**Designation:** MCF-7-luc-F5  
**Tissue:** Human: adenocarcinoma; mammary gland  
**Parental Line Source:** Karmanos Cancer Institute  
**Bioluminescence In Vitro:** 650-1000 photons/sec/cell, subject to imaging and culturing conditions  
**In Vivo Models Tested:** 
- Nude-beige (Harlan): mammary fat pad – lung/thoracic metastasis  
- Nu/nu (CR): mammary fat pad growth

### The Features

**Caliper Life Sciences Bioware Cell Line Models Offer the Ability to:**

- Monitor early tumor development  
- Monitor tumor growth and metastases \textit{in vivo}  
- Quantify tumor burden in the whole animal  
- Follow responses to therapeutic treatments non-invasively in longitudinal studies using the same cohorts of mice.

### Murine Pathogen Free

All Caliper Life Sciences cell lines are confirmed to be pathogen free by the IMPACT Profile (PCR) at the University of Missouri Research Animal Diagnostic and Investigative Laboratory.

### Model Description

MCF-7-luc-F5 is a luciferase expressing cell line that was derived from MCF-7 human mammary adenocarcinoma cells by stable transfection of the North American Firefly Luciferase gene expressed from the CMV promoter. This cell line can be used \textit{in vivo} to establish estrogen dependent tumor growth for:

- Mammary fat pad orthotopic model  
- Mammary fat pad with lung metastasis

### Orthotopic Growth of Breast Tumor Cells

![Orthotopic Growth of Breast Tumor Cells](image1.png)

**Figure 1.** Two days following implantation of estrogen pellets (17ß-Estradiol, 0.36 mg/pellet, 60 day release) MCF-7-luc-F5 cells \(7 \times 10^6\) are injected into the abdominal mammary fat pad of female nude-beige mice. Tumor growth is monitored weekly for six weeks by \textit{in vivo} imaging and caliper measurements (LVWx2). Signal at the injection site is visible on day 0 and tumors can be calipered after two weeks. Overall, the correlation of mean bioluminescence to mean tumor volume is \(R^2=0.6582\), possibly influenced by the small tumor volumes.
Orthotopic Tumor Growth: MCF-7-luc-F5

Two days following implantation of placenta or estrogen pellets (17ß-Estradiol, 0.36 mg/pellet, 60 day release), MCF-7-luc-F5 cells (7x10^6) are injected into the abdominal mammary fat pad of female nude-beige mice. Tumor growth is monitored weekly for eight weeks by bioluminescent imaging and caliper measurement (i.e., WxD). MCF-7-luc-F5 cells require estrogen supplement to grow in vivo.

Spontaneous Metastasis from an Orthotopic Tumor

MCF-7-luc-F5, 7x10^6 Cells, m.f.p.


Estrogen vs. Placebo Pellet

Figure 2. Two days following implantation of estrogen pellets (17ß-Estradiol, 0.36 mg/pellet, 60 day release) MCF-7-luc-F5 cells (7x10^6) are injected into the abdominal mammary fat pad of female nude-beige mice. Tumor growth is monitored weekly for eight weeks by bioluminescent imaging and caliper measurement (i.e., WxD). MCF-7-luc-F5 cells require estrogen supplement to grow in vivo. 6. Edinger M, Cao YA, Hornig YS, Jenkins DE, Verneris MR, Bachmann MH, Negrin RS, Contag CH. Advancing Animal Models of Neoplasia Through 5. Mendel DB, et al. In Vivo Antitumor Activity of SU11248, a Novel Tyrosine Kinase Inhibitor Targeting Vascular Endothelial Growth Factor and Platelet-derived Growth Factor Receptors: Determination of a Pharmacokinetic/pharmacodynamic Relationship. Clin Exp Metastasis 2000 Jan-Apr; 2(1-2): 41-52.

References


Contact Information: If you have any questions regarding these cell lines, please contact Caliper at 508-497-6592 or e-mail: reagents@caliperls.com

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Applications
Using Caliper’s MCF-7-luc-F5 Bioware cell line, measurable tumors may be calibrated after two weeks (Figure 1). Estrogen supplementation is required if MCF-7-luc-F5 cells are to grow in vivo (Figure 2). Using the IVIS Imaging System, in vivo imaging revealed metastases in the thoracic region, while endpoint ex vivo imaging confirmed metastases in the lungs, forelimbs, and brachial lymph node (Figure 3).

Orthotopic Tumor Growth: MCF-7-luc-F5

Figure 2. Two days following implantation of placebo or estrogen pellets (17ß-Estradiol), 0.36 mg/pellet, 60 day release), MCF-7-luc-F5 cells (7x10^6) are injected into the abdominal mammary fat pad of female nude-beige mice. Tumor growth is monitored weekly for eight weeks by bioluminescent imaging and caliper measurement (L. WxD). MCF-7-luc-F5 cells require estrogen supplement to grow in vivo.

Spontaneous Metastasis from an Orthotopic Tumor

Figure 3. Two days following implantation of estrogen pellets (17ß-Estradiol). 0.36 mg/pellet, 60 day release) MCF-7-luc-F5 cells (7x10^6) are injected into the abdominal mammary fat pad of female nude-beige mice. Mice are imaged from the ventral view with the primary tumor(s) shielded and front limbs taped back to detect low signals from secondary metastases. At the end of the experiment, animals are euthanized, and selected tissues are analyzed by ex vivo imaging. In vivo metastatic signals in the thoracic area (407 mice) are visible starting at week 6. It is determined by ex vivo analysis that 277 mice developed metastases in the lungs, 407 mice had signals in the forelimbs, and 57 exhibited signal in the brachial lymph node.

References

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