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► **To cite this version:**

François Chevalier, Charlotte Lepleux. Study of bystander signals emitted by chondrosarcoma cells irradiated in vitro with X-rays and carbon ions. ERRS and GBS 2017 - the Joint 43rd European Radiation Research Society (ERRS) and 20th German Society for Biological Radiation Research (GBS) Annual Meetings, Sep 2017, Essen, Germany. . hal-04236739

HAL Id: hal-04236739

<https://hal.science/hal-04236739>

Submitted on 16 Oct 2023

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Study of bystander signals emitted by chondrosarcoma cells irradiated *in vitro* with X-rays and Carbon ions

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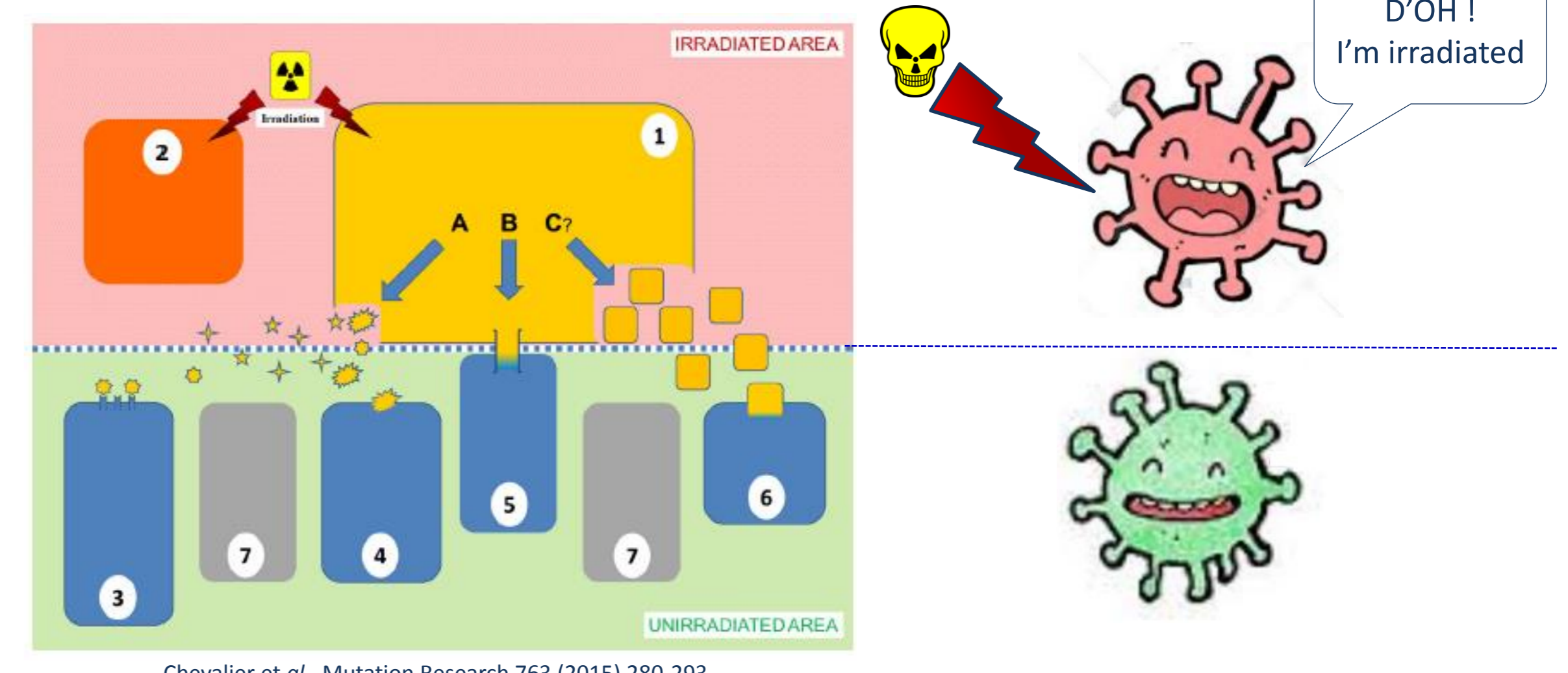
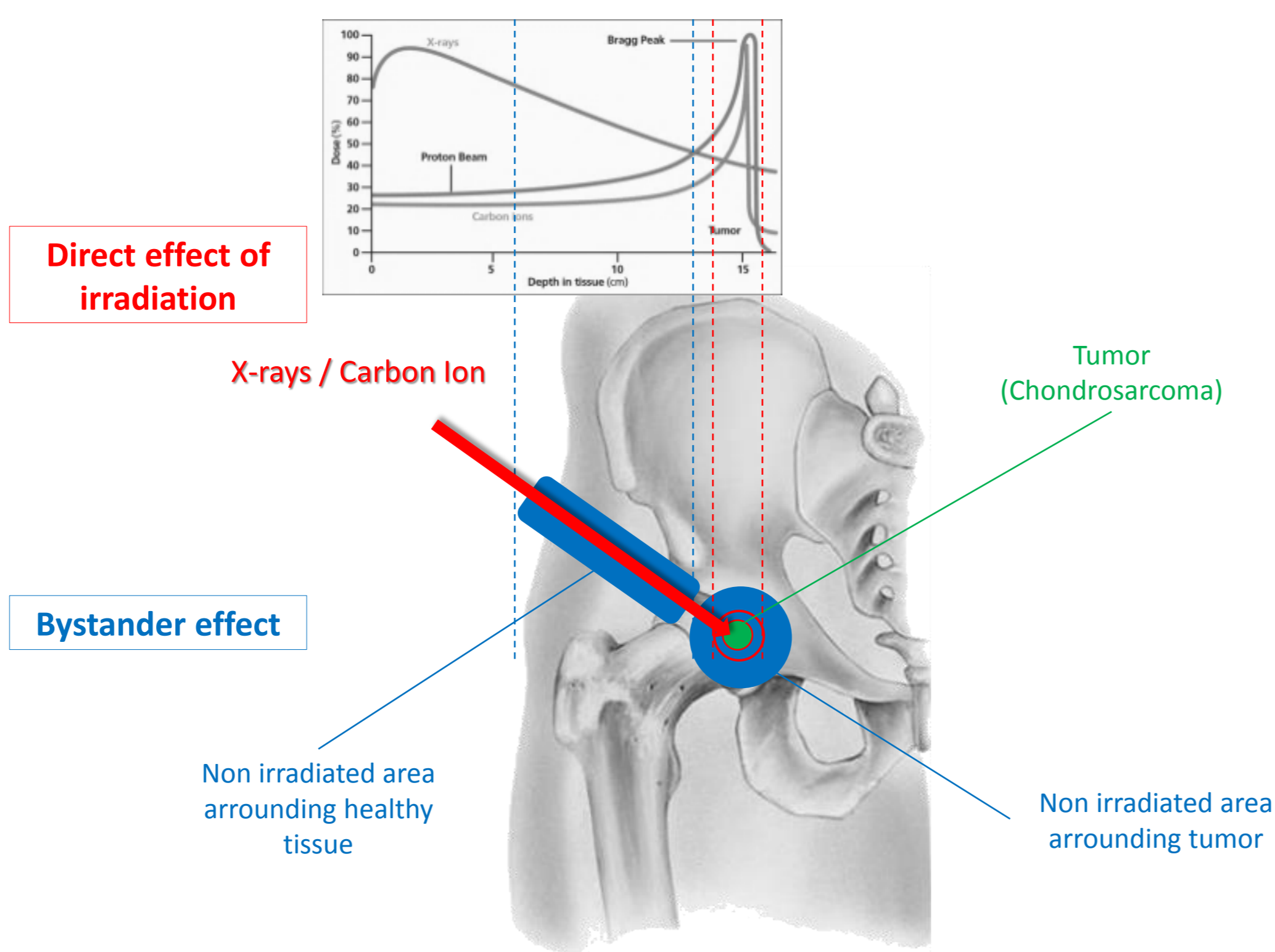
PhD program co-funded by :

