem Cell Markers in Normal Tissues and Colon Cancer Cell Lines. Cancer Res 73(7): 2368-78, 2013
- 37. Todaro M, et al. Colon Cancer Stem Cells: Promise of Targeted Therapy. **Gastroenterology** 138(6): 2151-62, 2010
- Volonté A, et al. Cancer-Initiating Cells from Colorectal Cancer Patients Escape from T Cell–Mediated Immunosurveillance In Vitro Through Membrane-Bound IL-4. J Immunol 192(1): 523-32, 2014

Pancreatic Cancer Cells

- Cano CE, et al. Genetic Inactivation of Nurp1 Acts as a Dominant Suppressor Event in a Two-Hit Model of Pancreatic Carcinogenesis. Gut Sept 2013 [epub]
- Herreros-Villanueva M, et al. SOX2 Promotes Dedifferentiation and Imparts Stem Cell-Like Features to Pancreatic Cancer Cells. **Oncogenesis** 2(8): e61, 2013
- Liu L, et al. Triptolide Reverses Hypoxia-Induced Epithelial– Mesenchymal Transition and Stem-Like Features in Pancreatic Cancer by NF-κB Downregulation. Int J Cancer 134(10): 2489-503, 2013
- 42. Rasheed Z, et al. Isolation of Stem Cells from Human Pancreatic Cancer Xenografts. **J Vis Exp** 43(pii): 2169, 2010

Head and Neck Cancer Cells

- Bertrand G, et al. Targeting Head and Neck Cancer Stem Cells to Overcome Resistance to Photon and Carbon Ion Radiation.
 Stem Cell Rev Rep 10(1): 114-26, 2014
- 44. Clay MR, et al. Single-Marker Identification of Head and Neck Squamous Cell Carcinoma Cancer Stem Cells with Aldehyde Dehydrogenase. **Head Neck** 32(9): 1195-201, 2010
- Lo JF, et al. The Epithelial-Mesenchymal Transition Mediator S100A4 Maintains Cancer-Initiating Cells in Head and Neck Cancers. Cancer Res 71(5): 1912-23, 2011
- Xie X, et al. Targeting HPV16 E6-p300 Interaction Reactivates p53 and Inhibits the Tumorigenicity of HPV-Positive Head and Neck Squamous Cell Carcinoma. **Oncogene** 33: 1037-46, 2013

FOR RESEARCH USE ONLY. NOT INTENDED FOR HUMAN OR ANIMAL DIAGNOSTIC OR THERAPEUTIC USES. STEMCELL TECHNOLOGIES INC.'S QUALITY MANAGEMENT SYSTEM IS CERTIFIED TO ISO 13485 MEDICAL DEVICE STANDARDS.



- Yu CC, et al. miR145 Targets the SOX9/ADAM17 Axis to Inhibit Tumor-Initiating Cells and IL-6-Mediated Paracrine Effects in Head and Neck Cancer. Cancer Res 73(11): 3425-40, 2013
- Zhang M, et al. Elevated Intrinsic Cancer Stem Cell Population in Human Papillomavirus-Associated Head and Neck Squamous Cell Carcinoma. Cancer 120(7): 992-1001, 2014

Brain Cancer Cells

- Choi SA, et al. Identification of Brain Tumour Initiating Cells Using the Stem Cell Marker Aldehyde Dehydrogenase.
 Eur J Cancer 50(1): 137-49, 2013
- Rasper M, et al. Aldehyde Dehydrogenase 1 Positive Glioblastoma Cells Show Brain Tumor Stem Cell Capacity. Neuro Oncol 12(10): 1024-33, 2010
- Sun P, et al. DNER, an Epigenetically Modulated Gene Regulates Glioblastoma-Derived Neurosphere Cell Differentiation. Stem Cells 27(7): 1473-1486, 2009

