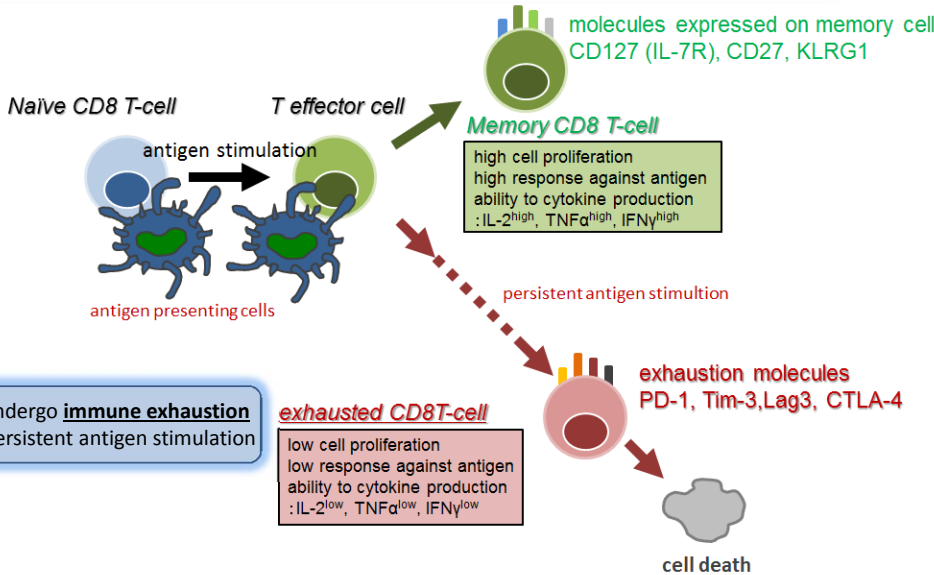


Cancer Immunotherapy with blocking of immune-exhaustion

Heiichiro UDONO, Shingo EIKAWA

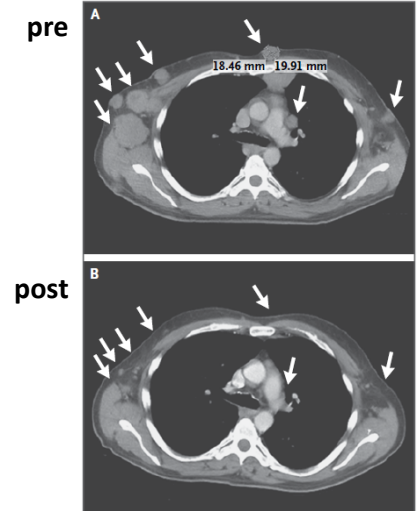
Department of Immunology,
Graduate School of Medicine, Dentistry and Pharmaceutical Sciences,
Okayama University

The mechanism of T-cell immune exhaustion



T-cells undergo **immune exhaustion** during persistent antigen stimulation

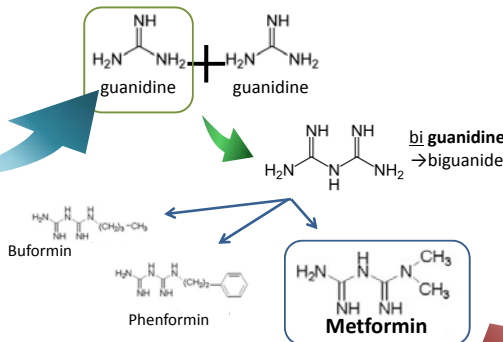
The chest showing tumor regression in a patient received the concurrent regimen of anti-CTLA-4 and anti-PD-1 (CT Scans)



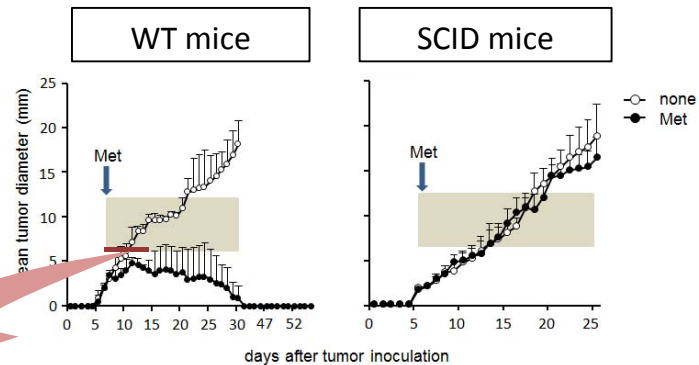
Wolchok JD et al. N Engl J Med. 2013 Jul 11;369(2):122-33

Metformin

Galega



Immune-mediated antitumor effects by Metformin



analysis

Metformin-induced reversion of exhausted T cells in tumor

Metformin prevents apoptosis of CD8⁺ TILs and induces effector memory phenotype with the ability to produce cytokine

