

ABSTRACT

TruCulture® is a whole blood collection and culture system that is designed to be used at clinical sites to investigate human immune responses under specific stimulation conditions. OptiMAP is a Multi-Analyte Profile (MAP) bead based immunoassay panel that measures 13 analytes that span the major immune responses (T_H1 , T_H2 , T_H17 , neutrophil, and monocyte/macrophage activation). The recall response of flu hemagglutinin (HA) antigens was examined in healthy adults vaccinated with the 2018-2019 annual flu vaccine. Whole blood was drawn into TruCulture tubes: null (media only), staphylococcal enterotoxin B (SEB), and null tubes spiked with 1.25mg each of 4 different recombinant HA proteins. All samples were incubated for 48 hours at 37°C. Supernatant were collected and analyzed using the OptiMAP panel. No inflammatory cytokines were detected in the null tubes from either the baseline or 2 weeks post-vaccination samples. There were no differences in cytokine production in the SEB stimulated samples between the baseline and 2 weeks post-flu vaccination time lines. For flu HA stimulated samples, there was a significant increase in production of GM-CSF, IFN- γ , IL-1 β , IL-6, IL-12p70, IL-23, and TNF- α at 2 weeks post-flu vaccination compared to samples collected at baseline. Additionally, flu HA stimulated samples post vaccination also demonstrated increased production of type I interferons, as analyzed by SIMOA. These data demonstrate that TruCulture in conjunction with OptiMAP and SIMOA are useful tools for investigating antigen specific responses.

MATERIALS AND METHODS

TruCulture Tubes

- Null – 782-001086
- *S.aureus* enterotoxin type B (SEB) – 782-001124
- Null + Flu Antigens (5 μ g/tube)

Flu Antigens (Immune Technology Corp.)

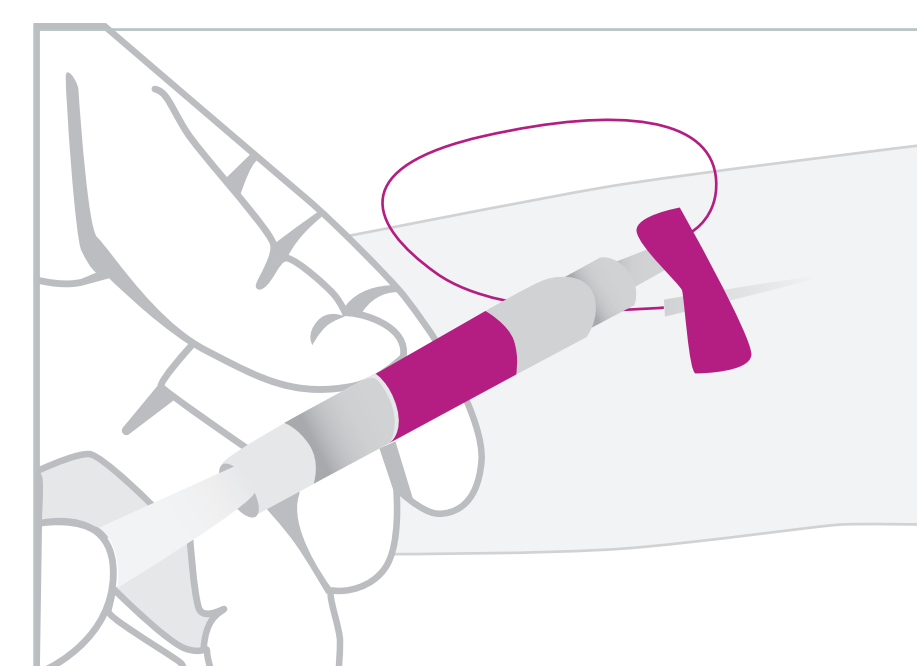
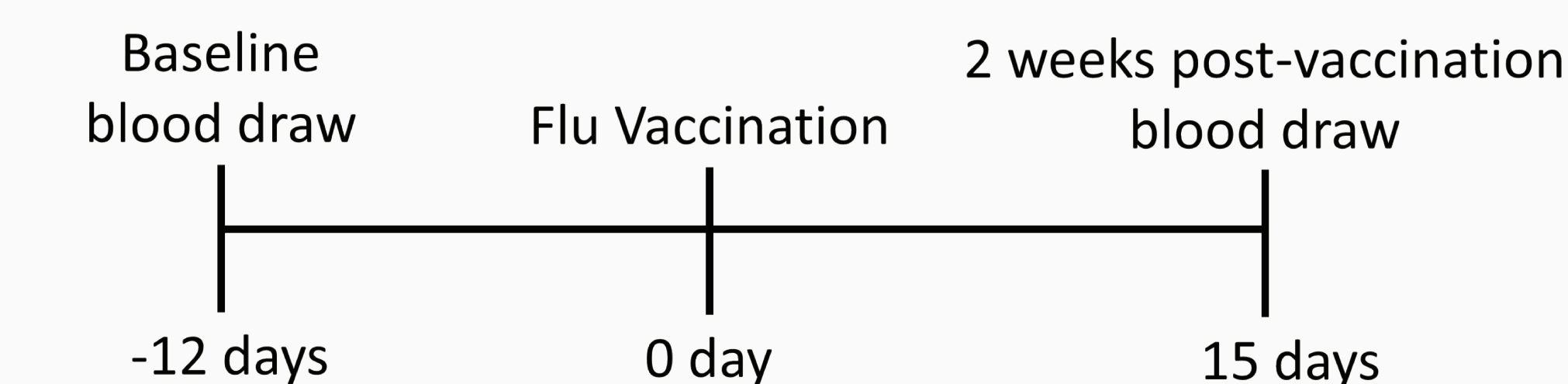
Recombinant proteins are at 1mg/mL