Project with the financial support of Region Normandy, project "IRHEMME" and EDF

Radiotherapy (cartilage irradiation) and Bystander effect

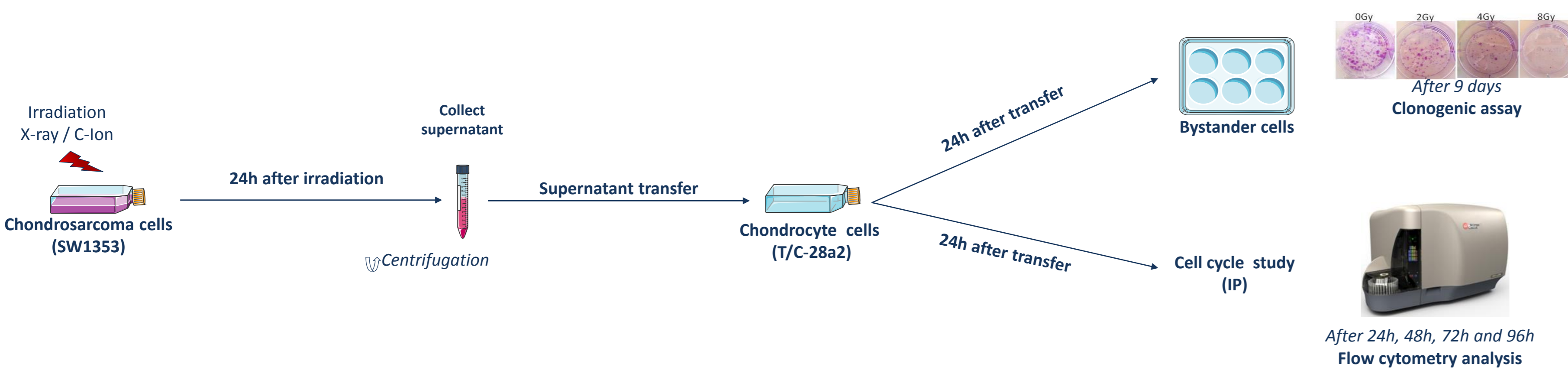
Hadrontherapy and Bystander effect :

Cancer is the first cause of death in France. It's necessary to understand the resistant mechanism of tumors to current therapy (radiotherapy and chemotherapy). Hadrontherapy by Carbon irradiation seems to be a good alternative. The hadrontherapy uses accelerated ions. It's a technique particularly interesting when the tumor is isolated and located in vital organs where it's essential to minimize the irradiation dose in healthy surrounding tissue. The ion beams (proton or carbon) have a specific advantage over photons. When they enter the tissues, ions deposit a large part of their energy at a given depth, at the "Bragg peak, beyond, the dose decreases abruptly, which completely protects the healthy structures behind the tumor. At the same dose, protons produce the same biological effects as photons but the ballistic precision of proton allows to increase the dose to treat the tumor without touching healthy tissue. Chondrosarcoma is a good candidate for Hadrontherapy because this cancer is radio and chemo-resistant tumor. However, it's necessary to evaluate the secondary effect of this type of irradiation especially the interaction between irradiated and non irradiated cells, there is a biological imprecision due to Bystander effect.

