

## Title

Feasibility Assessment Of The BD Rhapsody™ Single-cell RNA-sequencing Platform On Liver Fine-needle Aspirates And Blood Of Healthy Volunteers

## Introduction

The identification and development of tissue-based immune biomarkers in clinical research has increased in importance over the last decades as they may, more accurately, reflect the immune mechanisms related to disease severity, disease progression, and underlying responses to treatment, compared to systemic immunity markers. Monitoring liver-specific immunity has also proven to be critical in clinical research of chronic hepatitis B (CHB), as there are no known peripheral blood biomarkers that reflect Hepatitis B-specific immunity in the liver to predict disease outcome. Recent studies have paved the way to enable systematic implementation of liver-specific immune monitoring in CHB, mainly through optimization of minimally invasive biopsy methods such as fine-needle aspiration biopsies (FNAB) and development of an optimized workflow (on sampling and sample processing procedures) for downstream data generation (Genshaft et al, 2023 Hepatology, in press).

## Method and Materials

In this study, we extended these learnings to healthy volunteers and introduced the BD Rhapsody™ platform, a novel single-cell RNA-sequencing technology which enables single-cell capturing of hundreds to thousands of single cells for transcriptome analysis, using gentle, robust microwell-based single-cell partitioning technology. Liver fine-needle aspirates and paired whole blood of 10 healthy volunteers were collected and freshly processed on the BD Rhapsody™ Express System for downstream single-cell RNA-sequencing of liver and peripheral immune cells.

## Results

Primary data analyses demonstrated a high capture rate and cell-to-sequence recovery of both liver-enriched and liver-specific cell subsets. We succeeded to retrieve and profile both fragile and rare immunological cell types, including neutrophils, macrophages, natural killer, and mucosal-invariant T (MAIT) cells in liver FNAs and/or whole blood.

## Conclusion

The obtained expression profiles of hepatic immune cells from healthy volunteers have indicated that BD Rhapsody™ single-cell RNA-sequencing is a powerful platform that can be used to unravel the complex biology of liver immunity, which will be relevant for immune monitoring of CHB patients. In the long term, development of biomarkers for tissue-specific immunity will provide a new framework to assess the functional effect of therapeutics in relevant immune cells for patients participating in clinical studies.

## References

Genshaft et al, 2023 Hepatology, in press (bioRxiv 2021.11.30.470634)

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