NEO GENOMICS

Multiplexed Immunofluorescence Bibliography

Peer-reviewed journals
Oral Presentations
Conference Posters
Webinars

NeoGenomics is a leader in the field of multiplexed immunofluorescence services

Multiplex immunofluorescence has emerged as an effective and proficient approach to simultaneously identify specific proteins and immune cell types, to determine the spatial distribution and activation state of immune cells, as well as the expression of immune modulators, all at the same time. This method is highly beneficial for exploring immune evasion mechanisms and finding potential biomarkers that allow researchers to assess the mechanism of action and predict and monitor drug response.

NeoGenomics' Pharma Services offers two multiplex immunofluorescence platforms: MultiOmyx™ and PhenoImager™

This brochure outlines the numerous presentations and publications describing the use of either MultiOmyx or PhenoImager.™

Peer-Reviewed Publications

2022

Genetic subtyping and phenotypic characterization of the immune microenvironment and MYC/BCL2 double expression reveal heterogeneity in diffuse large B-cell lymphoma.
Xu-Monette ZY et al. Clin Cancer Res. March;28(5):972

Global evolution of the tumor microenvironment associated with progression from preinvasive to invasive human lung adenocarcinoma.
Altorki NK. et al. Cell Rep. April:110639

2021

Genomic complexity is associated with epigenetic regulator mutations and poor prognosis in diffuse large B-cell lymphoma.
You H. et al. Oncoimmunology. 2021 Jul 20;10(1):1928365

Antitumor immune effects of preoperative sitravatinib and nivolumab in oral cavity cancer: SNOW window-of-opportunity study.
Oliva M. et al. J Immunother Cancer. 2021 Oct;9(10):e003476

BT7480, a novel fully synthetic Bicycle tumor-targeted immune cell agonist™ (Bicycle TICA™) induces tumor localized CD137 agonism.
Hurov K. et al. J Immunother Cancer. Nov;9(11):e002883

2020

BL-8040, a CXCR4 antagonist, in combination with pembrolizumab and chemotherapy for pancreatic cancer: the COMBAT trial.
Bockorny B. et al. Nat Med.Jun;26(6):878

2019

Immune Profiling and Quantitative Analysis Decipher the Clinical Role of Immune-Checkpoint Expression in the Tumor Immune Microenvironment of DLBCL.
Xu-Monette ZY. et al. Cancer Immunol Res. 2019, Apr;7(4):644

2017

Oncolytic Virotherapy Promotes Intratumoral T Cell Infiltration and Improves Anti-PD-1 Immunotherapy.
Ribas A. et al. Cell. 2017, Sep 7;170(6):1109

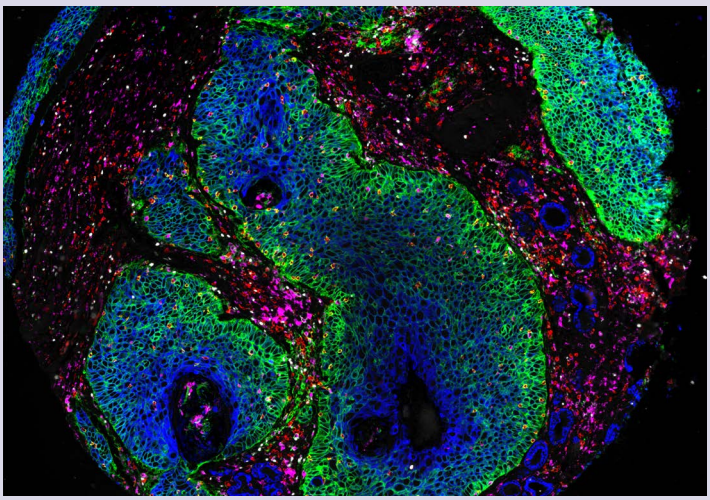
2014

Excess PLAC8 promotes an unconventional ERK2-dependent EMT in colon cancer.
Li C. et al. J Clin Invest. 2014 May;124(5):2172

A single slide multiplex assay for the evaluation of classical Hodgkin lymphoma.
Hollman-Hewgley D. et al. Am J Surg Pathol. 2014 Sept;38(9):1193

2013

Highly multiplexed single-cell analysis of formalin-fixed, paraffin-embedded cancer tissue.
Gerdes MJ. et al. Proc Natl Acad Sci USA. 2013 Jul;16;110(29):11982



MultiOmyx overlay image of NSCLC tissue multiplexed with 12-marker panel. PanCK (blue), CD8 (red), FoxP3 (white), CD68 (magenta), and PD-L1 (green).

