# Influenzinum 9CH and 15CH: "Boosters" of the immune response

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#### INTRODUCTION

Homeopathic medicines are traditionally used in medical practice to strengthen immunity and reduce inflammation. In particular, Influenzinum, homeopathic dilution of the current year's influenza vaccine, is used in clinical practice both for the prevention of influenza-like illness, the management of possible symptoms following an anti-influenza vaccination and post-infectious convalescence<sup>(1)</sup>.

#### **OBJECTIVE**

Evaluating the in vitro effect of homeopathic dilutions of Influenzinum 9CH and 15CH on biological markers of cellular inflammation: MCP-1 and IL-6, produced by macrophages, ICAM-1 by endothelial cells and reactive oxygen species (ROS) by microglial cells.

#### METHODS & RESULTS **Inflammation** Harvesting and **Treatment** Macrophages LPS + IFNγ cytokines assays differentiation THP-1 macrophages T-1h T0h T+24h Plate reader LPS+IFN $\gamma$ LPS+IFN γ Monocyte Chemoattractant protein-1: Chemokine involved MCP-1 in recruiting monocytes +34% with Influenzinum 9CH – production 2022 129 121 101 100 103 Interleukin 6: pro-inflammatory cytokine of innate 100 104 50 50 immunity +26% with Influenzinum 9CH – production 2022 Influenzinum 15CH - 2022 Influenzinum 9CH - 2023 Influenzinum 9CH - 2022 Influenzinum 15CH - 2022 Influenzinum 9CH - 2023 Influenzinum 9CH - 2022 Anti-inflam matory Anti-inflammatory LPS+IFNY \* p<0.05; \*\*p<0.01; \*\*\*\*p<0,0001; N=3 independent experiments **Endothelial** cells Microglial cells **Inflammation** Harvesting and ICAM-1 **Inflammation Treatment** CellROX **Treatment** $TNF\alpha$ **ELISA** T-4h T+16h T+16h T0h T-4h T0h Plate reader Microscope TNF- $\alpha$ LPS 250 **•** InterCellular Adhesion Molecule -1 allows the adhesion of ICAM-1 leukocytes to the surface of the endothelium during production (ratio vs untreated) inflammation ICAM-1 (Ratio vs untreated) ≈-20% with Influenzinum 9CH (productions 2022 and 2023) ≈-20% with Influenzinum 15CH 157 (production 2022) 2.5 132 **150** 125 119 Reactive Oxygen Species: a type of unstable molecule that contains oxygen and that easily reacts with 1.5 1.6 107 ROS other molecules in a cell. $H_2O_2$ , $HO^{\bullet}$ , $O_2$ . Excess of ROS (oxidative stress) induces inflammation. Influenzinum 15CH - 2022 Influenzinum 9CH - 2023 -26 to -40% with Influenzinum 9CH and 15CH (productions 2022 and 2023)

### CONCLUSIONS

- Influenzinum 9CH-2022 increases the production of MCP-1 and IL-6 which promote the differentiation, maturation and migration of monocytes.
- Influenzinum 9CH-2022 and 2023 and 15CH-2022 decrease ICAM-1 production involves in the migration and fixation of leukocytes.
- Influenzinum has antioxidant effects.

Overall, Influenzinum has a boosting effect on various biological parameters of innate immunity.

Reference: 1, Demarque D, Jouanny J, Poitevin B, Saint-Jean Y, Masson JL. Pharmacology & Homeopathic Materia Medica, (3rd Ed.), 2003, 442

IFN $\gamma$ : Interferon gamma, LPS: lipopolysaccharide, TNF $\alpha$ : tumor necrosis factor alpha



\* p<0.05; \*\*p<0.01; \*\*\*\*p<0.001; \*\*\*\*p<0.0001; N=3 independent experiments