Corona mRNA Vaccines, Elderly and Immunosenescence

The first mRNA vaccines against the SARS-CoV2 virus are about to be approved in the USA and Europe. In the United Kingdom, the Pfizer/ BioNTech BNT162 mRNA-based vaccine has already been approved. The manufacturers speak of an efficacy of 95 %. Does this mean that 95 people are protected out of 100 vaccinated people? At least that is what the manufacturers suggest and the media are spreading this message without criticism. But what does an effectiveness of 95% actually mean? The fundamental logic behind today's vaccine trials was worked out in 1900 by Karl Pearson an English mathematician and first used for the interpretation of a vaccine trail in 1915. (1)

The statistics explain how the mathematics behind the 95% works and why it does not mean that 95 out of 100 vaccinated people are protected. No clinical study has shown this! Behind every statistic is a kind of acrobatics. Or to quote a famous phrase describing the persuasive power of numbers:

There are three kinds of lies: lies, damned lies, and statistics.

Vaccine efficacy measures the risk reduction among vaccinated people during a clinical trial under ideal and controlled conditions. Vaccine effectiveness measures the risk reduction among vaccinated people under realistic field conditions, vaccination in the real world. The formula for efficacy/effectiveness is written as:

$$VE = \frac{ARU - ARV}{ARU} \text{ x } 100\ \%$$

VE – Vaccine efficacy/ effectiveness
ARU – Attack rate unvaccinated people
ARV – Attack rate vaccinated people

$$\text{Attack Rate} = \frac{\text{number of new cases in the population at risk}}{\text{number of persons at rik in population}}$$

Relative versus absolute risk reduction

"Specific data are not given but it is easy enough to approximate the numbers involved, based on the 94 cases in a trial that has enrolled about 40,000 subjects: 8 cases in a vaccine group of 20,000 and 86 cases in a placebo group of 20,000. This yields a Covid-19 attack rate of 0.0004 in the vaccine group and 0.0043 in the placebo group. Relative risk (RR) for vaccination = 0.093, which translates into a "vaccine effectiveness" of 90.7% [100(1-0.093)]. This sounds impressive, but the absolute risk reduction for an individual is only about 0.4% (0.0043-0.0004=0.0039).

The Number Needed To Vaccinate (NNTV) = 256 (1/0.0039), which means that to prevent just 1 Covid-19 case 256 individuals must get the vaccine; the other 255 individuals derive no benefit, but are subject to vaccine adverse effects, whatever they may be and whenever we learn about them……

We've already heard that an early effect of the vaccine is "like a hangover or the flu." Will vaccinees who are later exposed to coronaviruses have more severe illness as a result of antibody-dependent enhancement of infection (ADEI), a known hazard of coronavirus vaccines? Is there squalene in the Pfizer vaccine? If so, will vaccinees be subject to autoimmune diseases, like Gulf War Syndrome and narcolepsy that have been associated with the adjuvant?

We already know that current Covid-19 vaccine trials are unlikely to show a reduction in severe illness or deaths. (Doshi, BMJ 2020;371:m4037, October 21) Will they be like seasonal influenza vaccines, which have not proved to be lifesavers, and may even have increased overall mortality in the elderly? (Anderson et al, Ann Intern Med 2020;172:445) We need a lot more time and a lot more data, especially in view of massive uncertainties about Covid-19 case definitions and statistics." (2)

Where are the data?

"However, the full dataset on which the claim is based has not yet been released, and so we don't know exactly what has been found. The two companies are at pains to point out that the trial participants are ethnically diverse, which is good, but say nothing about the age of people in the trial. If a vaccine is to reduce severe disease and death, and thus enable the population at large to return to their normal day to day lives, it will need to be effective in older and elderly members of our society. We also know nothing yet about the severity of cases that were seen in the trial, whether infection or infectiousness was prevented, or how long the immunity is expected to last…" (3)

Immunosenescence and Vaccination

The immune system is one function of the body profoundly affected by aging. The reduced efficacy of vaccines in the elderly (>65 years) is generally attributed to immunosenescence. It involves both the host's capacity to respond to infections and the development of long-term immune memory, especially by vaccination. The decline in age-associated immune function on molecular, cellular and organismal changes is common to most if not all vertebrates, it's an evolutionary ubiquitous process which run in only one direction – a way of no return. Most of the parameters affected by immunosenescence appear to be under genetic control. The changes in B and T cells are illustrated in figure 1 and 2.