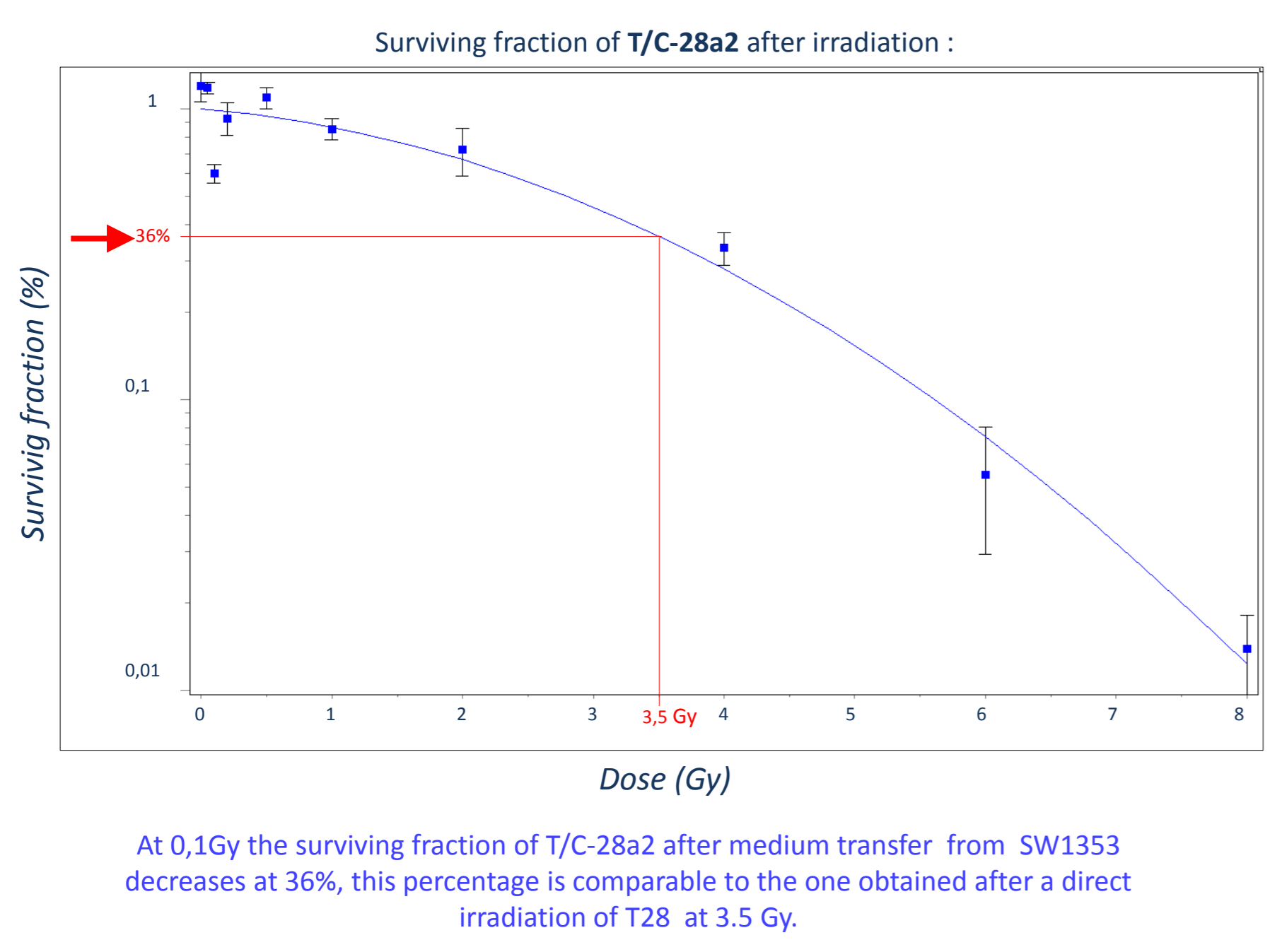
