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OPINION

GK1: An Alternative Treatment to Control the Respiratory Complications During COVID19

Considering the emergence of the global Covid-19 pandemic and the current lack of vaccines and therapies partially effective to treat severe cases, we would like to consider the use of GK-1, a novel peptide that we have found to enhance and immunomodulate the immune response to an antigenic challenge of different sources.

We summarize below the most relevant points of basic biomedical knowledge about this GK-1 peptide that underlie our proposal.

GK-1 is a synthetic peptide of 18 amino acids (GYYYPSDPNTFYAPPYSA) identified by our research group in the *Taenia crassiceps* cestode that is part of the effective synthetic vaccine against *Taenia solium* porcine cysticercosis (1). Unexpectedly, GK-1 induced high level of protection against experimental cysticercosis in vaccinated mice without the requirement of any adjuvant (2).

The GK-1 co-immunization with the human influenza vaccine increased the titer of IgG specific antibodies and the specific cellular immunity and increased the protection in mice (3,4). Indeed, it was observed that GK-1 promotes the infiltration of mononuclear cells (lymphocytes and macrophages) into the lung parenchyma a few days after influenza infection in mice immunized together with the influenza vaccine; a response that could be related to the resolution capacity of the lung infection (3). The increase in the vaccination efficiency seem to lie in the ability of GK-1 to promote in dendritic cells (5) and macrophages (6) a better antigen presentation to T lymphocytes, through the increase of the expression of MHC-II, molecules costimulators like CD86, and the secretion of pro-inflammatory soluble factors such as IFN- γ , TNF- α , and MCP-1 (4), this last involving the phosphorylation of MAPK p38, JNK and ERK 1/2 and in Myd88-dependent activation of NF- κ B (5).

Besides, GK-1 significantly increases life expectancy, reduces tumor growth in mice with melanoma and breast cancer (7,8) and the number of macrometastasis in lung in mice with breast cancer. These effects could be probably occurred through the downregulation of the PD-1/PD-L1 pathway and the increased activation and cytotoxic activity of CD8 + lymphocytes in both murine models (9).

Stability studies reveal that GK-1 is stable over a wide range of temperatures and pH and lyophilized can be kept at room temperature (10) and pre-clinical studies demonstrated that is harmless and not mutagenic (11).

The effect of GK-1 on the possible potentiation of the specific immune response in COVID-19 is supported by the observation that co-immunization of influenza vaccine with GK-1 increased the specific humoral and cellular immune response against the influenza virus (3,4). The ability of GK-1 to activate macrophages and dendritic cells optimizing their antigenic presentation (5,6) could underlie the immunoenhancing effect. Moreover, GK-1 also exhibited immunomodulatory properties, either by promoting the induction of a M1 temporal phenotype that later shifted to a regulatory M2 phenotype that could help in reducing the cytokine storm in COVID-19.

Considering the findings that support the ability of GK-1 to boost immunity in different experimental circumstances and different species, as well as its safety, we would like you to consider the use of this new biological tool as a possible immunomodulator against Covid-19 that are under development or as an immunopotentiator to favor the resolution of Covid-19 respiratory complications. Our team are keen to collaborate with any efforts to evaluate, under strict monitoring protocols, the potential of GK-1 as an immunopotentiating treatment in human volunteers infected with the Coronavirus strains of high-risk conditions.

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