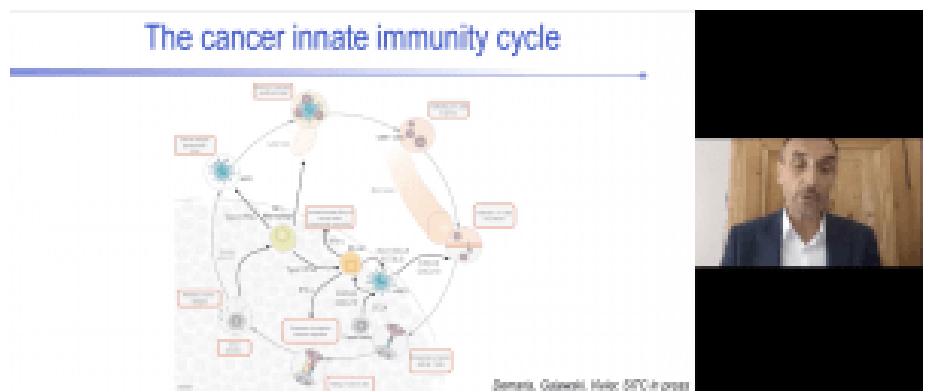


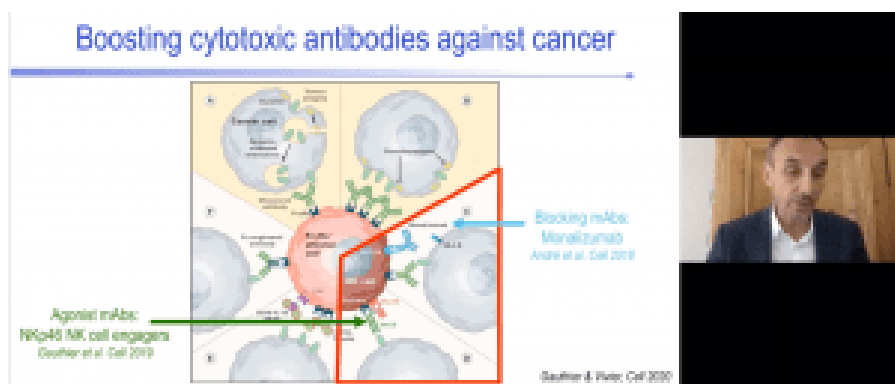
Harnessing innate immunity from cancer therapy to COVID-19

In this summary, we focus on the IUIS-Immunopaedia-Frontiers webinar talk by Eric Vivier on Harnessing innate immunity from cancer therapy to COVID-19.

Eric Vivier began his talk by giving an overview of why targeting innate cells may improve cancer immunotherapy. He showed that



Natural killer (NK) cells play a role in immune responses against cancer. Besides directly killing cancer cells independently or via antibody-dependent cellular cytotoxicity (ADCC), NK cells also release cytokines and chemokines which activate other innate cells involved in the induction of T cell-mediated immunity.



He gave an overview of the immunological basis of monoclonal antibodies, Monalizumab and Cetuximab, that target different

aspects of NK mediated immune responses. Monalizumab prevents the inhibition of NK/CD8 T cell activity my tumour cells by preventing the binding of HLA-E on tumour cells to NKG2A on

NK/CD8 T cells, while Cetuximab improves NK cell anti-tumour immune responses by recognising EGFR (molecule overexpressed on tumours cells) and binding to the FcγRIII/CD16 on NK cells activating NK cell-mediated ADCC. He then described a novel immunotherapy based on NKp46 NK cell engagers (NKCEs). This molecule can recognise tumour antigens and bind to both FcγRIII/CD16 and NKp46 receptor on NK cells resulting in ADCC and the release of cytokines/chemokines that contribute to the induction of adaptive T cells. He provided preliminary evidence that suggests that NKCEs could have a superior activity to current immunotherapies available.

Last year Eric Vivier gave an [IUIS webinar talk on Involvement of C5a-C5aR1 axis in COVID-19 pathology](#) (read

A model of C5a involvement in COVID-19

SARS-CoV-2 infects the human airway epithelium via the ACE2 receptors located primarily on type II pneumocytes.

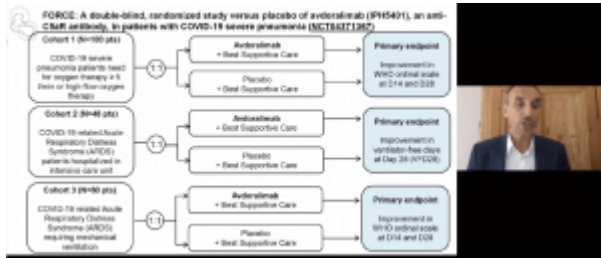
In **non-severe COVID-19**, the infection remains confined to the epithelium (epithelial disease), thanks to the efficient action of the innate immune system involving the complement system. C5a allows the recruitment of myeloid cells without triggering an inflammatory storm, and fibrinolysis is stimulated.

In **severe COVID-19**, SARS-CoV-2 overwhelms the immune system and crosses the epithelium to infect endothelial cells (endothelial disease). The innate immune system is overwhelmed. The myeloid cells recruited by C5a and endothelial cells release large amounts of IL-6. The COVID-19-related cytokine storm and endothelialitis-associated microthrombosis are triggered. The patient's condition worsens and the virus can infect other organs.

summary for more details). C5a plays a role in driving the pathogenesis of influenza-induced pneumonia and Acute respiratory distress syndrome (ARDS) by promoting infiltration of neutrophils and macrophages that get activated by a hyperinflammatory cytokine micro-environment. He then presented work that demonstrated that blocking of C5a activity using avdovalimab (anti-C5aR1 monoclonal antibody) reduces neutrophil migration and acute lung injury using a murine model. They are currently testing the utility of this immunotherapy against severe COVID-19 in clinical trials.

EXPLORE COVID-19: a translational study

- Most COVID-19 patients present only a few mild symptoms, but about 15% of patients progress to severe pneumonia, and about 5% develop acute respiratory distress syndrome (ARDS), for which effective therapeutic strategies are urgently required
- The immune system plays a dual role in COVID-19, contributing to both virus elimination and ARDS development
- EXPLORE COVID-19: a detailed characterization of the immune responses occurring during disease progression from mild to severe forms
- Repurposing of approved immunomodulatory drugs and candidate drugs already tested in clinical trials?



Summary by Cheleka AM Mpande