

## MOUSE MODEL FOR THE PRECLINICAL STUDY OF METASTATIC DISEASE

### SUMMARY

The Laboratory of Cancer Biology and Genetics, National Cancer Institute seeks partners for collaborative research to co-develop a mouse model that shows preclinical therapeutic response of residual metastatic disease.

### REFERENCE NUMBER

E-296-2012

### PRODUCT TYPE

- Research Materials

### KEYWORDS

- neoplasm
- treatment outcome
- carcinoma
- non small cell lung

### COLLABORATION OPPORTUNITY

This invention is available for licensing.

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### DESCRIPTION OF TECHNOLOGY

The successful development of new cancer therapeutics requires reliable preclinical data that are obtained from mouse models for cancer. Human tumor xenografts, which require transplantation of human tumor cells into an immune compromised mouse, represent the current standard mouse model for cancer. Since the immune system plays an important role in tumor growth, progression and metastasis, the current standard mouse model is not ideal for accurate prediction of therapeutic effectiveness in patients. This may contribute to increased failure in later phases of clinical trials, as appropriate tumor-host interactions are not preserved.

This technology developed by the NCI's [Laboratory of Cancer Biology and Genetics](#) establishes a system for producing mouse cancer models where the model is not immune compromised, providing an environment which is more akin to the disease state of cancer patients. To establish the model, a tumor is

(a) developed in tissue that has been propagated by serial transplantation (rather than cell culture), (b) labeled (using lentiviral vectors) with bioimaging markers (e.g., green fluorescent protein (GFP) and luciferase), and (c) transplanted into immunocompetent mice. Once established, the model can be used to monitor tumor growth, progression and metastasis through standard imaging techniques. The effectiveness of a given therapeutic approach can also be monitored using the same techniques.

Available data include *in vitro*, *in vivo* (animal and human), and *in situ* (on-site). The model is available as a prototype.

## POTENTIAL COMMERCIAL APPLICATIONS

Improved mouse model for preclinical testing of drugs to treat metastatic disease; Can be applied to any cancer where tumor cell lines can be developed without cell culture propagation; Can be used to build preclinical models that require consistent disease tracking and normal immune context (e.g. bone marrow transplantation, stem cell therapy, tissue regeneration).

## COMPETITIVE ADVANTAGES

Labeling markers are tolerized, allowing consistent expression in this mouse; Increased accuracy in prediction of drug effectiveness during preclinical stages--allows better prediction of success at later clinical stages; Mice are not immunocompromised, and thereby more accurately representing *in vivo* disease states; Labeling of tumors for transplantation allows tumors to be traced during growth, progression and metastasis in normal immune context; Labeling also allows more efficient study of the effectiveness of treatments.

## INVENTOR(S)

Chi-Ping Day (NCI) and Glenn Merlino (NCI)

## DEVELOPMENT STAGE

- Prototype

## PUBLICATIONS

Day CP, et al. Preclinical therapeutic response of residual metastatic disease is distinct from its primary tumor of origin. *Int J Cancer*. 2012 Jan 1;130(1):190-9. [PMID 21312195]. Day CP, et al. Immunological naturalization of immunocompetent host mice to luciferase-GFP for consistent tracking of transplanted tumors. Poster #1556, Annual Meeting 2013, American Association of Cancer Research, Washington D.C., April 6-10, 2013.

## PATENT STATUS

- **Not Patented:** Research Tool. Patent protection is not being pursued for this technology.

## THERAPEUTIC AREA

NCI Technology Transfer Center

<https://techtransfer.cancer.gov/pdf/e-296-2012.pdf>

- Cancer/Neoplasm