Lung Cancer Cells

- 52. Bleau AM, et al. New Syngeneic Inflammatory-Related Lung Cancer Metastatic Model Harboring Double KRAS/WWOX Alterations. **Int J Cancer** Jan 2014 [epub]
- 53. Noto A, et al. Stearoyl-CoA Desaturase-1 Is a Key Factor for Lung Cancer-Initiating Cells. **Cell Death Dis** 4(12): e947, 2013
- Ricci A, et al. TrkB is Responsible for EMT Transition in Malignant Pleural Effusions Derived Cultures from Adenocarcinoma of the Lung. Cell Cycle 12(11): 1696-1703, 2013
- Sullivan JP, et al. Aldehyde Dehydrogenase Activity Selects for Lung Adenocarcinoma Stem Cells Dependent on Notch Signaling. Cancer Res 70(23): 9937-48, 2010
- Yae T, et al. Alternative Splicing of CD44 mRNA by ESRP1 Enhances Lung Colonization of Metastatic Cancer Cell. Nature Comm 3: 883, 2012

Ovarian Cancer Cells

- 57. Abelson S, et al. Intratumoral Heterogeneity in the Self-Renewal and Tumorigenic Differentiation of Ovarian Cancer. **Stem Cells** 30(3): 415-24, 2012
- Bareiss PM, et al. SOX2 Expression Associates with Stem Cell State in Human Ovarian Carcinoma. Cancer Res 73(17): 5544-55, 2013
- Flesken-Nikitin A, et al. Ovarian Surface Epithelium at the Junction Area Contains a Cancer-Prone Stem Cell Niche.
 Nature 495(7440): 241-45, 2013
- Kryczek I, et al. Expression of Aldehyde Dehydrogenase and CD133 Defines Ovarian Cancer Stem Cells. Int J Cancer 130(1): 29-39, 2011

 Silva IA, et al. Aldehyde Dehydrogenase in Combination with CD133 Defines Angiogenic Ovarian Cancer Stem Cells that Portend Poor Patient Survival. Cancer Res 71(11): 3991-4001, 2013

Sarcomas

- 62. Sangiolo D, et al. Cytokine-Induced Killer Cells Eradicate Bone and Soft-Tissue Sarcomas. **Cancer Res** 74(1): 119-29, 2014
- Wang L, et al. Prospective Identification of Tumorigenic Osteosarcoma Cancer Stem Cells in OS99-1 Cells Based on High Aldehyde Dehydrogenase Activity. Int J Cancer 128(2): 294-303, 2011

Thyroid Cancer Cells

64. Todaro M, et al. Tumorigenic and Metastatic Activity of Human Thyroid Cancer Stem Cells. **Cancer Res** 70(21): 8874-85, 2010

Prostate Cancer Cells

- Jeter CR, et al. NANOG Promotes Cancer Stem Cell Characteristics and Prostate Cancer Resistance to Androgen Deprivation. **Oncogene** 30: 3833-45, 2011
- Le Magnen C, et al. Characterization and Clinical Relevance of ALDH^{bright} Populations in Prostate Cancer. Clin Cancer Res 19(19): 5361-71, 2013
- 67. van den Hoogen C, et al. High Aldehyde Dehydrogenase Activity Identifies Tumor-Initiating and Metastasis-Initiating Cells in Human Prostate Cancer. **Cancer Res** 70(12): 5163-73, 2010

Skin Cancer Cells

 Boonyaratanakornkit JB, et al. Selection of Tumorigenic Melanoma Cells Using ALDH. J Invest Dermatol 130: 2799– 2808, 2010

Kidney Cancer Cells

 Krishnamurthy S, et al. Endothelial Cell-Initiated Signaling Promotes the Survival and Self-Renewal of Cancer Stem Cells.
Cancer Res 70(23): 1-10, 2010



VIDEO

Optimization of ALDEFLUOR™ Protocols www.stemcell.com/OptALDEFLUOR

Copyright © 2014 by STEMCELL Technologies Inc. All rights reserved including graphics and images. STEMCELL Technologies & Design, STEMCELL Shield Design and Scientists Helping Scietists are trademarks of STEMCELL Technologies Inc. ALDEFLUOR is a trademark of ALDAGEN.

FOR RESEARCH USE ONLY. NOT INTENDED FOR HUMAN OR ANIMAL DIAGNOSTIC OR THERAPEUTIC USES. STEMCELL TECHNOLOGIES INC.'S QUALITY MANAGEMENT SYSTEM IS CERTIFIED TO ISO 13485 MEDICAL DEVICE STANDARDS.