

## APPLICATIONS

- Monitoring of the immunological status of patients in respect to the development of diseases and the effect of therapy
- Cell sorting of different populations for further analysis or culturing
- Measurement of extracellular vesicles and nanoparticles (uptake)

## COLLABORATION OPTIONS

- Fee-for-Service: performing the relevant experiments for you
- Consultancy and training: guiding your experimental set-up and training researchers at your location or at our facilities
- Research collaboration: open for joint grant applications when the project is complementary with our own research lines and goals

## KEY ADVANTAGES

- The team: Dedicated technicians with experience in quality controlled environments + professors in (neuro)immunology
- Fast: no optimization necessary, off-the-shelf analyses
- Quality: analyses according to SOPs and with the necessary controls
- Flexibility: pick and combine your panels

## PUBLICATIONS (selection)

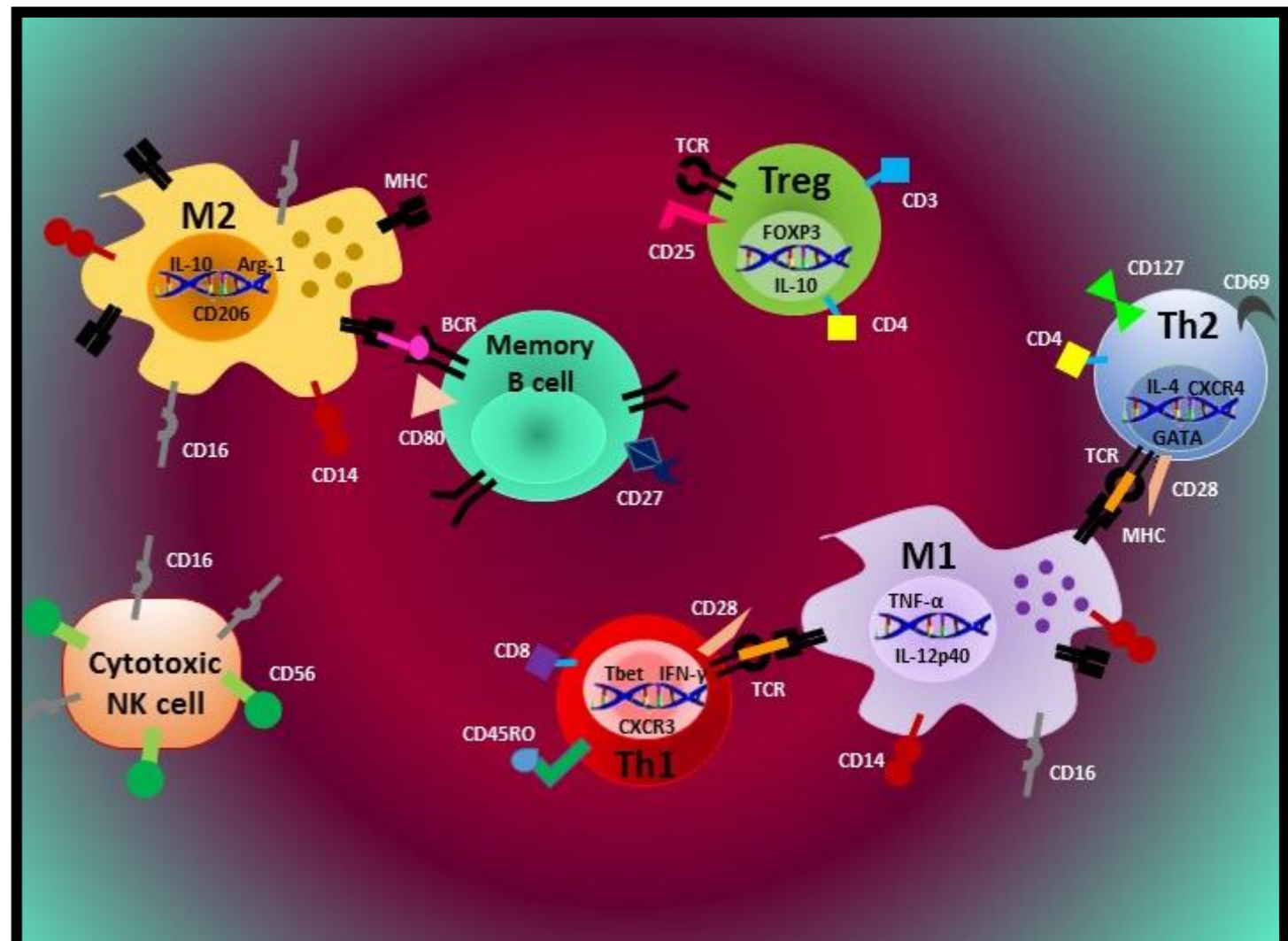
- Bogie et al. *Mult Scler* 2018; 24:290-300
- Ravanidis et al. *Stem Cells International*, vol. 2017, Article ID 2353240
- Claes et al. *J Immunol* 2016; 197:4576-4583
- Thewissen et al. *Cell Transplant* 2016; 25:1207-1218
- Dhaeze et al. *J Immunol* 2015; 195:832-840
- Janssens et al. *Brain, Behavior, and Immunity* 2015; 45:180-188

