

# Single-cell glycome and transcriptome profiling of pancreatic cancers

医療・福祉・介護

SATテクノロジー・ショーケース2025

## ■ はじめに

Pancreatic Ductal Adenocarcinoma (PDAC) is one of the most aggressive and lethal forms of cancer, with a 5-year survival rate of only 9%. Currently, there are no proven markers for early detection, and most patients are diagnosed at a late stage when the cancer has already metastasized to other organs. Glycans are predominant surface components of cells, and they are well known to play significant roles in immune response regulation, cell signaling, and protein function. Aberrant glycosylation patterns in PDAC or cancer are already established and are expected to be applied as therapeutic targets.

## ■ 活動内容

1. We previously developed plate- and droplet-based single-cell glycan and RNA sequencing (scGR-seq) method using multiple DNA-barcoded lectins and next-generation sequencing (1, 2). In this study, we used droplet-based scGR-seq to comprehensively analyze the glycomic and transcriptome profiles in the tumor microenvironment (TME) of tumor tissues of patients with PDAC at the single cell resolution. The method could systematically map the glycan signature for each tumor subtype and immune cells in tumor tissues. We could gain an overview of all the glycan changes that occurred throughout the epithelial-mesenchymal transition, which has never been attained with conventional glycan analysis methods.

2. Our findings should contribute to developing early detection methods and more effective immunotherapies strategies for this deadly cancer. This research would inspire new avenues for future investigation of the PDAC tumor glyco-landscape and its impact on the tumor immune microenvironment.

3. From this research, we could

- 3.1. Identify Single-cell glycome and transcriptome profile of PDAC by droplet-based scGR-seq.
- 3.2. Identify of glyco-immune checkpoint molecules.
- 3.3. Develop the drug candidate.

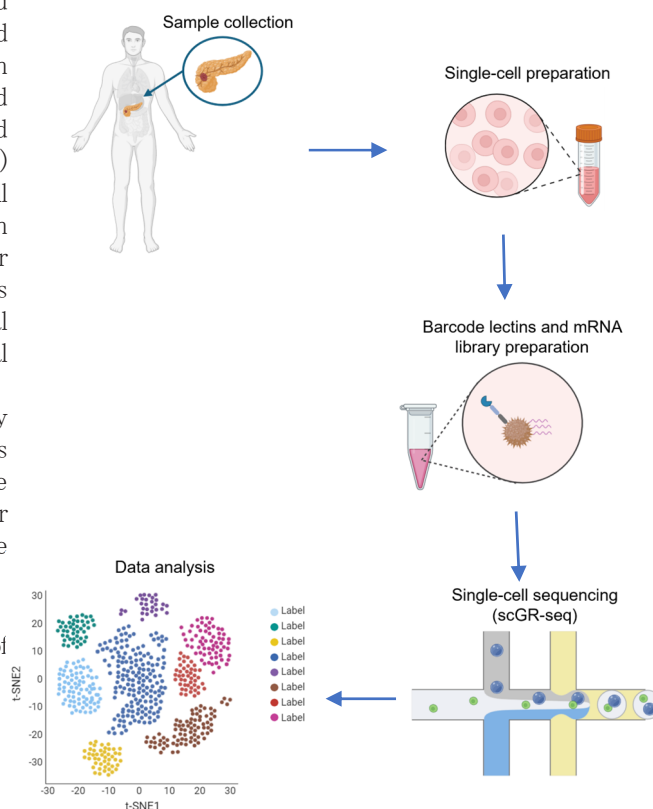
1. Minoshima et al. iScience 2021
2. Keisham et al. Small Methods 2024

## ■ 関連情報等(特許関係、施設)

<sup>1</sup>Cellular and Molecular Biotechnology Research Institute, Multicellular System Regulation Research Group, National Institute of Advanced Industrial Science and Technology (AIST), Central 6, 1-1-1 Higashi, Tsukuba, Ibaraki 305-8566, Japan

<sup>2</sup>Ph.D. Program in Human Biology, School of Integrative and Global Majors, University of Tsukuba, Tsukuba, Japan

<sup>3</sup>Department of Gastrointestinal and Hepato-Biliary-Pancreatic Surgery, Faculty of Medicine, University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki, 305-8575, Japan

代表発表者  
所属

**Dinh Xuan Tuan Anh(ディン スアン ツァン アン)**  
**1.Cellular and Molecular Biotechnology Research Institute, Multicellular System Regulation Research Group, AIST**

**2.Ph.D. Program in Human Biology, School of Integrative and Global Majors, University of Tsukuba**

問合せ先

〒305-8566 Central 6, 1-1-1 Higashi, Tsukuba, Ibaraki  
 TEL:070-9167-5679

■キーワード: (1) Pancreatic Ductal Adenocarcinoma PDAC  
 (2) scGR-seq  
 (3) Glycan  
 (4) Tumor microenvironment

■共同研究者: Sunanda Keisham<sup>1,2</sup>,  
 Arun Burrumsetty<sup>1</sup>,  
 Lalhaba Oinam<sup>1</sup>,  
 Osamu Shimomura<sup>3</sup>,  
 Tatsuya Oda<sup>3</sup>,  
 Hiroaki Tateno<sup>1,2</sup>