Consequently, older adults are more susceptible to infectious diseases. Age-associated immune changes take place in the innate and acquired immune systems and affect not only lymphocytes, but also myeloid cells with a change in pro-inflammatory cytokines. (4)

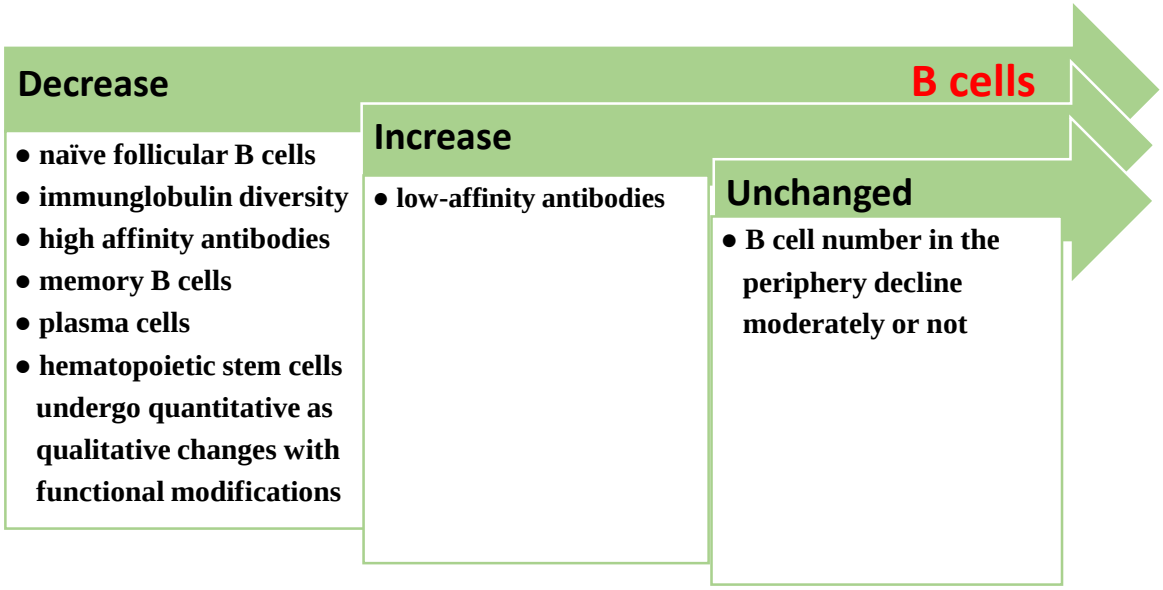

Figure 1: The age-related changes in the B cell life comprise quantitative and qualitative alterations and leads to a reduced immune responsiveness to vaccines.

