ENVIGO

Research Models and Services

Oncology - Mutant Mice

SCID Models

The *scid* (severe combined immunodeficiency) mutation was discovered in a C.B-17/Icr congenic strain in 1980 by Dr. M.J. Bosma at the Fox Chase Cancer Center (Philadelphia, PA). Envigo SCID models are produced with flexible-film isolators and monitored for microbiologic integrity. SCID mice accept xenografts, making them a useful model for oncology, immunology, HIV pathology, and other fields of biomedical research.

Envigo SCID Mice

Research Use

+ Xenograft transplantation (1,4,6,7,8,10,11, 13,14,16,20,22,24,25,27,30,32,34,35,37)
+ Spontaneous tumors (36)
+ Cancer cell tumorigenesis (10,12,26,29,36)
+ Tumor angiogenesis (14,18,32)
+ Tumor metastatic potential (3,12,13,14,18,30,31,32,37)
+ Tumor suppression therapy (1,2,5,6,7,11,16,17,19,21,22,24,25,29,31,34,35)
+ Carcinogenesis regulation (20,23,33)
+ Tumor imaging (9)

BALB/cJHan®Hsd-*Prkdc*^{scid}
C.B-17/IcrHan®Hsd-*Prkdc*^{scid}
C.B-17/IcrHsd-*Prkdc*^{scid}

Model Characteristics

- Autosomal recessive, single nucleotide polymorphism within *Prkdc* gene on chromosome 16
- Severe combined immunodeficiency affecting T- and B-cell development
- Normal population and function of Natural Killer (NK), macrophage and granulocyte cells
- Incidence of "leaky" phenotype (spontaneous development of functional T- and B-lymphocytes) increases with age in some stocks and strains

C.B-17/IcrHsd-*Prkdc*^{scid} *Lyst*$^{bg-J}$

Model Characteristics

- Autosomal recessive, single nucleotide polymorphism within *Prkdc* gene on chromosome 16
- Autosomal recessive *beige (bg-J)* mutation on chromosome 13
- Diminished Natural Killer (NK) cell activity relative to other SCID models
- Severe combined immunodeficiency affecting T- and B-cell development
- Severe lymphopenia
- "Leaky" phenotype significantly suppressed relative to other SCID models

NOD.CB17-*Prkdc*^{scid}/NCrHsd

Model Characteristics

- *Prkdc*^{scid} mutation has been transferred onto a Non-Obese Diabetic mouse background
- Severe combined affecting T- and B-cell development
- Functional in Natural Killer (NK) cells and APC cells
- Absence of circulating complement
- High incidence of lethal thymic lymphomas
- Does not show signs of autoimmune diabetes
- Leakiness increase with age is minimal

References:

Aharinejad, S., Abraham, D., Paulus, P., Abri, H., Hofmann, M., Grossschmidt, K., et al. (2002). Colony-stimulating factor-1 antisense treatment suppresses growth of human tumor xenografts in mice. Cancer Research, 62, 5317-5324.

Annicotte, J., Iankova, I., Miard, S., Fritz, V., Sarruf, D., Abella, A., et al. (2006). Peroxisome proliferators-activated receptor γ regulates E-cadherin expression and inhibits growth and invasion of prostate cancer. Molecular and Cellular Biology, 26, 7561-7574.

Backhus, L. M., Sievers, E. S., Lin, G. Y., Castanos, R., Bart, R. D., Starnes, V. A., et al. (2006). Perioperative cyclooxygenase 2 inhibition to reduce tumor cell adhesion and metastatic potential of circulating tumor cells in non-small cell lung cancer. Journal of Thoracic and Cardiovascular Surgery, 132, 297-303.

Bastide, C., Bagnis C., Mannoni, P., Hassoun, J., & Bladou, F. (2002). A nod scid mouse model to study human prostate cancer. Prostate Cancer and Prostatic Diseases, 5, 311-315.

Boehle, A. S., Kurdow, R., Schulze, M., Kliche, U., Sipos, B., Soondrum, K., et al. (2001). Human endostatin inhibits growth of human non-small-cell lung cancer in a murine xenotransplant model. International Journal of Cancer, 94, 420-428.

Boenicke, L., Chu, K., Pauls, R., Tams, C., Kruse, M. L., Kurdow, R., et al. (2003). Efficient dose-dependent and time-dependent protein transduction of pancreatic carcinoma cells in vitro and in vivo using purified VP22-EGFP fusion protein. Journal of Molecular Medicine, 81, 205- 213.

