CICAN'AUV

About us

The main objective of our team is to characterize the immunocompetent cells response (ICCs, e.g. immune cells, adipocytes, endothelial and epithelial cells) according their micro-environment variations. It is part of the immunonutrition field with two major goals: 1) Identify the relations between the immunizing / inflammatory changes and the metabolic disorders in connection with the nutritional status in physio and pathological states (i.e. ageing, cancer, obesity). 2) Maintain / optimize the ablities of the immunocompetent cells response by nutritional interventions targeted in a preventive and/or therapeutic approach. For that purpose, a strategy of modulation of the cross-talk between the ICCs and the other tissues (breast small bowel, bone) using of immunomodulatory bioactive compounds (pre and probiotic, vitamin D, plant bioactives) in order to prevent the risk of chronic pathology associated with aging.

In this framework, thanks to our expertise in phytochemistry and biology, naturally plants/bioactive extracted from them are selected and tested for their immunomodulatory properties and/or anti-proliferative activity.

Our services

IMMUNOCOMPETENT CELLS – INFLAMMATION

INTEGRATED EXPLORATION OF IMMUNE RESPONSE POLARIZATION

CELLULAR POLARISATION MODELS: Induced polarization by dendritic cells (derived from monocytes); MLR[MF1] ; Autologous polarization, Tolerance markers (IDO activity); Lymphoblast transformation; Induction of a pro-inflammatory Th1/M1 profile; M1/M2 macrophages and Th1/Th22/Treg/Th17

lymphocytes phenotyping.

PHENOTYPING: Cell surface and intracellular markers; Cytokines

OXIDATIVE STRESS-INFLAMMATION

BIOLOGICAL ANALYSIS EXAMPLES:

- Chemotaxis, migration, proliferation, cell cycle, apoptosis...
- Cell surface and intracellular marker expression (CD)
- ROS, MDA, Isoprostanes, Lipid hydroperoxides
- Anti-oxidant defenses: TEAC, GSH, DPPH, ORAC
- Cytokines, Metalloproteins
- Enzymatic activities: Glutathione reductase (GR), Glutathione peroxidases (GPX 1 and 4), -Glutathione S Transferase, Cyclooxygenase 2 (COX-2), Heme oxygenase 1 (HO-1), Xanthine oxidase, NADPH oxidases (NOX)...
- Intracellular immune response effectors (Fas, Trail, granzymes…)
- Signaling channels: NFkB, mTor, Pi3K/akt .....

CELL LINES: THP-1, JURKAT, NK92, RAMOS, YAC

BIOLOGICAL LIQUIDS: Serum/plasma; PBMCs; Spillage liquid; bronchoalveolar lavage fluid...

ORGANS (rodents): Bone marrow, spleen, thymus, Peyer's plaques, lymph nodes, bones, muscles

BIOACTIVE SCREENING

ADIPOCYTIC STEM CELLS, ADIPOCYTES

BIOLOGICAL ANALYSIS: differentiation, characterization, proliferation/viability, enzymatic and secretory activities (secretome), gene expression....

CELLULAR LINES: Lines 3T3, 3T3F442A (breast), hMAD (human)

PRIMARY CELLS: Mice pre-adipocytes and adipocytes

BIOACTIVE SCREENING

-IMPACT OF OBESITY

PRIMARY CELLS: Pre-adipocytes and human adipocytes from donors of variable weight to assess the impact of overweight/obesity.

ANIMAL MODEL: rodent models of Diet Induced Obesity

-SPECIFIC APPLICATIONS: TUMOR AND IMMUNE CELLS

IN VITRO EXPERIMENTAL CELL CULTURE (monolayers, 2D and 3D, organoids):

1. Cell cross-talk characterization of adipocytes-tumor cells-immune cells.

2. Bioactive screening: cancer cell lines: human mammary (MCF-7, MDA-MB231, T47D...) and murine (E0771), leukaemia (K562, Jurkat, THP-1...), intestinal (Caco-2, HT29), prostate (LNCaP, PC3, DU145...) ; vaginal (VK2) ; lung (A549) ; genetically modified lines: (EGFP-K562, EGFP-MCF-7, EGFP-EO771); non-cancerous cell lines: mammary epithelial cells (MCF10A, HMEC, 184B5...), mammary myoepithelial cells (Hs-578Bst).