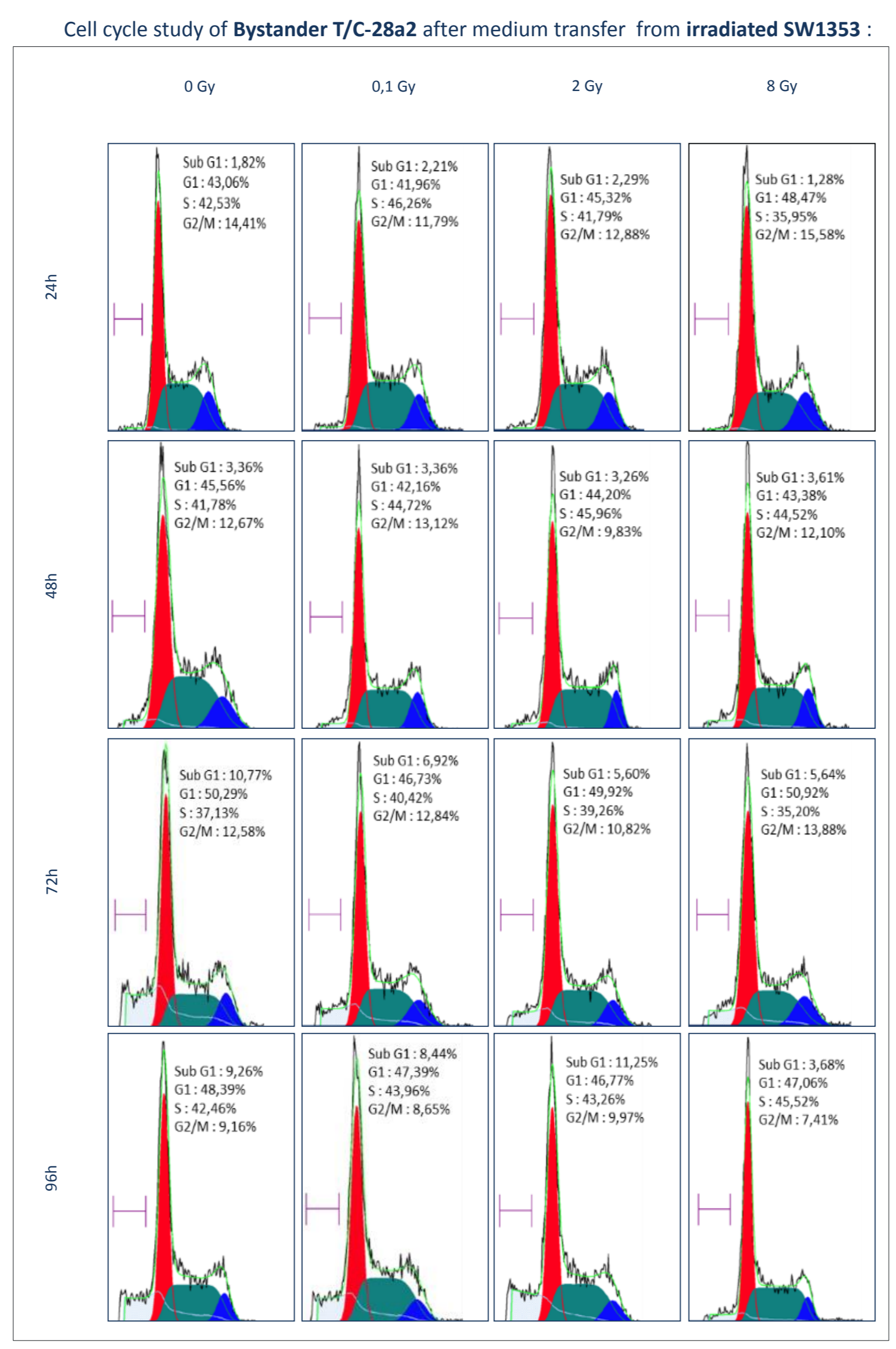