Brignole, C., Pastorino, F., Marimpietri, D., Pagnan, G., Pistorio, A., Allen, T. M., et al. (2004). Immune cell–mediated antitumor activities of GD2-targeted liposomal c-myb antisense oligonucleotides containing CpG motifs. Journal of the National Cancer Institute, 96, 1171-1180.

Campbell, R. A., Manyak, S. J., Yang, H. H., Sjak-Shie, N.N., Chen, H., Gui, D., et al. (2006). LAGλ-1: A clinically relevant drug resistant human multiple myeloma tumor murine model that enables rapid evaluation of treatments for multiple myeloma. International Journal of Oncology, 28, 1409-1417.

Chen, X., Sievers, E., Hou, Y., Park, R., Tohme, M., Bart, R., et al. (2005). Integrin αvβ3-targeted imaging of lung cancer. Neoplasia, 7, 271-279.

Devoogdt, N., Ghassabeh, G. H., Zhang, J., Brys, L., de Baetselier, P., & Revets, H. (2003). Secretory leukocyte protease inhibitor promotes the tumorigenic and metastatic potential of cancer cells. PNAS, 100, 5778-5782.

Forest, V., Peoc'h. M., Campos, L., Guvotat, D., & Vergnon, J. M. (2005). Effects of cryotherapy or chemotherapy on apoptosis in a non-small-cell lung cancer xenografted into SCID mice. Cryobiology, 50, 29-37.

Geldhof, A. B., Ginderachter, P. V., Raes, G., & De Baetselier, P. (1998). Multiple effects of transfection with interleukin 2 and/or interferon γ on the behavior of mouse T lymphoma cells. Clinical Experimental Metastasis, 16, 447-459.

Goya, M., Miyamoto, S., Magai, K., Ohki, Y., Nakamura, K., Shitara, K., et al. (2004). Growth inhibition of human prostate cancer cells in human adult bone implanted into nonobese diabetic/ severe combined immunodeficient mice by a ligand-specific antibody to human insulin-like growth factors. Cancer Research, 64, 6252-6258.

Guba, M., Cernaianu, G., Koehl, G., Geissler, E. K., Jauch, K., Anthuber, M., et al. (2001). A primary tumor promotes dormancy of solitary tumor cells before inhibiting angiogenesis. Cancer Research, 61, 5575-5579.

Jansen, B., Heere-Ress, E., Schlagbauer-Wadl, H., Halaschek-Wiener, J., Waltering, S., Moll, I., et al. (1999). Farnesylthiosalicylic acid inhibits the growth of human Merkel cell carcinoma in SCID mice. Journal of Molecular Medicine, 77, 792-797.

Kaufmann, R., Hainzl, A., Sterry, W., Alberti, S., & Klein, C. E. (1994). In vivo targeting of integrin receptors in human skin xenografts by intravenously applied antibodies. Archives of Dermatological Research, 286, 6-11.

Kogai, T., Kanamoto, Y., Che, L. H., Taki, K., Moatamed, F., Schultz, J. J., et al. (2004). Systemic retinoic acid treatment induces sodium/iodide symporter expression and radioiodide uptake in mouse breast cancer models. Cancer Research, 64, 415-422 18. Koivunen, E., Arap, W., Valtanen, H., Rainisalo, A., Medina, O. P., Heikkila, P., et al. (1999). Tumor targeting with a selective gelatinase inhibitor. Nature Biotechnology, 17, 768-774.

Kremer, M., Quintanilla-Martinez, L., Fuchs, M., Gamboa-Dominguez, A., Haye, S., Kalthoff, H., et al. (2003). Influence of tumor-associated E-cadherin mutations on tumorigenicity and metastasis. Carcinogenesis, 24, 1879-1886.

Lozupone, F., Pende, D., Burgio, V. L., Castelli, C., Spada, M., Venditti, M., et al. (2004). Effect of human natural killer and γδ T cells on the growth of human autologous melanoma xenografts in SCID mice. Cancer Research, 64, 378-385.

Luciani, F., Spada, M., De Milito, A., Molinari, A., Rivoltini, L., Montinaro, A., et al. (2004). Effect of proton pump inhibitor pretreatment on resistance of solid tumors to cytotoxic drugs. Journal of the National Cancer Institute, 96, 1702-1713.

Moser, C., Schmidbauer, C., Gürtler, U., Cross, C., Gehrmann, M., Thonigs, G., et al. (2002). Inhibition of tumor growth in mice with severe combined immunodeficiency is mediated by heat shock protein 70 (Hsp70)-peptide–activated, CD94 positive natural killer cells. Cell Stress & Chaperones, 7, 365-373.

