

# Tissue Solutions' Virtual Biobank

## Supporting Cutting Edge Research in the UK

### Introduction

Tissue Solutions is an ISO 9001:2015 certified virtual biobank offering a single access point for a wide range of diseased and healthy tissues in fresh, frozen, and FFPE formats. We provide a customised tissue provision service, quickly sourcing materials to individual requirements ensuring projects are not constrained by access to human biomaterials or collection timelines.

As part of this, we source biomaterials in the UK to support scientists in the UK through our research tissue bank. We supply fresh, frozen and FFPE tissue samples. This includes: Blood, urine, saliva, faeces and skin biopsies from common inflammatory and autoimmune disease and oncology samples as well as healthy controls.

### Helping Scientists

Working with Tissue Solutions' Research Tissue bank allows scientists quick and simple access to the tissue samples needed for their research. By working in partnership with our tissue acquisition team these scientists' valuable time is well spent at the bench.

Other key advantages include:

- Simple access process
- Quick turnaround for approval with external Governance committee
- We manage all the logistics
- Nice to get referenced in their publications, but not essential
- Both academic and commercial users can work under our ethics

If we don't have it in our network then we find it for you. With the right connections and approvals we can add new NHS sources to our approval to cover other sample types and diseases on request.

### Procuring Specialized Samples

Through our Research Tissue Bank we help other scientists carry out their research by meeting all their tissue acquisition needs. All samples are collected in the UK on request to specific requirements ensuring all donor inclusion and exclusion criteria are met.

We work hand in glove with both scientists and collection sites to only collect samples when needed for current research. This ensures patient tissue samples are used and are not left banked in a freezer waiting to be released.

We are working with 13 approved sites across the UK under our ethics and have supplied 1514 human tissue samples to date, many of these being fresh time critical shipments.

### Ticking Clock Case Study

Aquila BioMedical is a Contract Research Organisation with world leading expertise in immuno-oncology. They have a regular requirement for fresh human bloods which they have used to develop a specialized panel of *in vitro* functionality assays using isolated cell fractions. One such assay is their macrophage functionality assay where monocytes are derived from the blood and subsequently differentiated into macrophages.

Aquila BioMedical's macrophage functionality assays depend upon use of human blood that is as fresh as possible. During our discussions with their scientists it was clear that the cell type they were trying to isolate from fresh whole blood were very fragile and did not survive extended shipping times.

We were tasked with getting blood from multiple donors per day to their lab within 2 hours of blood draw. The scientific literature details how cell markers transform over extended storage or handling.

Tissue Solutions coordinated the recruitment of specified numbers of healthy donors on specific days. Bloods were drawn from these donors at different times during the day and samples were couriered directly to Aquila for immediate use in the lab. Multiple donors can be provided in any one week with clear communication critical between Tissue Solutions and Aquila BioMedical as to delivery dates, times and number of donors required to fit in with the lab schedule.