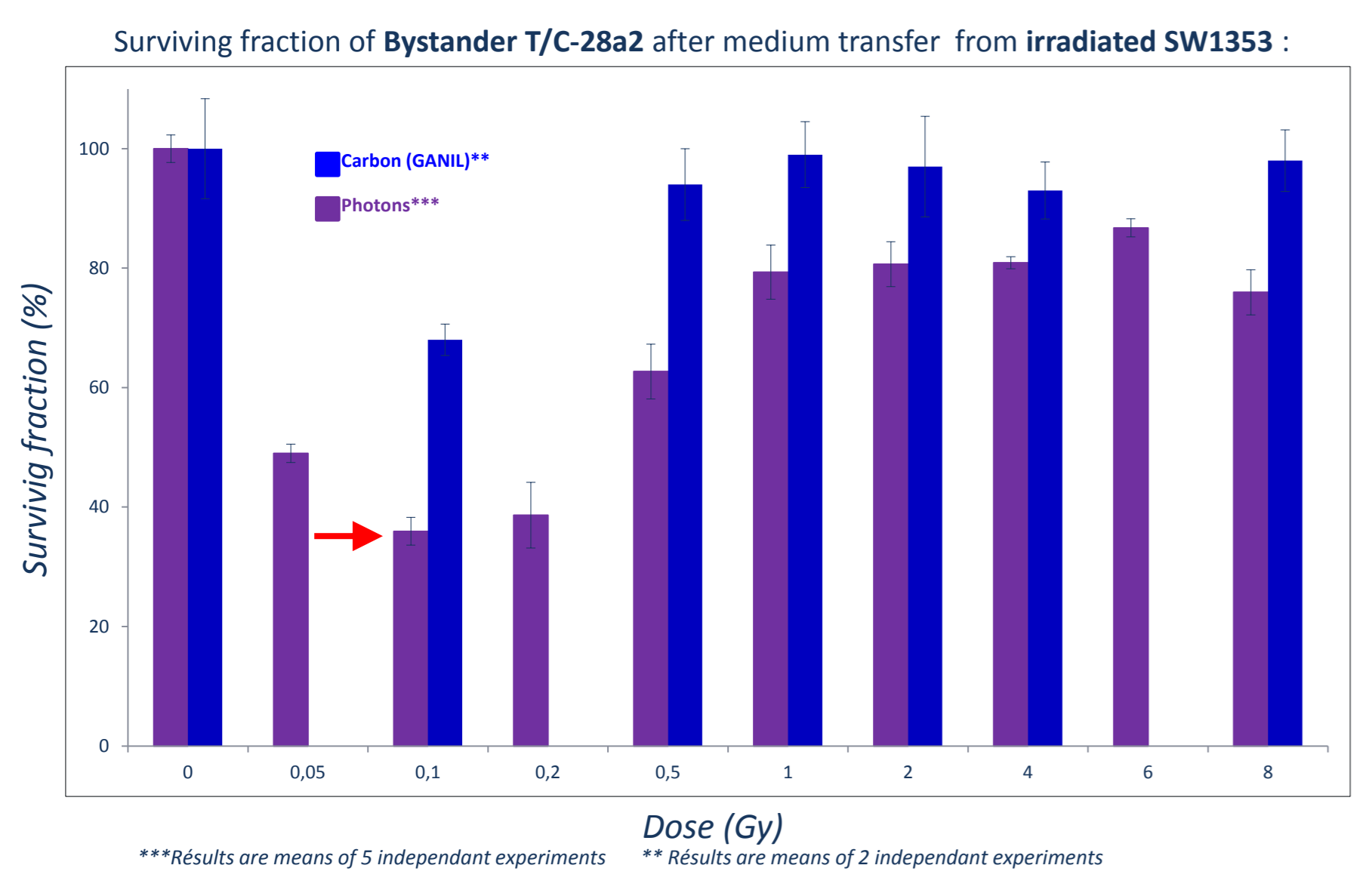