Ochiai, M., Ubagai, T., Kawamori, T., Imai, H., Sugimura, T., & Nakagama, H. (2001). High susceptibility of SCID mice to colon carcinogenesis induced by azoxymethane indicates a possible caretaker role for DNA-dependent protein kinase. Carcinogenesis, 22, 1551-1555.

Peng, K., Ahmann, G. J., Pham, L., Greipp, P. R., Cattaneo, R., & Russell, S. J. (2001). Systemic therapy of myeloma xenografts by an attenuated measles virus. Blood, 98, 2002-2007.

Piechocki, M. P., Lonardo, F., Ensley, J. F., Nguyen, T., Kim, H., & Yoo, G. H. (2002). Anticancer activity of docetaxel in murine salivary gland carcinoma. Clinical Cancer Research, 8, 870-877.

Prochazka, M., Gaskins, H. R., Shultz, L. D., & Leiter, E. H. (1992). The nonobese diabetic scid mouse: Model for spontaneous thymomagenesis associated with immunodeficiency. PNAS, 89, 3290-2394.

Rebouissou, C., Wijdenes, J., Autissier, P., Tarte, K., Costes, V., Liautard, J., et al. (1998). A gp130 interleukin-6 transducerdependent SCID model of human multiple myeloma. Blood, 91, 4727-4737.

Santin, A. D., Cané, S., Bellone, S., Palmieri, M., Siegel, E. R., Thomas, M., et al. (2005). Treatment of chemotherapyresistant human ovarian cancer xenografts in C.B-17/ SCID mice by intraperitoneal administration of Clostridium perfringens enterotoxin. Cancer Research, 65, 4334-4342.

Schniewind, B., Heintz, K., Kurdow, R., Ammerpohl, O., Trauzold, A., Emme, D., et al. (2006). Combination phenylbutyrate/ gemcitabine therapy effectively inhibits in vitro and in vivo growth of NSCLC by intrinsic apoptotic pathways. Journal of Carcinogenesis, 5, 25.

Seftor, E. A., Seftor, R. E., Nieva, D. R., & Hendrix, M. J. (1998). Application of chemically modified tetracyclines (CMTs) in experimental models of cancer and arthritis. Advances in Dental Research, 12, 103-110.

Seftor, R. E. B., Seftor, E. A., De Larco, J. E., Kleiner, D. E., Leferson, J., Stetler-Stevenson, W. G., et al. (1998). Chemically modified tetracyclines inhibit human melanoma cell invasion and metastasis. Clinical and Experimental Metastasis, 16, 217-225.

Shoenfeld, Y., & Fishman, P. (1999). Gamma-globulin inhibits tumor spread in mice. International Immunology, 11, 1247-1251.

Takizawa, Y., Saida, T., Tokuda, Y., Dohi, S., Ikegawa, S., & Ueyama, Y. (1995). Engraftment of precursor lesions of human cutaneous neoplasms onto C.B-17 SCID mice: A useful in vivo experimental model of carcinogenesis in human skin. Archives of Dermatological Research, 287, 237-241.

Thallinger, C., Wolschek, M. F., Wachek, V., Maierhofer, H., Gunsberg, P., Polterauer, P., et al. (2003). Mcl-1 antisense therapy chemosensitizes human melanoma in a SCID mouse xenotransplantation model. The Journal of Investigative Dermatology, 120, 1081-1086.

Wacheck, V., Heere-Ress, E., Halaschek-Wiener, J., Lucas, T., Meyer, H., Eichler, H. G., et al. (2001). Bcl-2 antisense oligonucleotides chemosensitize human gastric cancer in a SCID mouse xenotransplantation model. Journal of Molecular Medicine, 79, 587-593.

Williams, S. S., Alosco, T. R., Croy, B. A., & Bankert, R. B. (1993). The study of human neoplastic disease in severe combined immunodeficient mice. Laboratory Animal Science, 43, 139-146.

Wu, T. T., Sikes, R. A., Cui, Q., Thalmann, G. N., Kao, C., Murphy, C. F., et al. (1998). Establishing human prostate cancer cell xenografts in bone: Induction of osteoblastic reaction by prostate-specific antigen-producing tumors in athymic and SCID/ bg mice using LNCaP and lineage-derived metastatic sublines. International Journal of Cancer, 77, 887-894.

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