UNIVERSITÀ DEGLI STUDI DI PALERMO

DIPARTIMENTO DI SCIENZE E TECNOLOGIE BIOLOGICHE CHIMICHE E FARMACEUTICHE (STEBICEF)

**Gruppo Biochimica**

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**KEY WORDS: osteosarcoma, breast cancer, TNBC, cancer stem cells, miRNAs, natural anticancer drugs**

## Current Topics:

### Isolation and characterization of Cancer Stem cells (CSCs)

**We have produced a highly aggressive CSC line selected from human osteosarcoma MG63 cells and named 3AB-OS. This cell line has been extensively characterized and we have shown that it contains a mutant p53 with gain of function that is at the root of dedifferentiation of human osteosarcoma MG63 cells into 3AB-OS cancer stem cells. We have also studied the stemness characters of human TNBC cell lines.**

### Functions of microRNAs (miRNAs) as oncogenes or tumor suppressor genes in cancer development

**We have shown that Let-7d miRNA has both anti-oncogenic and oncogenic functions in 3AB-OS CSCs. We also showed that in these cells miRNA-29b-1 is potently downregulated, while its stable transfection impairs cell proliferation, self-renewal and chemoresistance, thus acting as anti-oncogene. This suggested that developing miR-29b-1 as a novel therapeutic agent might offer benefits for osteosarcoma treatment. Now, we are evaluating the role of miRNA-29b-1 in human TNBC formalin-fixed, paraffin-embedded cancerous tissues and TNBC cell lines aimed at finding new diagnostic biomarkers and therapeutic agents.**

### Cytotoxic effects of natural drugs on breast cancer

**We are searching for natural drugs that act by inducing cytotoxic effects on breast cancer, especially on TNBC. In particular, we are cooperating with the research group of Prof. Giovanni Tesoriere to evaluate *in vitro* and *in vivo* the cytotoxic effects of parthenolide alone and together with other natural drugs and to identify their molecular mechanisms of action. We have already obtained some very interesting results.**

**Representative references**

1. Di Fiore R, et al. Mutant p53 gain of function can be at the root of dedifferentiation of human osteosarcoma MG63 cells into 3AB-OS cancer stem cells. Bone. 2014 ;60:198-212.
2. Di Fiore R, et al. MicroRNA-29b-1 impairs in vitro cell proliferation, self-renewal and chemoresistance of human osteosarcoma 3AB-OS cancer stem cells. Int J Oncol. 2014 ;45:2013-23.
3. Di Fiore R, et al. Let-7d miRNA Shows Both Antioncogenic and Oncogenic Functions in Osteosarcoma-Derived 3AB-OS Cancer Stem Cells. J Cell Physiol 2016; 231:1832-1841.
4. Carlisi D, et al. Parthenolide and DMAPT exert cytotoxic effects on breast cancer stem-like cells by inducing oxidative stress, mitochondrial dysfunction and necrosis. Cell Death Dis. 2016; 14;7:e2194.