

# Immune system and prostate signalome in a rat model of prostate cancer: influence of lifelong exercise training

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This work aimed to understand how lifelong exercise training promotes the remodelling of the immune system and prostate signalome in a rat model of prostate cancer (PCa). Fifty-five male Wistar rats were divided into four groups: control sedentary, control exercised, induced PCa sedentary and induced PCa exercised. Exercised animals were trained in a treadmill for 53 weeks. PCa induction consisted on the sequential administration of flutamide, N-methyl-N-nitrosourea and testosterone propionate implants. Serum concentrations of C-reactive protein (CRP) and tumor necrosis factor (TNF)-like weak inducer of apoptosis (TWEAK) were not different among groups. Peripheral levels of  $\gamma\delta$  T

cells were higher in PCa exercised group than in the PCa sedentary group ( $p < 0.05$ ). Exercise training also induced Oestrogen Receptor (ESR1) upregulation and Mitogen-activated Protein Kinase 13 (MAPK13) downregulation, changed the content of the phosphorylated (at Ser-104) form of this receptor (coded by the gene ESR1) and seemed to increase ER $\alpha$  phosphorylation and activity in exercised PCa rats when compared with sedentary PCa rats. Our data highlight the exercise-induced remodelling of peripheral lymphocyte subpopulations and lymphocyte infiltration in prostate tissue. Moreover, exercise training promoted the remodelling of prostate signalome in this rat model of prostate carcinogenesis.

## Funding:

This work was supported by European Investment Funds by FEDER/ COMPETE/POCI - Operational Competitiveness and Internationalization Program and National Funds by FCT - Portuguese Foundation for Science and Technology, under the projects Project RUNawayPCa (POCI-01-0145-FEDER-016728 and PTDC/DTP-DES/6077/2014), the research units: CITAB (UIDB/04033/2020), Inov4Agro (LA/P/0126/2020), CECAV (UIDB/CVT/00772/2020), AL4AnimalS (LA/P/0059/2020), LAQV (UIDB/50006/2020), CIAFEL (UIDB/00617/2020), ITR (LA/P/0064/2020), iBiMED (UIDB/04501/2020) and PhD fellowship to E.N.G. (SFRH/BD/136747/2018).