- Objective :**
- Understanding the radiation-induced Bystander effect after cartilage irradiation
 - Identify Bystander Factors
 - Reproduce the cartilage physiology with 3D model

Bystander effect identification



Bystander effect at low dose

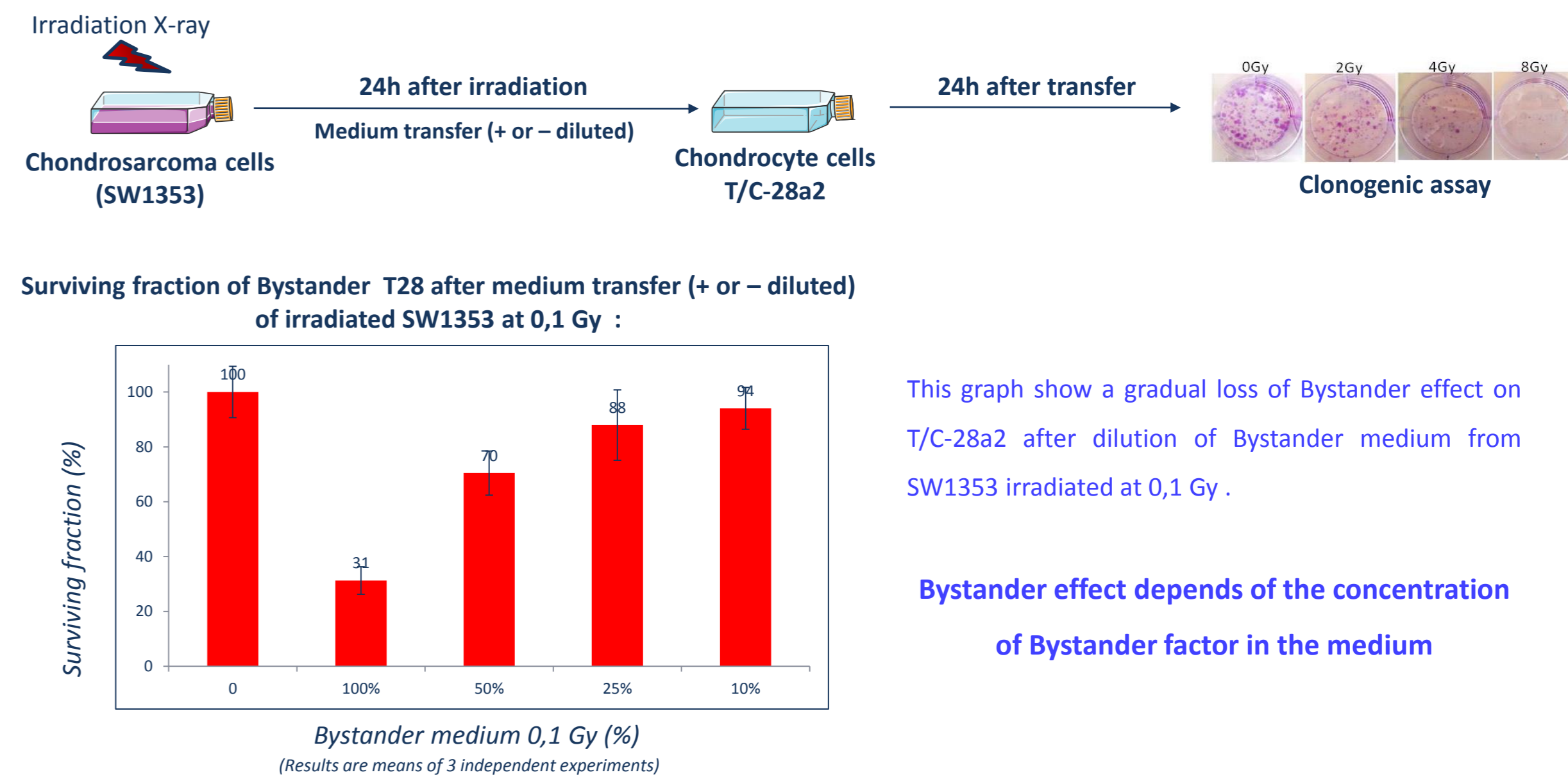


SW1353 and T/c-28a2 cells communicated after an irradiation particularly at low dose (0,1 Gy) : SW1353 cells produced a bystander signal in the conditioned medium, which induces a proliferation delay in T/C-28a2 bystander cells

The proliferation delay observed with the clonogenic assay had no impact in bystander cells repartition in each cycle phases

Bystander effect study

Bystander effect is concentration dependent



TNF-α potential Bystander factor