### BUSINESS DEVELOPER

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## COLLABORATION OPPORTUNITY

# Immune status monitoring packages

- Validated and standardized quantitative PCR and flow cytometry assays
- For *in vitro/in vivo* experiments and human samples
- Building on our vast experience in (neuro)immunology



# UHASSELT

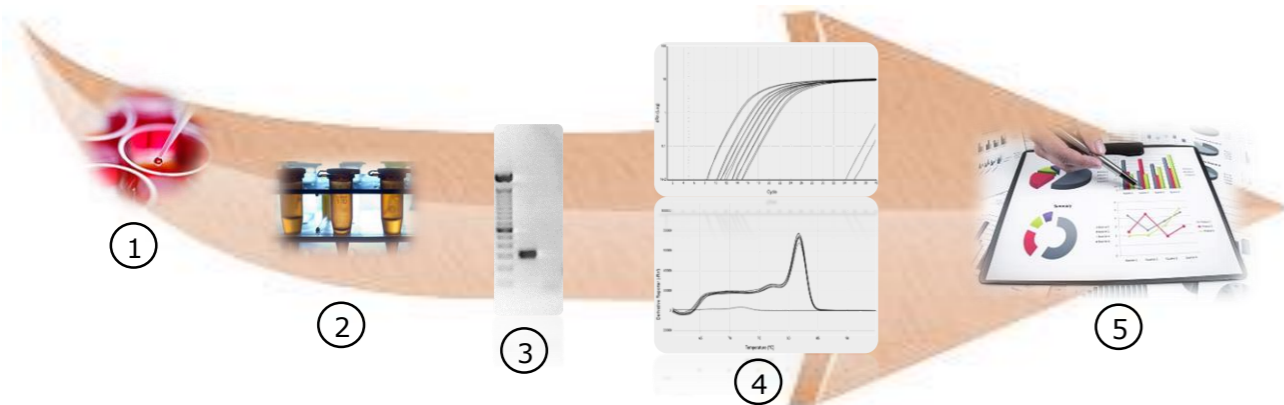
KNOWLEDGE IN ACTION

## QUANTITATIVE PCR PANELS

Validated panels of genes are present at BIOMED to study following immune cell subsets and related cytokines and neurotrophic factors:

- T cells (Th1, Th2, Th17 and Tregs)
- Macrophages ( M1 and M2 phenotype)
- Pro- and anti-inflammatory cytokines
- Neurotrophic factors

For each phenotype and subset, primer sets of 2 or 3 genes have been validated for **quick and reproducible analysis** of human and murine cell subsets.



Service options in a row: 1) cell culture, 2) RNA isolation and cDNA synthesis, 3) cDNA quality control, 4) quantitative PCR analyses, 5) report

### T cell subsets

T cells are very important players of the immune system and are at the core of adaptive immunity. Many subsets of T cells exist. Available validated primer sets characteristic for the indicated T cell subsets:

- Regulatory T cells (**Tregs**): TGF- $\beta$ , IL-10, Foxp3
- **Th-1**: T-bet, IFN- $\gamma$ , CXCR3
- **Th-2**: IL-4, GATA-3, CXCR4
- **Th17**: IL-17, CCR6, ROR $\gamma$ t

### Macrophages

Macrophages are endowed with a variety of receptors and are activated in response to combinations of various stimuli to acquire specialized functional phenotypes. As for the lymphocyte system, a dichotomy has been proposed for macrophage activation: classic vs. alternative, also M1 and M2, respectively. Available validated primer sets characteristic for M1 and M2 macrophages:

- **M1**: IL-12p40, TNF- $\alpha$
- **M2**: IL-10, CD206, ARG-1

### Equipment

AB StepOne Plus Real Time PCR System  
StepOne™ Software

### Pro- and anti-inflammatory cytokines

Cytokines are small proteins important in cell signaling. The list of pro-and anti-inflammatory cytokines is infinitely long. Available validated primer sets for cytokines:

- **Pro-inflammatory**: TNF- $\alpha$ , IL-12p40, IL-23p19, IL-22, IL-17, IL-6, IFN- $\gamma$ , GM-CSF
- **Anti-inflammatory**: TGF- $\beta$ 1, IL-10, IL-4

### Neurotrophic factors

Neurotrophic factors (NTFs) are a family of biomolecules – nearly all of which are peptides or small proteins – that support the growth, survival, and differentiation of both developing and mature neurons. Available validated primer sets characteristic for neurotrophic factors: human NGF, BDNF, LIF, CNTF

For each analysis, **housekeeping genes** are included in the experiments for normalization. (YWHAZ, TBP, RPL13a, PGK1, HMBS, GAPDH, CYCA, ACTB).

