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Systemic vaccination with a tuberculosis subunit vaccine leads to a better containment of the bacterial load in lung of mice treated with retinoic acid

Silvia Vendetti[1], **Antonella Riccomi, Valentina Gesa, Elisa Cirelli, Else Marie Agger, Giovanni Piccaro** and **Carla Palma**
[1]Istituto Superiore di Sanità, Italy
Statens Serum Institute, Denmark

The vast majority of pathogens invade through or cause disease at mucosal surfaces. Development of novel immunization strategies suitable for mucosal vaccines is widely desired to protect against infectious diseases. However, very few mucosal vaccines are available for human use, none of which are recombinant proteins or subunits of pathogens, owing to the lack of potent and safe mucosal adjuvants. Therefore, novel approaches to elicit mucosal immune responses are highly needed. Given the crucial role of Vitamin A metabolites, such as retinoic acid (RA) in imprinting a mucosal homing capacity on T and B cells, we evaluated the capacity of RA to improve mucosal vaccinations against tuberculosis. We found that mice treated with RA as compared with untreated ones, showed enhanced mucosal (IgA) H56 mycobacterial fusion protein-specific antibody responses and enhanced Ag-specific CD4+ T lymphocytes harbouring the lung after systemic immunization with the TB subunit vaccine (CAF01 and H56). Therefore, we evaluated the effects of RA on protection against challenge with virulent *Mycobacterium tuberculosis* (Mtb) strain after systemic vaccination with the TB subunits vaccine (CAF01 and H56). Vaccination with BCG was included in the experiment as control. We found that immunization with CAF01 and H56 in presence of RA leads to a lower bacterial colonization in the lungs 14 days after challenge as compared to control mice. Furthermore, higher pro-inflammatory cytokine production, such as IFNγ and IL-17 was found in the lung of mice immunized with CAF01 and H56 in presence of RA 24h after Mtb infection. Therefore, we hypothesize that the mucosal immune responses elicited during vaccination in presence of RA could have an impact on the containment of bacterial growth in the lungs. This approach can contribute to progress beyond the state of the art in adjuvant research by achieving mucosal immunity in the absence of mucosal adjuvants.

Biography

Silvia Vendetti has completed her thesis from University "La Sapienza" Rome, Italy, her PhD in Immunopharmacology and Postdoctoral studies from University of Palermo, Italy and Imperial College School of Medicine, UK. She is senior research scientist at Department of Infectious, Parasitic and Immune-mediated Diseases, Instituto Superiore di Sanità, Rome, Italy. She has published more than 40 papers in reputed international peer reviewed journals.

silvia.vendetti@iss.it

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