IN VIVO EXPERIMENTAL MODEL:

1. Effects of overweight/obesity on cancer and immune cells.
2. Benefits of physical activity in tumor growth, immune defense and treatment response.

ENDOTHELIAL CELLS

BIOLOGICAL ANALYSIS: Migration, proliferation, cellular cycle, apoptosis, angiogenesis….
CELL LINES: HUVEC, HMMEC (breast)
BIOACTIVE SCREENING

FIBROBLASTS

BIOLOGICAL ANALYSIS: cellular repair (lesion filling test, MMP, Collagen-1); macrophage-fibroblast interactions...
CELL LINES: HDFa
BIOACTIVE SCREENING

CHONDROCYTES

BIOLOGICAL ANALYSES: Organoid formation, Specific markers of inflammation
CELLULAR LINES: NHAC-Kn (human chondrocytes)
BIOACTIVE SCREENING
OUR EQUIPMENTS: FLOW CYTOMETER, PICTURE FLOW CYTOMETER, FLUORESCENCE; LUMINESCENCE; IMPEDANCEMETRY (ICELLIGENCE TECHNOLOGY); RTqPCR; GENE EXTINCTION; HPLC; WESTERN-BLOT; IMMUNOHISTOCHEMISTRY, CONFOCAL MICROSCOPY[MF2] .

BIOACTIVES AND PHYTOCHEMISTRY

- PLANTS of SELECTION therapeutic and/or nutritional interest (ethnobotanical and/or chemotaxonomic approaches)
- BOTANIC IDENTIFICATION (macro-microscopy)
- PREPARATION OF PLANT EXTRACTS
- CHROMATOGRAPHIC ANALYSES and CHARACTERIZATION OF BIOACTIVE VEGETABLE EXTRACTS (HPLC/UV, SM and SMn, CPG/SM and FID, HPTLC)

- SPECTROSCOPIED ANALYSES OF VEGETAL EXTRACTS (spectrophotometric and fluorimetric assays)
- ISOLATION and STRUCTURAL IDENTIFICATION of BIOACTIVE PHYTOCOMPONENTS: (1D and 2D NMR, IR, high resolution MS, X-rays...)
- SCREENING of biological activities and BIOGUIDE FRACTION (Flash chromatography, ion exchange, steric exclusion, preparatory HPLC...)

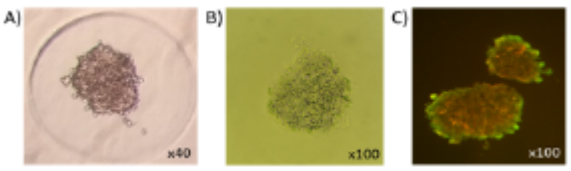
OUR SPECIFIC TARGETS: INFLAMMATION, IMMUNOMODULATION, CANCER, OVERWEIGHT /OBESITY

OUR EXPERTISE:

- CHEMICAL CLASSES (TOTAL PHENOLS, TOTAL FLAVONOIDS, ANTHOCYANOSIDES...) QUANTIFICATION
- ANTIGLYCOXIDANT ACTIVITY (DPPH, ORAC, ANTI-AGING...) EVALUATION
- BIOACTIVES (CLHP-UV/MS, HPTLC, GC/SM AND FID) QUANTIFICATION

Facilities / Equipments

OUR SPECIFICITIES:



- Integrated exploration of the polarization of the immune response (original cellular polarization models)
- Cultures 2 and 3D (organoids)
- Experimental model "overweight, cancer, physical exercise"
- Biological screening and phytochemistry.

Partnership

- **PIERRE FABRE**: plant bioactives effects on ICCs activity
- **GREENTECH**: pre-probiotics and plant bioactive on ICCs activity
- **DOMES PHARMA**: plant bioactive impacts on the CICs activity
- **3iNAture**: plant bioactive effects on ICCs activity
- **BIOSE**: probiotic effects on ICCs activity
- **FLOWGENE**: immunocompetent cell activity
- **FERLUX**: anti-free radical activity of plant bioactives, spectrophotometric assays of plant active ingredients, evaluation of anti-glycant and anti-free radical activities

(https://www6.clermont.inrae.fr/unh_eng/Teams/ECREIN)

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