Vaccination - intended and non-intended consequences

Andrea Cooper
What do we want from our vaccine?

- **Limit infection** – requires active immune responses in the lung tissue
- **Limit consequences of infection** – requires rapidly recruitable and functional immune responses in the lung
- **Limit disease progression** - requires rapidly recruitable, functional immune responses in the lung that are regulated and effective for the duration of infection. Also limited systemic impact of the immune response.
- **Limit transmission** - requires rapidly recruitable and functional immune responses in the lung that are not damaging to the lung structure
What do we want from our vaccine?

- **Limit infection** – Novel immune responses/local antibody/innate lymphoid cells/circulating activated myeloid cells from the bone marrow
- **Limit consequences of infection** – memory T cells that can be recruited quickly and that can activate infected cells at the site
- **Limit disease progression** – Rapid expression of T cell/macrophage axis with dominant mononuclear inflammation. Minimal dissemination and limited induction of systemic inflammation
- **Limit transmission** - Rapid expression of T cell/macrophage axis with dominant mononuclear inflammation. Rapid and contained wound healing.
T cells that can enter into the parenchyma and migrate to the infected cells.
T cells that can persist in the lesion and continue to activate infected cells

What do we want from our vaccine?
Regulated immune responses that limit damage to the lung keeping disease local and avoiding transmission

What do we want from our vaccine?
To be better than natural immunity and to overcome natural variation.

90-95% who are infected do not develop disease.

What do we want from our vaccine?
Induce T cells that are protective for the duration of infection
What do we want from our vaccine?

Inducing cells that can enter the parenchyma and activate infected cells.
What do we want from our vaccine?

Cells that can persist in the parenchyma
Conclusions

- IL-27 receptor expression drives T cells to be less able to persist in the inflammatory site, less able to penetrate close to the infected cells and less able to control bacterial. (JEM PMID: 26282876)

- How do we induce these kinds of long term effective cells??
Thank you

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Egidio Torrado
Braga

Mingfeng Liao
Shenzhen

Mariana Resende
Porto

Prof Akhtar, Sadaf Sulman
Lahore