- HA1(H3N2)(A/Singapore/INFIMH-16-0019/2016)
- HA2(B/Colorado/06-2017)
- HA1(B/Phuket/3073/2013)
- HA1(H1N1)(A/Michigan/45/2015)

OptiMAP – 13 Analyte Multiplex Assay

| ENA-78 | IFN- γ | IL-12p70 | TNF- α |
|--------|---------------|----------|---------------|
| IL-8 | IL-2 | IL-10 | IL-6 |
| | IL-17 | IL-23 | IL-1 β |
| | IL-13 | GM-CSF | |

Experimental Protocol:



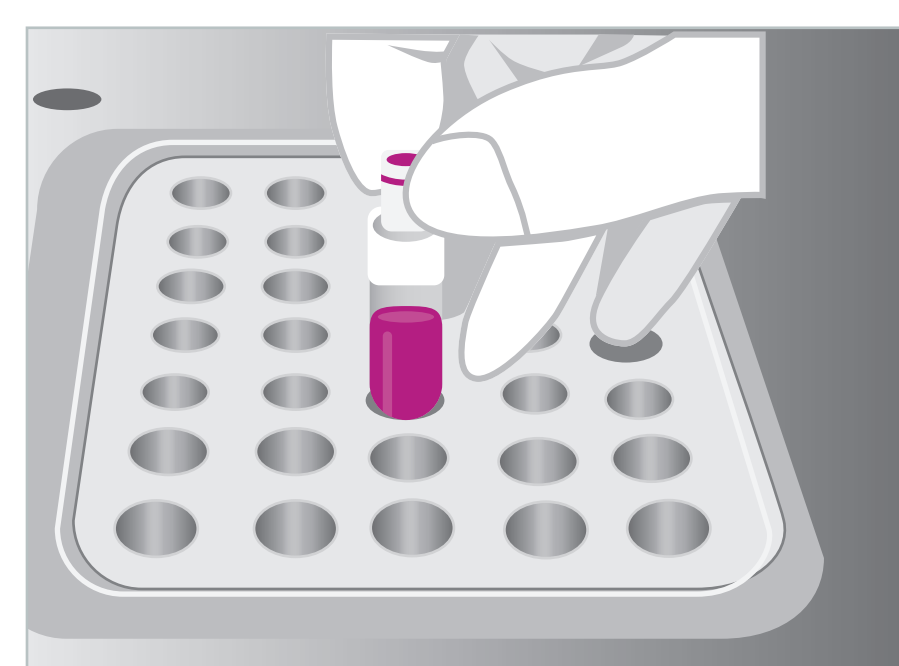
01. COLLECT

Draw 1 mL of blood directly into the TruCulture Tube and break off the plunger.



