

Research Topics

a. Comparative *in vitro* and *in vivo* studies on the expression and regulation of drug metabolizing enzymes (P450-dependent monooxygenases, conjugative enzymes, drug transporters).

In particular:

- a.1. importance of constitutive factors, e.g. sex, age, species, breed/strain, individual susceptibility (pharmacogenetics);
- a.2. identification of P450 isoforms responsible for the oxidative metabolism of different chemotherapeutics and contaminants;
- a.3. effects of the exposure to the above cited substances, as well as to illegal growth promoters, on the expression and regulation of biotransformative enzymes (i.e. induction/inhibition phenomena).

b. Studies on xenobiotic molecular and cellular toxicity.

In this field of research, the following studies are likely to be recognised:

- b.1. xenobiotic cytotoxicity testing;
- b.2. *in vitro* studies on biochemical and molecular mechanisms of action of xenobiotics (i.e. apoptosis/necrosis) executed on target or surrogate tissues (i.e. the liver, the immune system).

c. Veterinary oncology and anti-cancer chemotherapy

- c.1. transcriptomics of companion animal neoplasms
- c.2. patient geno- and phenotyping (pharmacogenetics);
- c.3. *in vitro/in vivo* studies on new therapeutic targets and characterization of their bio-molecular effects

d. Toxicogenomic studies, including:

- d.1. studies concerning the effects of xenobiotics on the transcriptome of veterinary species;
- d.2. studies devoted to the definition of biochemical/molecular biomarkers of internal dose or effect to be used in the screening approach.

Methods and techniques

1. **Biochemical techniques** (subcellular fractions isolation, enzymatic activities, immunoblotting)
2. **Cell biology techniques** (cultures and transfection of established cell lines, primary cell cultures, cytotoxicity testing, enzymatic activity in culture)
3. **Molecular biology techniques** (DNA/RNA isolation, PCR end point, Real time PCR, cloning, sequencing, cDNA microarray, RNA-seq).

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