SCIENCESPRINGDAY

FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

Departamento de Ciências da Vida

Transcriptome and proteome profiling of canine mammary tumors

Centro de Química Estrutural, Instituto Superior Técnico

FACULDADE DE CIÊNCIAS E TECNOLOGIA
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CQE Química Estrutural

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B.Sc. in Microbial Biology and Genetics
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Objectives

Canine mammary tumors (CMTs) are the most common tumor type in female dogs, with about 50% of them being malignant. In these cases, surgery appears to be the only successful treatment. The main goals of this PhD thesis are:
1) Construction of a CMT tumor base with clinical, epidemiological and histopathological information from each animal; 2) Establishment of primary CMT cell lines; 3) Characterization and quantification of the transcriptome of CMTs by RNA-seq; 4) Analysis of the proteomes of CMTs and primary CMT cell lines; 5) Primary CMT cell lines susceptibility to novel organometallic compounds developed at CQE-IST; 6) Potential new anti-tumoral compounds that will improve CMT treatment and prognosis will be furthered tested in human breast cancer cell lines.

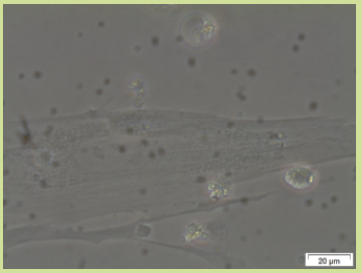

Figure 1 – Cells of a primary culture from canine mammary tumor cells.

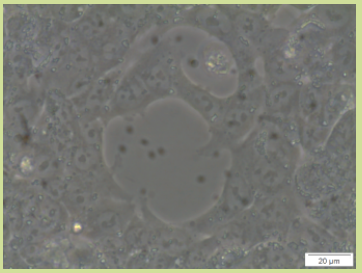

Figure 2 – Cells of a primary culture from canine mammary tumor cells forming a duct.

Methodology

1) Matched tumoral and normal mammary tissue are collected from patients, Clinical and histological characterization had been performed for each animal and data stored in a database containing clinical, epidemiological and histopathological. 2) Primary CMT cell lines from fresh sample biopsies have been established. 3) RNA have been extracted from tumoral and normal samples stabilized in RNAlater and sequenced. 4). Two dimensional gel electrophoresis, 2-DE, will be performed for proteins of tumor cell lines and selected tumor samples. 5) Selected immortalized CMT cell lines will be used for susceptibility testing to several new organometallic compounds, using common anti-tumor drugs such as doxorubicin as a control. 6) New anti-tumoral compounds with promising results in CMT cell lines will be further tested in Human breast cancer cell lines such as MCF-7.

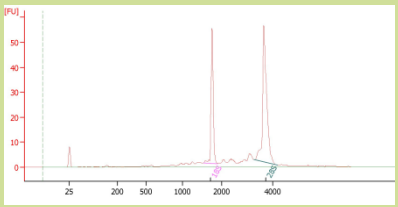

Figure 3 – Electropherogram of a RNA sample from a canine mammary tumor biopsy.

Expected Results

1) The CMT tumor base will a source of information and biological material for the present and future work in canine mammary tumor. 2) The primary CMT cell lines (Figures 1 and 2) will provide suitable *in vitro* models for oncogenomic and drug screening assays and for scientific dissemination. 3) High quality total RNA obtained from the samples (figure 3) will be used for RNA-seq studies that will allow us to obtain a picture of the transcript population (new exons or genes and rare transcripts some of them non-coding). We will also get insights into the miRNA population involved in tumorigenesis or in tumor suppression that could serve as targets for gene therapy in the dog. 4) The 2-DE analysis (figure 4) of proteins in CMT cell lines will reveal the main players for the tumoral progression. 5) Expectantly novel organometallic compounds will be discovered for cancer therapy in canine mammary tumor. 6) These novel organometallic compounds will also be useful in the treatment of Human breast cancer.

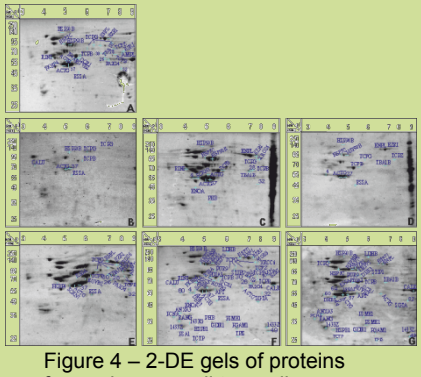

Figure 4 – 2-DE gels of proteins from a human cell tumor line, HCT116.

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