For more information please contact:
T: +1 800.720.4363
E: pharmaservices@neogenomics.com

Conference Oral Presentations

2022

Building a path towards commercialization of Multiplexed IF.
Qingyan Au – HubXchange Oncology CDx event
Virtual, September

Using a dual proteomics and multiplexed IF approach for the detection of biomarkers predictive for response to ICI-therapy.
Anna Juncker-Jensen – Biomarkers UK
London UK, May

2021

Profiling Exhausted T Cells using Vectra® Polaris™ Multiplex Immunofluorescence Assay in HNSCC.
Sara Pollan – Molecular Med TRI-CON
Virtual, February

Pathways for Multiplexed IF: development through clinical trials and commercialization considerations.
Qingyan Au – HW CB and CDx
Virtual, September

Comprehensive analysis of IO markers in the TME of solid tumor samples using GeoMx™ Digital Spatial (Spacial for JR) Profiler (DSP) and MultiOmyx!™ Hyperplexed Immunofluorescence (IF).
Lakshmi Chandramohan – AACR exhibitor spotlight series
Virtual, September

Characterizing NSCLC tumor microenvironment using the integrated MultiOmyxTM-RNAscope® workflow.
Courtney Todorov – 5th Annual NextGen IO Virtual Congress
Virtual, October

Identification of immunosuppressive cell trios in TNBC with implications for immunotherapy.
Anna Juncker-Jensen – Biomarkers UK
Manchester UK, November

2020

Machine Learning for Tumor and Cell Segmentation and Cell Classification within the Tumor Microenvironment.
Máté Levente Nagy Immuno-Oncology 360°
New York, February

Characterizing the Bone Marrow Immune Contexture of Acute Myeloid Leukemia using MultiOmyx!™
Qingyan Au, Molecular Med TRI-CON
San Francisco, March

Leveraging single-cell level multiplexed IF analysis for a deeper understanding of IO biomarkers in the tumor microenvironment.
Anna Juncker-Jensen – Next Gen Immuno-Oncology Congress
Virtual, June

Profiling Exhausted T Cells using Vectra® Polaris.
Sara Pollan – Akoya Biosciences User Group Meeting
Virtual, January

Cell Segmentation, Classification, and Spatial Analysis for Dual-IHC and MultiOmyx™ Assays Using Deep Learning.
Máté Levente Nagy – Merck Technology Symposium
Virtual

2019

Using MultiOmyx™ hyperplexed assay to detect immunosuppressive cells and their mechanisms in triple-negative breast cancer.
Anna Juncker-Jensen – Molecular Med TRI-CON
San Francisco, March

Detecting Immunosuppressive Cells and Their Mechanisms by Multiplex Immunofluorescence.
Anna Juncker-Jensen – World CB & CDx Europe
London UK, April

Comparing Immune Cell Populations and Novel Biomarkers in Subtypes of Non-Small Cell Lung Cancer.
Anna Juncker-Jensen – Molecular Diagnostics Europe
Lisbon Portugal, May

2019 Continued

An Integrated Approach of Immuno-phenotyping Tumor FFPE Samples by MultiOmyx™ Multiplexed Protein Assay and Nanostring PanCancer Gene Expression Analysis.
Anna Juncker-Jensen – Annual Bioanalytical Conference
Madison MI, July

Characterization of Immunosuppressive Cells Using MultiOmyx™ Hyperplexed Immunofluorescence Assay in Hematological Malignancies.
Qingyan Au – 2019 the Japanese Society of Medical Oncology Annual Meeting, Kyoto, July

Novel Perspectives on the Immune Environment of Acute Myeloid Leukemia Using MultiOmyx.™
Josette William – Immuno-Oncology 360°
New York, February

2018

Using MultiOmyx™ to Distinguish between M1/M2 TAMs, and MDSCs in the Pancreatic Tumor Microenvironment
Anna Juncker-Jensen – Merck Technology Symposium
Long Branch NJ, September

Conference Posters

2022

Custom PhenoImager™ fluorescent multiplex IHC panel identifies mature tertiary lymphoid structures in colorectal cancer.
Pollan SG. et al. – AACR, New Orleans LA