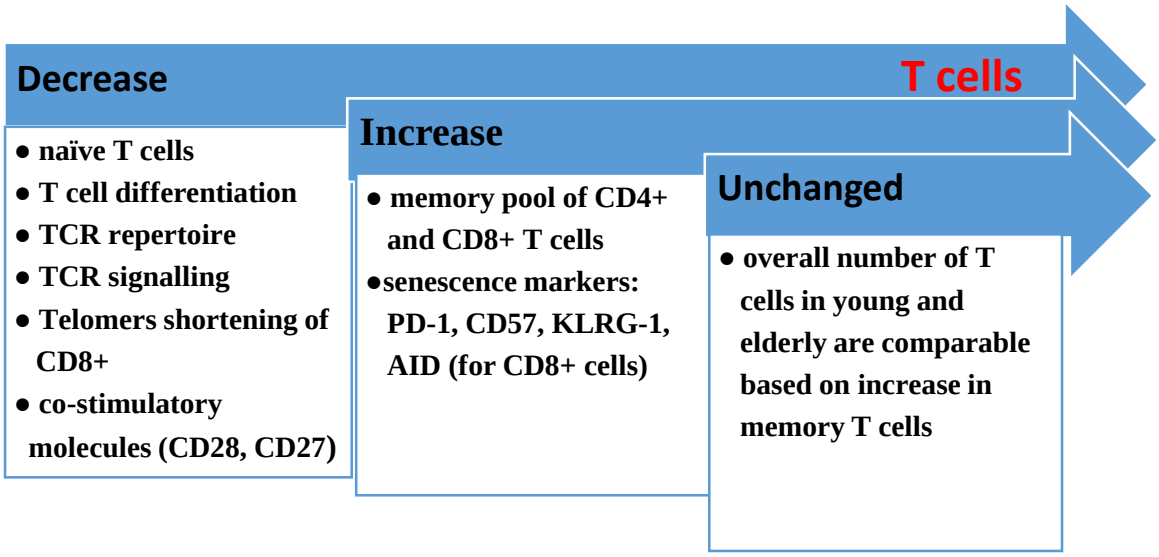

Figure 2: The age-related changes in the T cell life comprise quantitative and qualitative alterations and leads to a reduced immune responsiveness to vaccines.

(Figures from: Introduction to Molecular Vaccinology. Matthias Giese. Springer, 2016)

Vaccination and natural barriers in elderly

The most radical hallmark of immunosenescence is the

reduced ability to respond to new antigens.

Further hallmarks are the accumulation of memory T cells and a lingering level of low-grade inflammation termed "inflamm-aging." An old person is immunologically not able to process a new antigen in such a way that a robust immune response is generated. So it is understandable that the reported effectiveness of a seasonal Flu vaccine in old people is in the range of 10% only or less. (5,6)

Miraculous secrets of mRNA vaccines…

According to the evolutionary theory of aging the genetic program is optimized for reproduction and not for aging. In all vertebrates the emphasis of genomes is on reproduction, not post reproductive survival:

Aging is an irreversible biological process governed by genes.

Mostly we discuss the age-related reduction of immune functions only and ignore that the complete life cycle of all proteins is affected by aging processes:

All components of the translation apparatus are affected by aging.

It begins with a reduction of ribosomes with age and includes all steps up to the finished protein product. The age-related changes affect the complete translation cycle of mRNAs. Consequently, the translation rate of all mRNAs decreases. (7) Oddly enough, the mRNA vaccine should not be affected by these natural changes?

It borders on a miracle that a mRNA vaccine can trick the natural aging processes governed by genes.

If it is like this, then the mRNA vaccine would have to intervene in the gene regulation. But if the vaccine intervenes in the gene regulation, then it could be highly dangerous. It is high time for BioNTech, also for Moderna Inc. to explain the science behind these miracles.

…and the reality:

Sanofi and GlaxoSmithKline's COVID-19 vaccine - Low immune response in people aged 50 years and older

"Interim data from a phase 1/2 trial showed the vaccine triggered immune responses in people aged 18 to 49 years that were comparable to those seen in convalescent COVID-19 patients. However, Sanofi and GSK saw "a low immune response" in older adults…Sanofi and GSK have identified an insufficient concentration of the antigen as the likely cause of the weak data…" (8)

Whether the antigen concentration is causative for the "low immune response" is more than questionable in view of the immunosenescence.

The most radical hallmark of immunosenescence is the reduced ability to respond to new antigens.

Sanofi and GSK vaccine approach is based on a recombinant protein. The immunosenescence takes place regardless of the type of vaccine. We should learn from the low immune response of Flu vaccines in elderly and accept the molecular processes within us:

Aging is an evolutionary ubiquitous process running in only one direction – A WAY OF NO RETURN.

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