## FLOW CYTOMETRY PANELS

Multicolor flow cytometric analysis can be performed on multiple analytes in serum, plasma, supernatant and other complex biological matrices.

Hasselt University has validated panels of antibodies to study the following subsets of immune cells and other specific surface markers:

- Human T cells and their cytokines
- Human B cells, B cell survival and costimulatory markers
- Apoptosis of human immune cells
- Murine spleen, lymphnode, brain and spinal cord cells

For each panel, an experiment template is available for **quick and reproducible analysis with preset settings**.



### Immune cell surface markers

- B cells: CD19
- Monocytes: CD14
- Natural killer cells: CD16, CD56
- T cells: CD3, CD4 (TH), CD8 (Tc)

### T cell surface markers

- Th cells: CD4
- Cytotoxic T cells: CD8
- Naïve/Memory T cells: CD45RA/RO
- Effector and memory T cells: CD127
- Activated T cells: CD25
- Homing of T cells: CCR7

### B cell surface markers

- General marker: CD19
- Costimulation: CD27, CD80, CD86, HLA-DR, CD40
- Cell adhesion: CD38
- Antibodies after immune response: IgD, IgM, IgG, and IgA

### B cell survival surface markers

CD267, CD268, CD269, CD27 and IgD

### Immune cell apoptosis panel

CD4, CD19, CD69-APC, CD45RO, Annexin V, 7-AAD

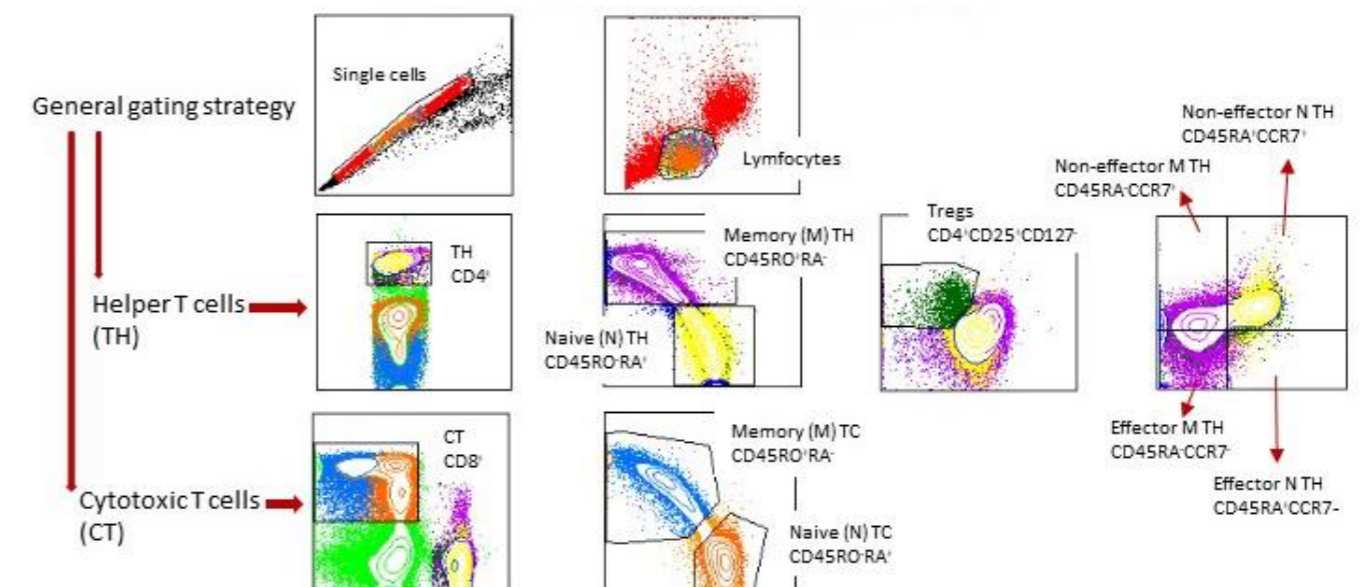
### T cell cytokine assay

CD3, CD4, CD69, IL-10-, IL-4, IL-17, IFN and GM-CSF

### Murine immune cells from spleen, lymph nodes and brain/spinal cord tissues

CD3, CD19, CD4, CD8, CD45, Ly6C, FOXP3, IL-4, IFN- $\gamma$ , IL-17, CD11b and Zombie NIR fixable viability kit

Below, an example of the characterization of T cell subsets is shown. Of course, other subpopulations can be visualized by including additional markers or by adding plots to the template.



### Equipment

FACS Aria II, BD LSR Fortessa  
BD FACSDiva Software