GENETICALLY ENGINEERED MODELS (GEM)

NATURAL IMMUNO-DEFICIENT

WILD TYPE

NATURAL MUTANTS

MICE
Mutant inbred

NXG - hPBMC Mouse

Strain name: NOD-Prkdc^{scid}-*Il2rg*^{tm1}/Rj

Type: Inbred transgenic mouse, GEMM

Origin: Janvier Labs, in 2021

Colour and related genotype: Albino mouse

Grafted human cells: PBMCs

Presentation of the model

Peripheral blood mononuclear cells -engrafted mice are a benchmark for studying human immune responses in vivo. These innovative models seamlessly bridge the gap between conventional animal studies and clinical research by providing a robust platform to evaluate human immune cell dynamics.

Their applications span oncology, infectious diseases, and autoimmunity, offering unparalleled insights into tumor-immune interactions, host-pathogen mechanisms, and therapeutic responses. Leveraging cutting-edge protocols and immunodeficient strains like NXG mice, PBMC-engrafted models empower researchers with a powerful tool to decode complex immune mechanisms and accelerate the development of transformative therapies.

The NXG mouse model:

The NXG mouse is an inbred strain model on the NOD genetic background, sharing similarities with other strains like NSG, NcG, NOG (refer to the NXG technical sheet for greater details). It carries two crucial mutations: *Prkdc*^{scid}, known as "SCID," which inhibits T and B cell development, resulting in their absence; and *Il2rg*^{tm1}, a knockout of the interleukin-2 receptor subunit gamma gene, essential for various immune cells, causing severe immunodeficiency with the absence of T, B, and NK lymphocytic cells. Additionally, the NXG strain expresses the NOD variant of the Sirpa gene, promoting reduced phagocytosis of transplanted human cells due to cross-recognition with CD47 ligands on human cells.
All these factors contribute to establishing the NXG strain as one of the best performing models in the context of humanizing the immune system.

The humanization process:

Humanizing mice with PBMCs involves injecting NXG mice with these cells, resulting in the engraftment of a functional human immune system. This approach creates a robust platform for studying immune responses and human-specific diseases (Fig. A-B). The engrafted immune system exhibits a predominance of T cells (Fig. C), with a human-like balance between CD4+ and CD8+ cells (Fig. D). These T cells demonstrate a high level of activation, mimicking human immune responses (Fig. E).

Services:

The mice are injected with PBMCs at five weeks of age and are ready for shipment as early as two days post-injection. They are maintained in a Specific Opportunistic Pathogen-Free (SOPF) environment, and we can provide a full health status report from the production facility of origin.

On request, Janvier Labs offers customized engraftment with PBMCs carrying defined human leukocyte antigens (HLAs) or cells derived from patients with specific conditions such as Type 1 diabetes, Type 2 diabetes, rheumatoid arthritis and more. For more information, reach out to one of our representatives.

Main application and research fields

ONCOLOGY

IMMUNOTHERAPY

INFECTIOUS DISEASES

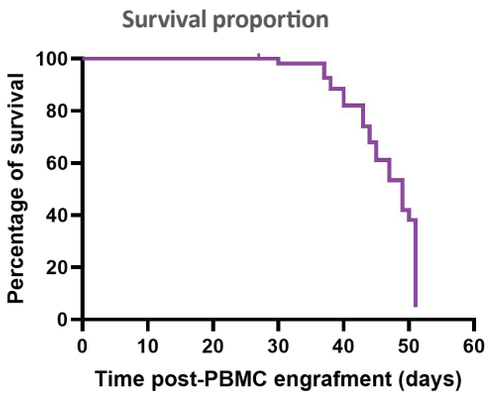
IMMUNOLOGY

AUTO-IMMUNE DISEASES

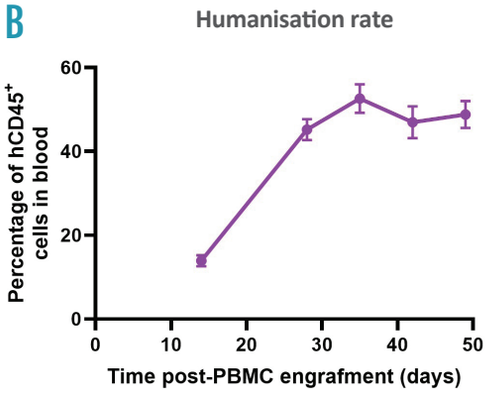
JANVIER LABS

Peripheral blood and weight

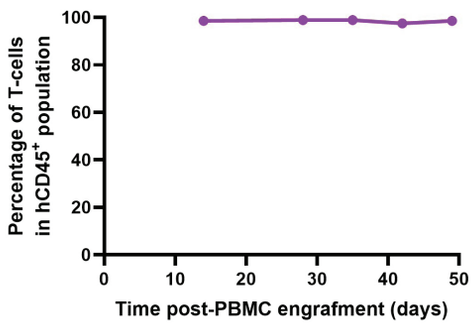
A



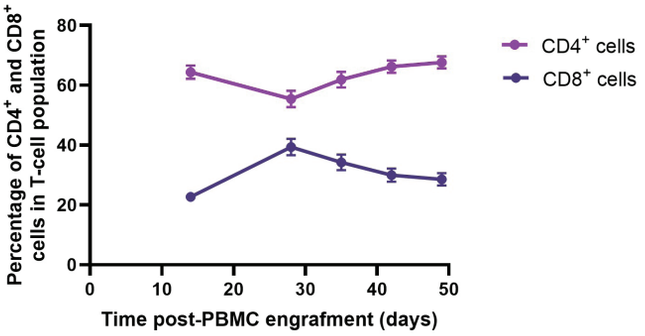
B



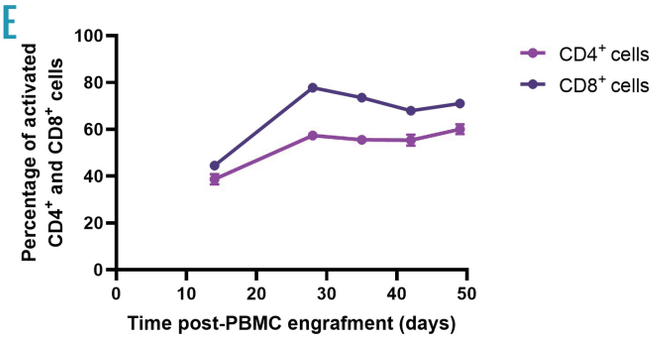
C



D



E



Assessment of Human Immune System Engraftment in NXG Mice Injected with Human PBMCs

Five-week-old NXG mice were injected with human PBMCs, and immune engraftment was monitored over time.

- (A) Survival curve of mice following PBMC injection, showing the proportion of mice surviving GvHD onset.
- (B) Humanization levels, represented by the percentage of hCD45+ cells in peripheral blood.
- (C) Percentage of human T-cells among the hCD45+ population.
- (D) Distribution of CD4+ and CD8+ cells within the human T-cell compartment.
- (E) Proportion of activated phenotypes (hCD4+ and hCD8+ T-cells) in peripheral blood.

Data points represent the mean values from 30 mice across two independent experiments, with error bars indicating the standard error of the mean (SEM).

contact@janvier-labs.com
Tel +33 (0)2 43 02 11 91
www.janvier-labs.com

V2024.10.22