CELLULAR INFECTION & RESPONSE MODELS

SMALTIS in partnership with mAbExperts

Smaltis and mAbEXperts group deliver a global service linked to the study of celllular behavior

CONTEXT

Understanding **interactions between cell hosts and bacteria** is a key point in the fight against infections.
Infection cellular models are useful to predict bacterial interactions and behavior with eukaryotic cells.

SERVICES

Different **models** are **already available or are specifically tailor-made** in order to support the development of products acting against bacterial infections or to assess the cytotoxicity of a compound or microorganism.

PRODUCTS TO BE TESTED

Assessment of the impact of **anti-infective compounds, phages, probiotic strains or substances** on:
- Interactions between pathogenic bacteria or pathogenic bacterial substances (supernatant, vesicles…) and eukaryotic cells
- Direct cellular response

PREREQUISITES

Minimal Inhibitory Concentration
Lethal Concentration 50
Multiplicity Of Infection
…

READS-OUT

CELLULAR **ADHESION**
Characterization and Quantification of bacterial adhesion
CELLULAR **INVASION**
Characterization and Quantification of bacterial invasion
CELLULAR **RESPONSE**
Cellular behavior and damages
CELLULAR **TOXICITY**

TOOLS FOR ASSESSMENT

- **Genomic response**: specific gene expression quantification (e.g. inflammation, autophagy, apoptosis)by RT-qPCR
- **Proteomic response**: measurement of protein secretion (ELISA, ELIspot, WB) in the culture medium after infection (e.g. cytokines/inflammatory mediators)
- **Global cellular response**: migration (under the effect of a factor), proliferation (assessment of stimulation and growth by counting)
- **Immunolabelling** via specific antibodies
- Bacterial **counting**
- **LDH assay**: quantification of cell death with the measure of the Lactate Dehydrogenase released in the medium
- **Hemolytic activity:** Red Blood Cell Lysis
- **ADCC:** Antibody-dependent cell-mediated cytotoxicity
- **Stimulation of cytokines production** by cells
- **Phagocytosis** of cells and bacteria
- **ADCP:** Antibody-dependent phagocytosis
- **Multiparametric analysis** thanks to Luminex™ technology

EXAMPLES OF ACHIEVEMENT

Immunostaining characterization of adhesion/invasion properties of *E. coli* strains on T84 intestinal cell line

Assessment of the effect of infant food compounds on the adhesion of *E. coli* strains to intestinal cells

Assessment of adhesion/invasion power of environmental strains (*Pantoea sp, Arthobacter sp, Bacillus subtilis*)

Characterization and assessment of cytotoxicity of mutants derived from *P. aeruginosa* strain PAO1on A549 and NCI-H820 lung lines and macrophage line J774A.1

Assessment of the effect of compounds and strains on extracellular and intracellular bacterial clearance

Assessment of the efficacy of antibacterial compounds on *S. aureus* strains phagocyted by macrophages J774A.1

Determination of bacteriophages-induced cytotoxicity on MG63 osteoblasts line

AVAILABLE CELL TYPES

Intestinal cells
Caco2, T84, HT29
Lung cells
A549 and NCI-H820
Macrophages
Murine macrophages J774A.1, THP-1 monocytes
Osteoblasts
MG63
Skin cells
…**Other on request**

Tumor library: access to tumor cell lines or tissues from patients

SOURCING OF BACTERIA

Reference strains
Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, Escherichia coli, Enterobacter spp.…
Clinical strains
Access to more than 40 000 strains isolated from different pathologies
Characterized mutant strains
Example: targeted mechanisms of resistance
Patients' samplings
Patient's samplings containing bacterial strains

Already available or to be created according to the project