Esposizione alla nicotina, invecchiamento, machine learning e blockchain solution: un approccio multilivello basato su modelli in vitro e pazienti per costruire una road map del rischio perCovid-19 (IFT

Nicotine Changes Airway Epithelial Phenotype and May Increase the SARS-COV-2 Infection Severity

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Abstract:

Background: Nicotine is implicated in the SARS-COV-2 infection through activation of the α7-nAChR and over-expression of ACE2. Our objective was to clarify the role of nicotine in SARS-CoV-2 infection exploring its molecular and cellular activity.

Methods: HBEpC or si-mRNA-α7-HBEpC were treated for 1 h, 48 h or continuously with 10−7 M nicotine, a concen- tration mimicking human exposure to a cigarette. Cell viability and proliferation were evaluated by trypan blue dye exclusion and cell counting, migration by cell migration assay, senescence by SA-β-Gal activity, and anchorage-independent growth by cloning in soft agar. Expression of Ki67, p53/phospho-p53, VEGF, EGFR/pEGFR, phospho-p38, intracellular Ca2+, ATP and EMT were evaluated by ELISA and/or Western blotting.

Results: nicotine induced through α7- nAChR

(i) increase in cell viability,
(ii) cell proliferation,
(iii) Ki67 over-expression,
(iv) phospho- p38 up-regulation,
(v) EGFR/pEGFR over-expression,
(vi) increase in basal Ca2+ concentration,
(vii) reduction of ATP production,
(viii) decreased level of p53/phospho-p53,
(ix) delayed senescence,
(x) VEGF increase,
(xi) EMT

and consequent

(xii) enhanced migration,

and

(xiii) ability to grow independently of the substrate.

Conclusions: Based on our results and on evidence showing that nicotine potentiates viral infection, it is likely that nicotine is involved in SARS-CoV-2 infection and severity.

References: https://doi.org/10.3390/ molecules26010101

Keywords: Cell Proliferation; EMT; Mitochondrial Dysfunction; nAChR; Nicotine; SARS-CoV-2

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