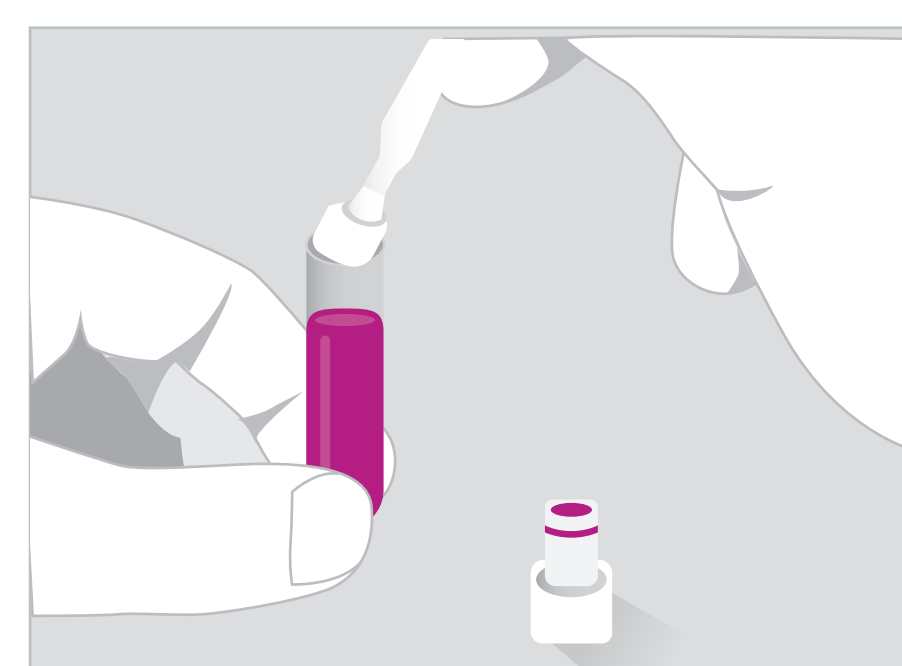
02. MIX

Gently invert tube to mix 3 to 5 times



03. INCUBATE

Place tube in 37°C heat block for up to 24 or 48 hours.

