**Supplementary Table S1.** Selection of pathogens and pathogen-derived vaccines that elicit a trained immunity effect.

| Pathogen Species | Pathogens (1st Stimulus) | Host Species | Cell Type | Biological/Immunological Effects | References |
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| BACTERIA | BCG vaccine | Human and mice | Monocytes Macrophages NK-cells | • Induction of non-specific protection against various infections beyond tuberculosis, such as yellow fever and malaria, e.g., due to enhanced cytokine production upon a 2nd stimulus. | [24,25,26] |
| | *Salmonella typhii* vaccine | Human | Monocytes | • Oral vaccination with attenuated Salmonella typhii causes a reaction to a second non-specific stimulus with increased cytokine production, and enhanced expression of TLR4/5, as well as multiple surface markers on monocytes. | [27] |
| | *Pseudomonas aeruginosa* | Human | Epithelial cells | • Exposure of respiratory epithelial cells with P. aeruginosa modulated their response to a subsequent different stimulus.<br>• Employing inhibitors of histone acetyltransferase and methyltransferase, epigenetic regulation was assumed as the reason. | [16] |
| | *Acinetobacter baumannii* | Mouse | Macrophages | • Intranasal vaccination can induce a training effect in alveolar macrophages and protected against subsequent infection not only with A. baumanii but also with P. aeruginosa.<br>• Enhanced TLR4- and TNF-$\alpha$ expression was observed in RAG-1 deficient mice. | [17] |
| | *Neisseria gonorrhoe* | Human | Macrophages | • Epigenetic modifications, like enriched H3K9ac, were detetected, indicating that N. gonorrhoe leads to a trained immunity phenotype in macrophages. | [18] |
| VIRUSES | Measles vaccine | Human | | • Mortality studies in developing countries suggest that the measles vaccine may provide a broad general positive impact on mortality | [28] |

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| | | | | rates, independent of its targeted protection against measles. | |
| | Smallpox vaccine | Human | | • Immunization correlated with improved long-term survival in a high-income country, not accountable for by the vaccine's specific protective effects. | [29] |
| | Oral polio vaccine (OPV) | Human | | • Vaccination with OPV reduces all course child-hood mortality in developing-countries. | [30] |
| | Influenza vaccine | Human | Monocytes | • Influenza vaccination was linked to a reduction in SARS-CoV-2 infections and an improved immune response concerning various viral stimuli.<br>• In addition to adaptation in surface molecules of monocytes, decreased production of Il-1ß and IL-6 and additionally an increase in IL-1-RA could be shown. | [31] |
| | Herpesvirus | Mice | Macrophages | • Protection against a subsequent infection with Listeria monocytogenes and Yersinia pestis due to enhanced production of IFN- γ and activation of macrophages. | [19] |
| | Hepatitis B virus | Human | Monocytes | • Exposure of newborns to HBV in utero appears to trigger a state of trained immunity.<br>• In vitro analyses revealed that umbilical cord blood exhibited heightened responsiveness to bacterial infection, evidenced by alterations in cytokine production, for instance. | [20] |
| FUNGI | *Candida albicans* | Mouse | Monocytes | • ß-glucan in fungal cell wall triggers alterations in the genetic expression of immune-related genes, leading to heightened cytokine production in monocytes. | [21] |
| | *Cryptococcus neoformans* | Mouse | Dendritic cells | • Enhanced proinflammatory cytokine production, such as IFN-γ, associated with | [22] |

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| | | | | epigenetic changes in response to a 2nd stimulus. | |
| PARASITES | *Plasmodium falciparum* | Human | PBMCs | • After exposure to Plasmodium falciparum, the response of PBMCs was increased when exposed to TLR2 stimulation. Characteristic epigenetic and metabolic alterations associated with a trained immunity phenotype have been identified. | [23] |