Dual approach using proteomics and multiplexed immunofluorescence for the detection of markers predictive for immunotherapy in melanoma patients
Juncker-Jensen A. et al. – AACR, New Orleans LA

Obesity-induced changes in the tumor microenvironment impact the response to chemotherapy and overall ovarian cancer metastatic success.
Juncker-Jensen A. et al. – AACR, New Orleans LA

Spatial interrogation of tertiary lymphoid structures (TLS) in colorectal carcinoma (CRC) tumor microenvironment using the MultiOmyx™ assay.
Au Q. et al. – AACR, New Orleans LA

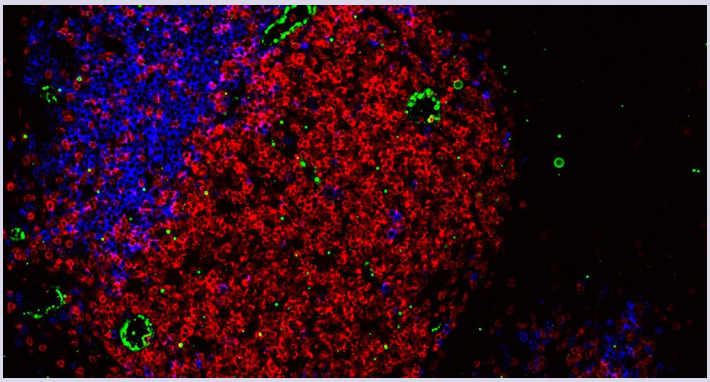
Ubiquitin ligases implicated as predictive biomarkers for poor outcome to immunotherapy in melanoma patients.
Vowinckel J. et al. – AACR, New Orleans LA

2021

Improving MultiOmyx Analytics cell classification workflow efficiency by Invariant Information Clustering on historical data.
Vivek R. et al. – AACR, Virtual

Multiplex Immunofluorescence assay, MultiOmyx: Detection and deep profiling of immune cells in HBV-infected liver biopsies.
Juncker-Jensen A. et al. –World Vaccine Congress, Barcelona Spain

Quantifying perivascular immune cells in the stroma of human triple negative breast tumors using deep learning spatial analytics.
Juncker-Jensen A. and Stavrou N. et al. – SITC, Washington DC



MultiOmyx overlay image of a TLS structure in bladder cancer tissue, multiplexed with 12-marker panel. CD3 (blue), CD20 (red), and PNAd (green).

For more information please contact:
T: +1 800.720.4363
E: pharmaservices@neogenomics.com

2021 Continued

A novel cross-site analysis of Vectra® Polaris™ (now PhenoImager™) multiplex fluorescence PD-1/PD-L1 immunohistochemistry on colorectal cancer with high and low microsatellite instability.
Pollan SG. et al. – SITC, Washington DC

Perivascular Accumulation of Immunosuppressive Cells in the Stroma of Human Triple Negative Breast Carcinomas: Implications for Immunotherapy.
Moamin MR. et al. – AACR, Virtual

Characterizing viral mRNA and immuno-protein expression in head and neck squamous cell carcinoma using a novel automated RNAScope™/ Polaris™ integrated assay.
Pollan SG. et al. – AACR, Virtual

Comprehensive Analysis of immuno oncology markers in the TME of solid tumor samples using GeoMx™ Digital Spatial Profiler (DSP) and MultiOmyx™ Hyperplexed Immunofluorescence (IF).
Chandramohan L. et al. – AACR, Virtual

Improving MultiOmyx™ Analytics cell classification workflow efficiency by Invariant Information Clustering on historical data.
Reddy V. et al. – AACR Virtual

Co-detection of a tumor-infiltrating lymphocyte immunofluorescence (IF) panel and cytokine RNA in-situ hybridization (ISH) markers in non-small cell lung cancer (NSCLC) tumor microenvironment using combined MultiOmyx and RNAScope platforms.
Todorov C. et al. – AACR, Virtual

2020

Distinguishing dendritic cell subtypes in the tumor microenvironment using MultiOmyx™
Gozo M. et al. – AACR Virtual

Profiling exhausted T cells using Vectra® Polaris™ multiplex immunofluorescence assay in HNSCC.
Pollan S. et al. – AACR, Virtual