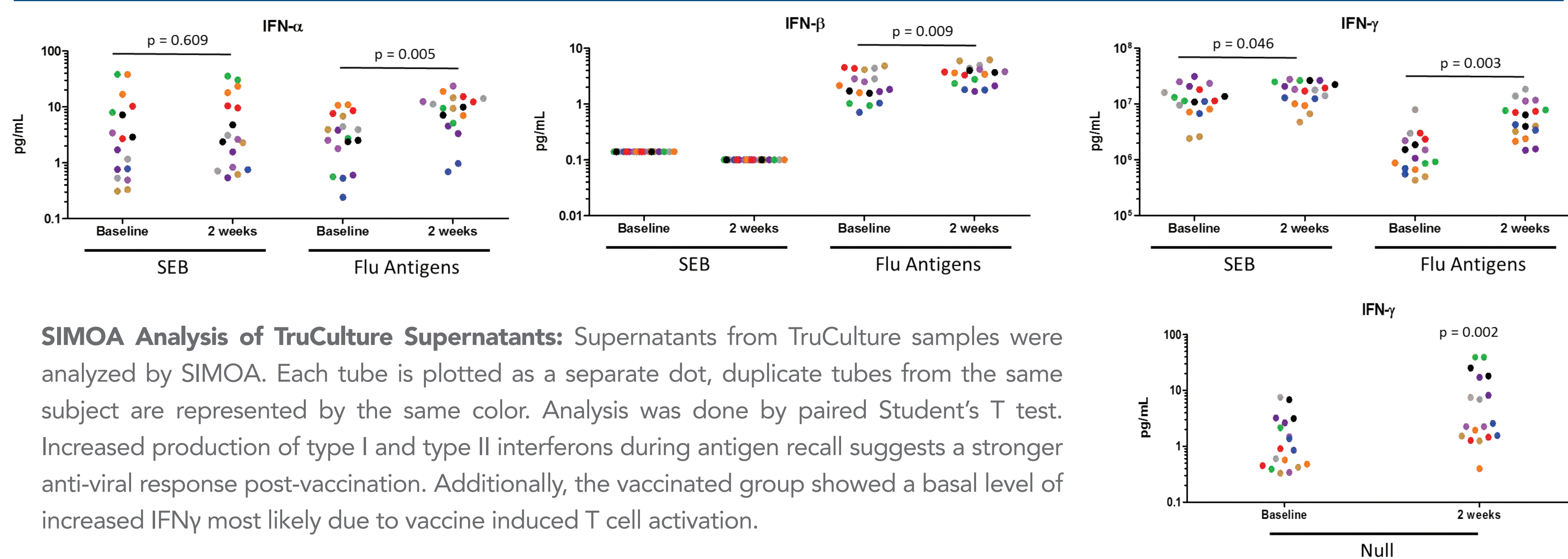


04. SEPARATE

Manually insert valve to separate supernatant from the cells. Collect supernatant and cell layer for downstream analysis.

RESULTS

Flu Vaccination Increased Type I and Type II Interferons as Analyzed by SIMOA



SIMOA Analysis of TruCulture Supernatants: Supernatants from TruCulture samples were analyzed by SIMOA. Each tube is plotted as a separate dot, duplicate tubes from the same subject are represented by the same color. Analysis was done by paired Student's T test. Increased production of type I and type II interferons during antigen recall suggests a stronger anti-viral response post-vaccination. Additionally, the vaccinated group showed a basal level of increased IFN γ most likely due to vaccine induced T cell activation.

SUMMARY

- TruCulture is an easy to use culture system to investigate immune responses during antigen recall after vaccination.
- UltraSensitive SIMOA assays can be used to detect changes in analytes at low concentrations.
- Relative IFN γ concentrations correlated between OptiMAP and SIMOA.

TRUCULTURE A Blood Collection and Whole Blood Culture System

TruCulture whole blood culture

- Integrated closed sterile whole blood collection and culture system
- Retains all blood components, including all leukocytes, platelets, soluble factors, and Fc receptor expressing cells
- Easy to use, eliminates the need for cell manipulation
- Standardized to ensure consistent performance across multiple users and clinical sites

