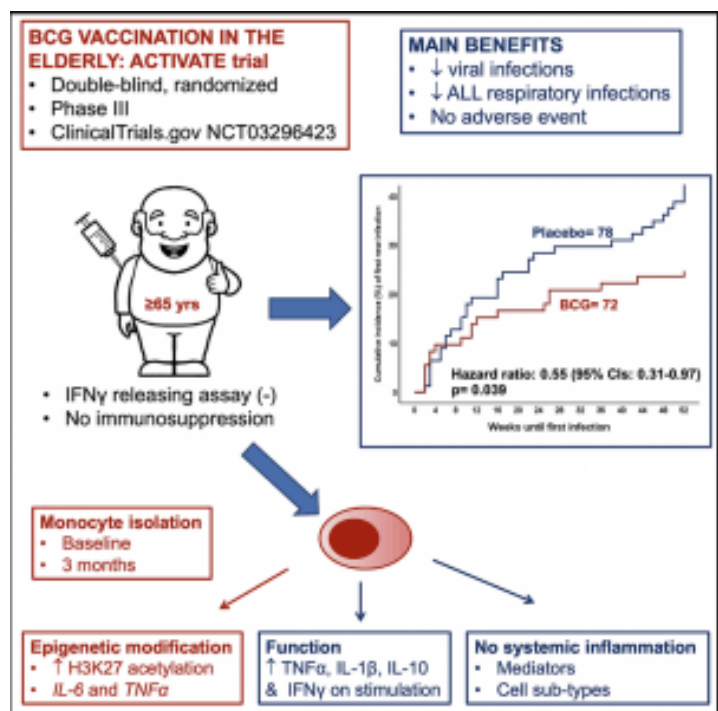
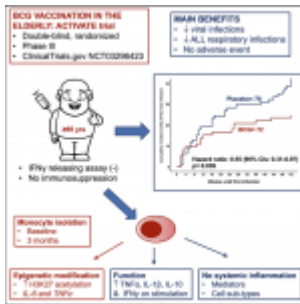


BCG vaccination reduces infection in the elderly



Giamarellos-Bourboulis et al., 2020. Graphical Abstract

Vaccines that contain live attenuated viruses or bacteria such as oral polio, measles, and Bacillus Calmette-Guérin vaccines are associated with a lower risk of respiratory infections and lower all-cause mortality in infants. These non-specific effects are mediated by trained immunity.

Trained immunity is the non-specific resistance to infection conferred by innate immune cells. Mechanistic studies have attributed trained immunity to epigenetic reprogramming that

occurs when innate immune cells are activated by infection or vaccination ([Netea et al., 2016](#)). This epigenetic reprogramming results in enhanced inflammatory and antimicrobial properties in innate cells when encountered with secondary stimuli.

The elderly are very susceptible to infections. Many researchers have suggested that vaccine-induced trained immunity could be a potential strategy to reduce the incidence of infection in the elderly. To determine if this is possible, researchers designed a clinical trial (ACTIVATE) that vaccinated elderly hospitalized patients on the day of hospital discharge with a single dose of placebo or BCG and followed-up for 12 months. The first participant was recruited in 2017 and the last patient visit was scheduled for August 2020. However, due to the COVID-19 pandemic researchers performed an interim analysis to determine if BCG vaccination had non-specific protection against any infection.

They showed that elderly BCG vaccination is safe and reduces the time to acquiring infections as well as reducing the incidence of respiratory infections. This *protective* effect was mediated by trained immunity. Specifically, they demonstrated BCG-induced epigenetic modifications and functional changes that resulted in higher pro-inflammatory responses by monocytes (see image).

Journal Article: Giamarellos-Bourboulis et al., 2020.
[Activate: Randomized Clinical Trial of BCG Vaccination against Infection in the Elderly.](#) Cell

Summary by Cheleka AM Mpande