GoTChA: High-Throughput Method for Single-Cell Genotyping from Genomic DNA

Lead Inventor:

Dan Landau, M.D., Ph.D.
Associate Professor of Medicine, Weill Cornell Medical College
Associate Professor of Physiology and Biophysics, Weill Cornell Medical College
Core Member, New York Genome Center

Business Development Contact:
Brian Kelly
Director, Technology Licensing
(646) 962-7041
bjk44@cornell.edu
GoTChA: High-Throughput Method for Single-Cell Genotyping from Genomic DNA

**Background & Unmet Need**

- Somatic mutations drive cancer initiation and progression and are linked to hematopoiesis-related cardiovascular diseases, such as atherosclerosis
- Specific impact of mutations on human biology and their role in disease remain poorly understood
- Mutant cell populations often lack distinguishing cell surface features, making it challenging to identify, isolate and study them on a single cell basis
- High-throughput droplet-based approaches rely on RNA sequencing and are therefore limited by target expression levels and genomic locus of the mutation, while genomic DNA-based methods suffer from low throughput
- **Unmet Need:** High-throughput genotyping methods to better understand the impact of somatic mutations on gene regulation across various contexts, including in patient samples

**Technology Overview**

- **The Technology:** GoTChA (Genotyping of Targeted loci with Chromatin Accessibility) is a novel high-throughput method of single-cell genotyping from genomic DNA
- GoTChA allows identification of mutant and wild type cells at the single cell resolution, independently of gene expression and genomic position
- The comprehensive processing pipeline applies noise correction and provides accurate genotyping integrated with chromatin accessibility information
- GoTChA is compatible with other single cell technologies such as mtscATAC-seq for mitochondrial DNA genotyping and ASAP-seq for multionic protein measurements
- **PoC Data:** In a PoC study, GoTChA genotyped 50–60% of cells for TP53 or JAK2 mutations with >96% accuracy
- GoTChA was also utilized to probe the therapeutic effect of ruxolitinib at the single-cell level

**Inventors:**
- Dan Landau
- Robert Myers
- Franco Izzo
- Ronan Chaligné

**Patents:**
- PCT Application Filed

**Publications:**

**Biz Dev Contact:**
- Brian Kelly
  (646) 962-7041
  bjk44@cornell.edu

**Cornell Reference:**
- D-9978
GoTChA: High-Throughput Method for Single-Cell Genotyping from Genomic DNA

**Technology Applications**

- Study the impact of mutations on gene regulation in various contexts in human biology and disease
- Compare chromatin accessibility in mutated and wild type cells, potentially informing therapy decisions
- Can be combined with mtscATAC-seq for mitochondrial DNA genotyping and ASAP-seq for multiomic protein measurements

**Technology Advantages**

- High-throughput simultaneous ATAC-seq and genotyping within the same sequencing run
- Stable and consistent results due to novel noise correction and independence of target expression and genomic location
- User-friendly pipeline that processes data from raw reads to final genotyping calls and integration with ATAC-seq for individual cells

**Supporting Data / Figures**

- Figure 1: GoTChA significantly improves genotyping of single cells in patient samples
- Figure 2: GoTChA facilitates comparison of accessibility of a therapy target motif in mutated and wild type cells

**Inventors:**
- Dan Landau
- Robert Myers
- Franco Izzo
- Ronan Chaligné

**Patents:**
- PCT Application Filed

**Publications:**

**Biz Dev Contact:**
- Brian Kelly
  (646) 962-7041
  bjk44@cornell.edu

**Cornell Reference:**
- D-9978
GoTChA: High-Throughput Method for Single-Cell Genotyping from Genomic DNA

Supporting Data / Figures

Figure 3: Overview of the GoTChA protocol.

Inventors:
Dan Landau
Robert Myers
Franco Izzo
Ronan Chaligné

Patents:
PCT Application Filed

Publications:

Biz Dev Contact:
Brian Kelly
(646) 962-7041
bjk44@cornell.edu

Cornell Reference:
D-9978