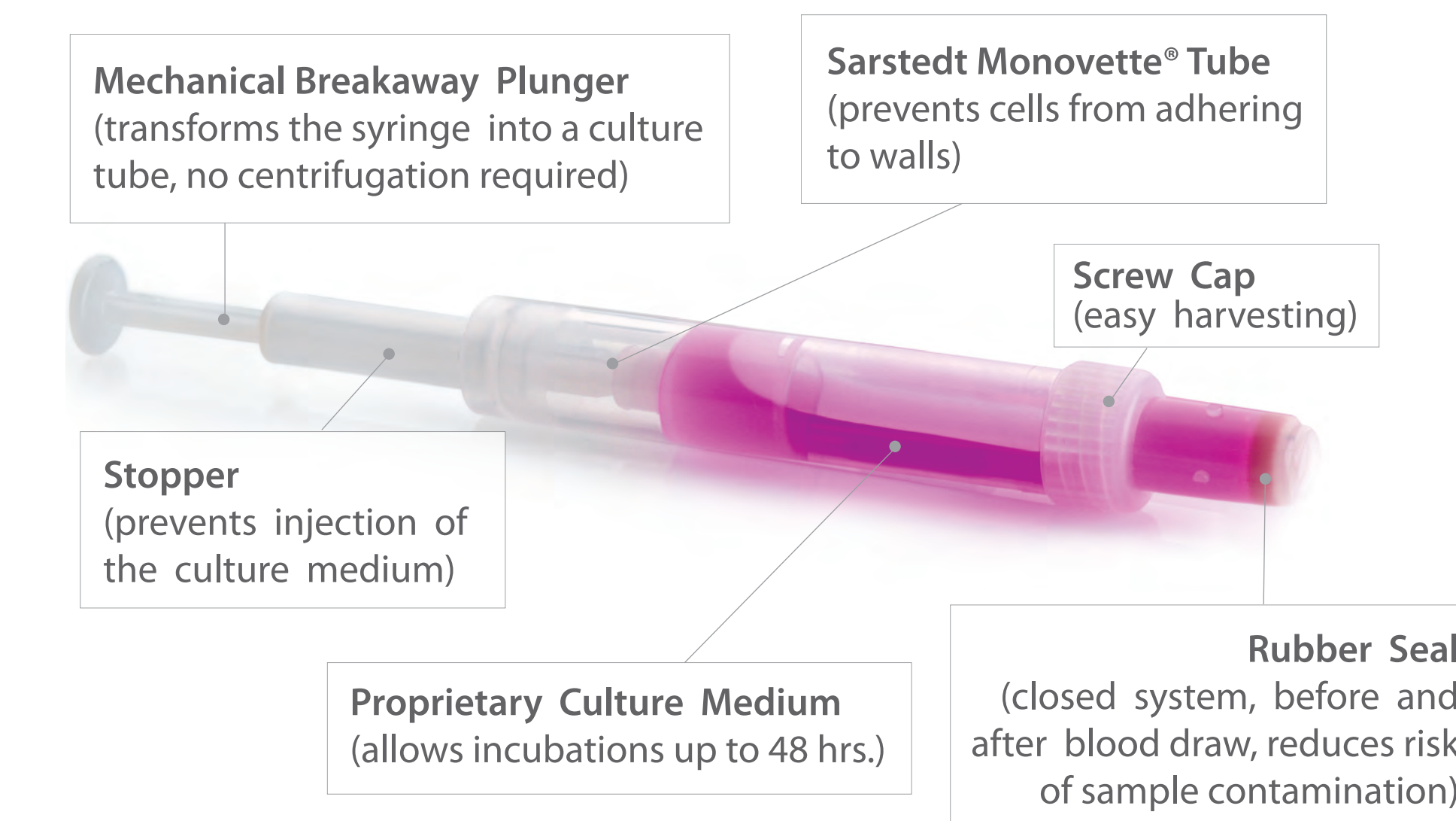
PBMC (Peripheral blood mononuclear cells) culture

- Separate blood collection and specialized cell culture procedures
- Does not retain all blood components, including granulocytes (ex. neutrophils which makes up >50% of all circulating leukocytes), soluble factors, etc.
- Extensive manipulation, processing, and often freezing/shipping prior to culturing
- Poor reproducibility