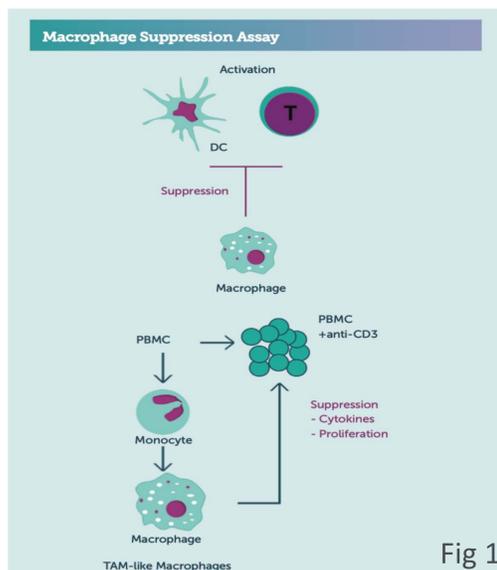


Fig 1

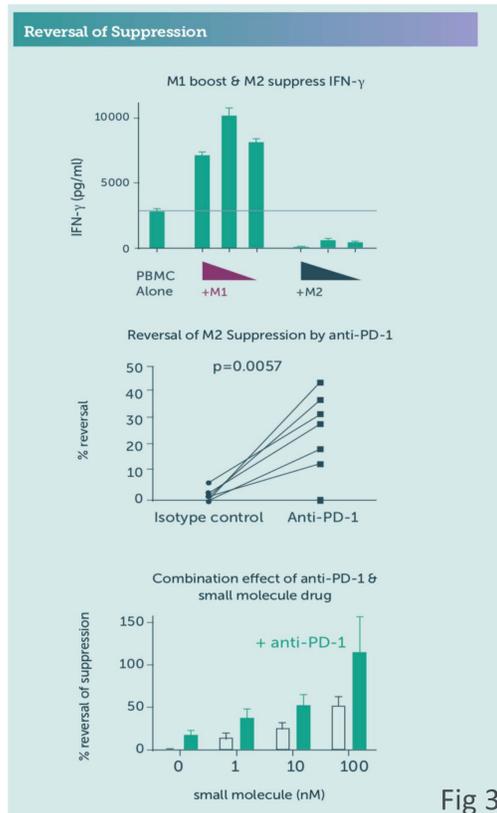


Fig 3

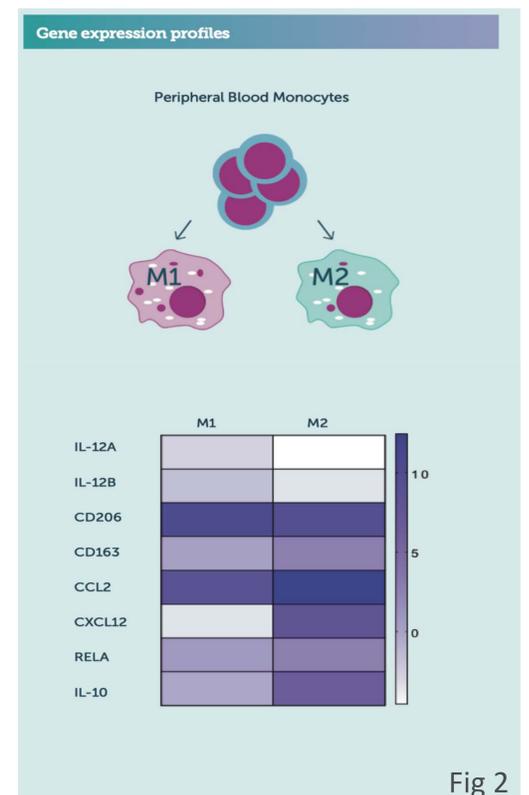


Fig 2

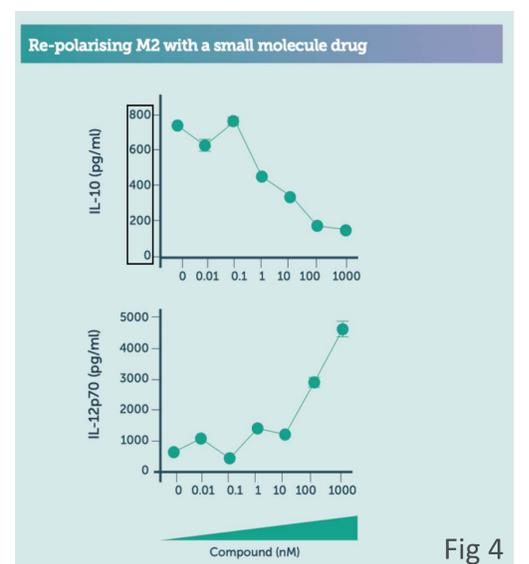


Fig 4

### Results and Conclusions

Tumour cells alter the host's immune response to make it easier for them to grow unchecked. As a result, many biotech and pharmaceutical companies are actively developing drugs to reverse macrophage suppression thereby allowing T cells to target and kill tumour cells. Aquila BioMedical have developed a panel of *in vitro* assays using functioning macrophages from blood obtained from Tissue Solutions, providing relevant human data on potential cancer therapeutics.

One set of assays now offered by Aquila BioMedical focuses on macrophage function where they characterise the effects of novel immunomodulatory agents on the human macrophage phenotype via flow cytometry, qPCR or ELISA based technologies. Macrophages can regulate how dendritic cells activate T cells to make the T cells more or less active in killing tumours (Fig 1).

The effects of these immunomodulators on monocyte to macrophage differentiation rate, cell viability and levels of apoptosis can also be measured. Tumour cells can polarise macrophages to being more tumour friendly (M2 phenotype). Such macrophages induce proliferation and survival of tumour cells, facilitate angiogenesis, and suppress immune responses via expression of inhibitory molecules (e.g. PD-L1, B7-H4) and cytokines (e.g. IL-10, TGF- $\beta$ , Fig 2-4).

Aquila BioMedical's assays are sensitive enough to detect the effects of new therapies on re-polarising macrophages away from M2 phenotype to being more M1 like. Thereby helping measure efficacy of novel anti cancer therapies within a human system.

### Engagement

Aquila BioMedical carry out world-leading immune cell assays for clients around the globe.

[www.aquila-bm.com](http://www.aquila-bm.com)

Tissue Solutions have built an extensive network of more than 200 sources to help support research such as this at Aquila BioMedical. Tissue Solutions are constantly engaging with new sources within the UK.

[www.tissue-solutions.com](http://www.tissue-solutions.com)

### Acknowledgements

Thanks to everyone at Aquila BioMedical for allowing the macrophage assay data to be shown and to Laura White at Tissue Solutions for managing the collection process.