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Translational research in cancer

Mycobacterium tuberculosis. In vitro antibiotic sensitivity change by irradiation

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Introduction. Classically, pulmonary tuberculosis (PT) was a contraindication for radiotherapy (RT) in lung cancer patients (LCP), because the provoked local immunosuppression could reactivate the infection. The study of Zack et al. in 1974 found that the surviving fraction of mycobacterium strains irradiated mutate into tuberculostatic drug resistance. However, in 2010, Helal et al. published that; after irradiating mycobacterium strains in vitro some multiresistant strains became sensible and a change in the expression of multiple genes in microbes irradiated was produced. These results are contradictory.

Objective. To assess the effects of irradiation on microbiological characteristics of multiresistant mycobacterium strains. Here we present our preliminary results.

Material and methods. We studied 5 multiresistant *M. tuberculosis* complex strains, identified by Gen Probe Accuprobe. Liquid antibiotic sensitivity study to isoniazid, rifampicin, ethambutol, streptomycin and pyrazinamide was performed by BD Bactec MGIT 960 system as recommended by the manufacturer. The study was performed twice, before and after strain irradiation with one fraction of 24 Gy, 6 MV LINAC photons.

Results. One of the five strains irradiated showed a phenotypic change to sensitivity to streptomycin after irradiation.

Conclusions. If the effect of variation to sensitivity is confirmed, this study raises 2 interesting applications of public health impact: First, in multidrug-resistant PT patients, in vitro test might be performed prior to treatment, and selected for a very low dose irradiation to obtain mutations to sensitivity to drugs used in the treatment and eliminate resistance. Secondly, in LCP with PT to be treated by RT, the in vitro test before RT would allow choose appropriate antibiotics to every patient. These two potential applications have motivated that we are currently carrying out the irradiation of a larger number of strains to verify the consistency and reproducibility of the preliminary results obtained.

<http://dx.doi.org/10.1016/j.rpor.2013.03.851>

Neoadjuvant radiochemotherapy in rectal cancer induces changes in the expression of nuclear β -catenin: Prognostic significance

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Objective. Locally advanced rectal cancer (LARC) treated with preoperative radio-chemotherapy (RT-CT) produces a wide range of disease control rates, and mechanisms of tumor resistance are not fully understood. Our goal is to investigate the prognostic value of the expression of β -catenin and E-cadherin at the time of diagnosis and after RT-CT, to ascertain whether RT-CT induces