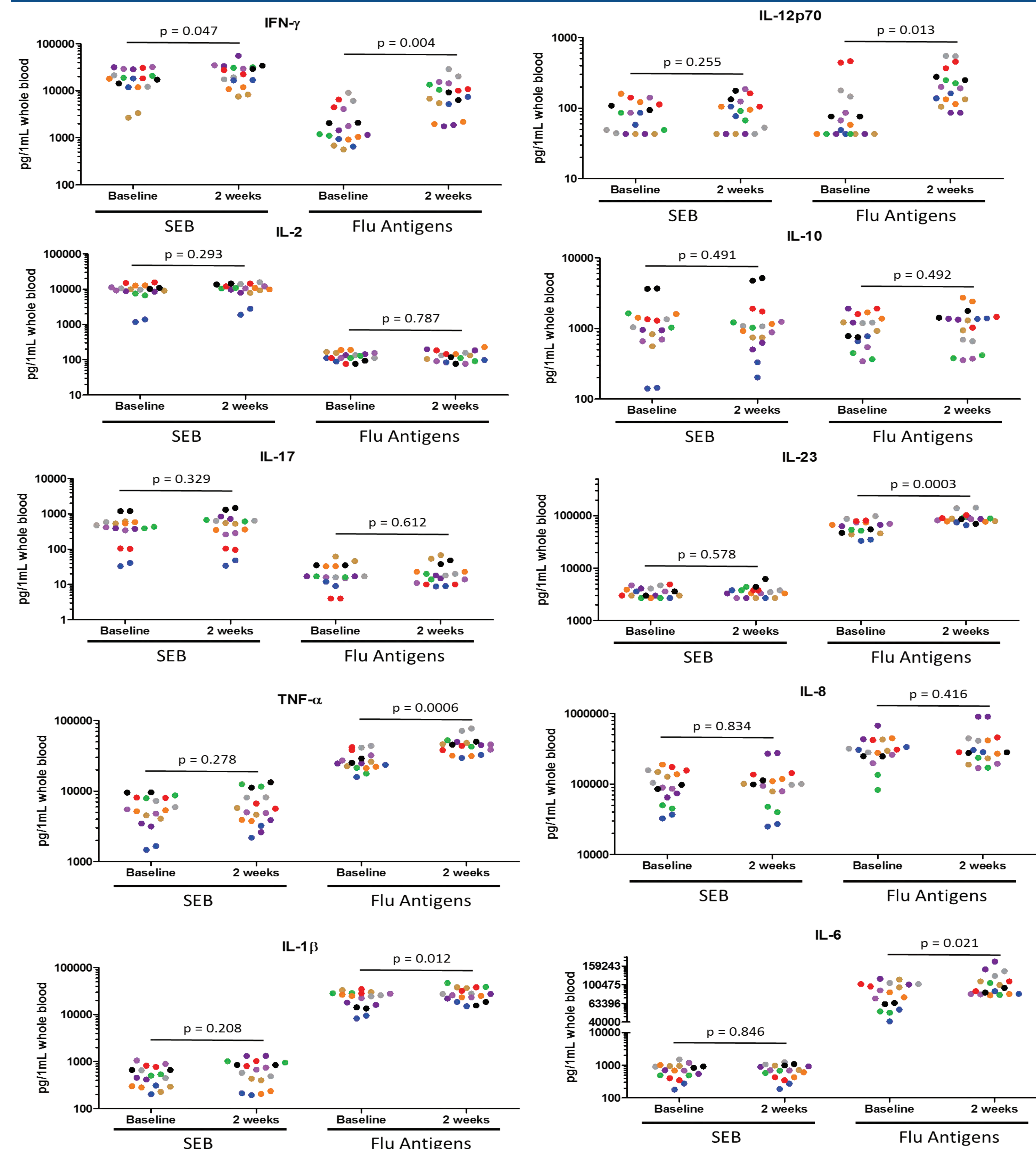
DOWNLOAD THIS POSTER AND LEARN MORE ABOUT TRUCULTURE AND MYRIAD RBM BIOMARKER SERVICES

Scan QR Code via a barcode reader application



RESULTS

Increased Inflammatory Responses to Flu Antigens Post-Vaccination by OptiMAP



OptiMAP Analysis of TruCulture Stimulated Samples: Supernatants from TruCulture samples were analyzed by OptiMAP. Each tube is plotted as a separate dot, duplicate tubes from the same subject are represented by the same color. Analysis was done by paired Student's T test. Whole blood stimulated with Flu Antigens after 2 weeks vaccination increased production of protective adaptive immune responses, such as IFN γ , IL-12p70, and IL-23. Additionally, increased proinflammatory cytokine production were also observed. SEB stimulated samples did not demonstrate the same recall response after vaccination.