In vitro drug treatment to proliferate and activate effector cells for immunotherapy

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STAT5 SUMOylation inhibition increases CD4 and CD8 T-cell proliferation and and production of immune effector molecules in CD8 T-cells and NK (natural killer) cells. Both attributes address critical limiting factors in applying cell therapies to fighting cancers and pathogens. The difficulty of obtaining enough activated effector cells limits the efficacy of cell therapies. In vitro drug treatment of effector cells prior to administration to patients can overcome this deficiency. The technique is compatible with the full range of cell therapies, including genetically modified T cell therapy, like chimeric antigen receptor T cells (CAR T cells).

GW and University of Utah researchers found small molecules that block SUMOylation of STAT5-enhancing cytokine (growth factors secreted by the immune system) activity, and inducing cytotoxic molecules, such as granzyme B, which works as an agent in cell-killing of cancerous and infected cells. The compounds have a wide safe effective dose range to achieve positive effects on the immune cells without toxicity.

Applications:

- Improving immunotherapy treatment efficacy for cancer and HIV

Advantages:

- Increases number of T-cells to use in immunotherapy
- Increases cytotoxic activity of T-cells and NK cells
- Wide safety window for effective use without toxicity to the immune cells

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