Reduction of tumor-infiltrating B cells linked to recurrence of NSCLC tumors.
Juncker-Jensen A. et al. – AACR Virtual

Spatial analytics of the tumor microenvironment on double stained immunohistochemistry images using deep learning.
Nagy ML et al. – AACR Virtual

Using multiplexed immunofluorescence to quantitatively analyze myeloid derived suppressor cells (MDSCs) in relation to tertiary lymphoid structures (TLS) in bladder cancer.
Juncker-Jensen A. et al. – SITC Virtual

2019

Pro-Tumorigenic Mechanisms of M2 Tumor-Associated Macrophages in Triple-Negative Breast Cancer.
Juncker-Jensen A. et al. – AACR, Atlanta GA

Characterization of TIGIT Expression Using MultiOmyx™ Hyperplexed Immunofluorescence Assay in NSCLC and melanoma.
Au Q. et al. – AACR, Atlanta GA

Using a Multiplexed Immunofluorescence Approach to Compare Immune Cell Populations in Subtypes on Non-Small Cell Lung Cancer.
Juncker-Jensen A. et al. – WCLC, Barcelona Spain

An Integrated Multiplexing Approach for the Immunoprofiling of the Tumor Microenvironment of Ovarian Granulosa Cell Tumors.
Juncker-Jensen A. et al. – EORTC, Boston MA

An Integrated Multiplexing Approach Identifies IDO1 as a Biomarker for Recurrence of Rare Ovarian Granulosa Cell Tumors.
Juncker-Jensen A. et al. – SITC, National Harbor MD

Pro-Tumorigenic Mechanisms of M2 Tumor-Associated Macrophages in Triple-Negative Breast Cancer.
Juncker-Jensen A. et al. – Keystone Symposium, Santa Fe NM

2019 Continued

Phenotypic Characterization of the Immune Landscape in the Bone Marrow of Patients with Acute Myeloid Leukemia (AML) Using MultiOmyx™ Hyperplexed Immunofluorescence Assay.
Au Q. et al.– ASH, Orlando FL

PD-1 and LAG-3 synergize to drive tumor-infiltration of T cytotoxic cells in NSCLC tumors.
Juncker-Jensen A. et al. – ESMO IO, Geneva Switzerland

2018

Tumor-Infiltrating Myeloid Cells – Using MultiOmyx™ to Distinguish between TAMs, TANs, and MDSCs in the Pancreatic Tumor Microenvironment.
Juncker-Jensen A. et al. – AACR, Chicago IL

Efficient Large Scale Cell Classification and Analysis for MultiOmyx™ Assays: A Deep Learning Approach.
Nagy ML. et al. – AACR, Chicago IL

Demonstration of Anti-Tumor Immunity via Intratumoral Regulated Platform Ad-RTS-hIL-12 in Advanced Breast Cancer and Recurrent Glioblastoma Patients.
Lebel FM. et al. - Ziopharm Oncology – ASCO, Chicago Il

Identification of predictive and pharmacodynamic biomarkers associated with the first-in-class selective AXL inhibitor bemcentinib across multiple phase II clinical trials.
Holt RJ. et al. - BerGenBio – ASCO, Chicago Il

Using MultiOmyx™ to Analyze Correlations between Immunosuppressive Cells and Tumor-Infiltrating Lymphocytes in the Pancreatic Tumor Microenvironment.
Juncker-Jensen A. et al. – ESMO, Munich Germany

First in Human Study with GSK3359609, Inducible T cell Co-stimulator Receptor Agonist in Patients with Advanced, Solid Tumors: Preliminary Results from INDUCE-1.
Hansen AR. et al. – GSK ESMO, Munich Germany

Characterization of Myeloid-Derived Suppressor Cells and Tumor Associated Macrophages Using MultiOmyx™ Hyperplexed Immuno-Assay in Hodgkin Lymphoma.
Au Q. et al. – ASH, San Diego CA

Using a Multiplexed Immunofluorescence Assay to Detect Immunosuppressive Cells and their Mechanisms in the Pancreatic Tumor Microenvironment.
Juncker-Jensen A. et al. – ESMO IO, Geneva Switzerland

2017

Integrated Analysis of MicroRNA, mRNA, and Protein Expression Utilizing MultiOmyx™ and NanoString™ from Formalin-Fixed Paraffin-Embedded, Lung, Head and Neck, Breast, and Melanoma Tumors.
Au Q. et al. – AACR, Washington DC

2016

MultiOmyx™ multiplexed tumor infiltrating lymphocyte panel provides comprehensive immunophenotyping from a single FFPE slide.
Au Q. et al. – AACR, New Orleans LA

Detection of IFNγ induced PD-L1 expression by combined in situ RNA analysis and protein profiling from a single FFPE slide.
Au Q. et al. – AACR, New Orleans LA

2015

MultiOmyx™: A multiplexed immunofluorescent assay capable of profiling protein expression and phosphorylation, in combination with next-generation sequencing from a single FFPE tissue section.
Au Q. et al. – AACR, Philadelphia PA

For more information please contact:
T: +1 800.720.4363
E: pharmaservices@neogenomics.com

Webinars

2022

Novel cross-site analysis of PhenoImager™ HT multiplex IHC panel.
Sara Pollan, March

2021

Comparison of stain co-localization in IHC sequential cuts and true co-expression in mIF images from Polaris.
Máté Levente Nagy, April – Indica Labs webinar

Depp profiling and spatial characterization of tumor microenvironment with CellDIVE and MultiOmyx workflow.
Qingyan Au, July – Leica webinar

Configuring a laboratory workflow for unbiased CTC enumeration and biomarker research.
Sandy Au and Dr. Kasi, September – RareCyte webinar

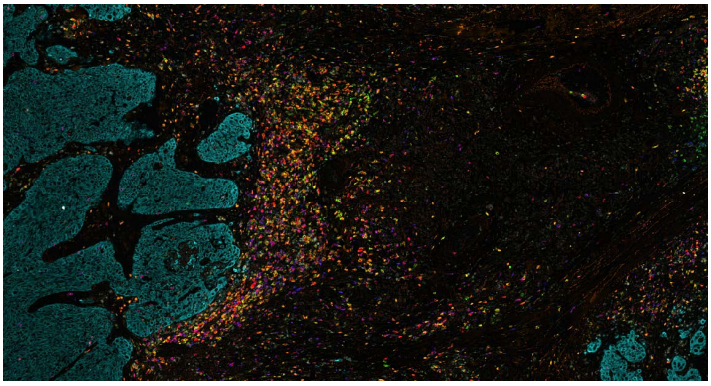
Profiling Exhausted T-cells using Vectra Polaris Multiplex Immunofluorescence.
Sara Pollan, January

2020

Leveraging single-cell level multiplexed immunofluorescence for characterizing the tumor microenvironment after IO biomarker targeting in clinical trials.
Anna Juncker-Jensen, November

Routine Use of AI Towards Automating Histopathology Analysis.
Máté Levente Nagy, December

运用MultiOmyx™超多标免疫荧光技术平台深度解析肿瘤微环境
Qingyan Au, October



PhenoImager™ overlay image of HNSCC tissue multiplexed with a 6-marker panel. PanCK (cyan), CD3 (red), CD4 (green), CD8 (blue) CD68 (white), and FoxP3 (orange).

For more information please contact:
T: +1 800.720.4363
E: pharmaservices@neogenomics.com

9490 NeoGenomics Way
Fort Myers, FL 33912
United States
Phone: 866.776.5907
Fax: 239.690.4237

31 Columbia
Aliso Viejo, CA 92656
United States
Phone: 800.720.4363
Fax: 949.425.5865

7256 S. Sam Houston Pkwy W., Suite 300
Houston, TX 77085
United States
Phone: 800.720.4363/713.528.4363
Fax: 713.668.3565

NeoGenomics Laboratories, Inc.
4570 Executive Drive, Suite 250
San Diego, CA 92121
Phone: 949.445.7300 5056

NeoGenomics Europe, S.A.
A-One Business Center
Bâtiment A5, 2nd Floor
Z.A. La Pièce/Route de l'Etraz 1
1180 Rolle, Switzerland
Phone: +41.21.721.06.00
Fax: +41.(0)21.826.00.73

NeoGenomics Singapore Pte. Ltd.
61 Science Park Road, #02-11
Singapore 117525
Phone: +65.69115202

Suzhou NeoGenomics
Pharmaceutical Research Co., Ltd
Building 6, Block 19, Yong'An Road
Huguan Industrial Park,
Suzhou New District, China

neogenomics.com