Information for Using Luciferin in Bioluminescent Imaging

May 9, 2016

Ordering Information: D-luciferin or beetle luciferin are used for standard bioluminescent imaging. There are some other products that may include fluorescent tags or formulations for specific applications. If you have questions as to what will work best for your applications, please contact Scott Malstrom. The most common suppliers of luciferin are Caliper and Promega. I have tested luciferin samples from both companies and have found no difference in quality or performance. In order to facilitate ordering, information from the of Perkin Elmer web page is included at the end of this note.

Preparation and storage:

1g bottle of dry stock is re-suspended in 33.3 mls of saline for a concentration of 30 mg/ml; aliquot luciferin into small tubes or vials and freeze at -80 deg C. Repeated freeze and thawing cycles are not recommended as potency may diminish. Frozen stock is stable for at least one year.

Imaging experiments:

Animals are dosed with a volume equivalent to 5 ul of luciferin/1 g of body weight (165 mg/kg). (i.e.) 20g mouse = 110 ul of luciferin. This concentration of luciferin per body weight provides a saturating dose of luciferin.

Luciferin Injections are commonly administered i.p.; however i.v. or sub-cutaneous routes of administration provide comparable results.

Luciferin should be administered ~10 min prior to imaging so that the substrate can circulate throughout the animal. Your best imaging window is between 10 and 25 minutes post luciferin administration. After 25 minutes, the luciferin levels start to diminish and have returned to near background levels by one hour post luciferin administration.

Product information: Pricing information was collected on May 9, 2016

Perkin Elmer

XenoLight D-Luciferin Potassium Salt

XenoLight™ D-Luciferin - K^+ Salt
[122799]

XenoLight™ D-Luciferin K^+ Salt Firefly, (synthetic). 4,5-Dihydro-2-(6-hydroxy-2-benzothiazolyl)-4-thiazolecarboxylic acid potassium salt. CAS RN [115144-35-9]

1 unit = 1 gram ~$260 depending on the deal

Luciferin is a chemical substance found in the cells of various bioluminescent organisms. When luciferin is oxidized under the catalytic effects of luciferase and ATP, a bluish-green light is produced. Because the reaction is dependent on ATP, it allows researchers to determine the presence of energy or life. Firefly luciferin is a particularly good reporter for *in vivo* biophotonic imaging due to properties of its emission spectra.

D-Luciferin Potassium Salt (P/N 122796) is isolated from firefly and extensively validated in a number of biophotonic imaging applications using the IVIS® Imaging System available from Caliper Life Sciences.

Luciferin Toxicity

Luciferin is a low molecular weight organic compound that consists of a benzothiazole moiety attached to a thiazole carboxylic acid moiety. Luciferin is found in fireflies and other animals which, in the presence of ATP and the enzyme luciferase, becomes luminescent. The small size of luciferin also makes it a poor antigen and immune responses to luciferin are unlikely. Luciferin is able to pass the blood brain barrier, the blood placenta barrier and the blood testis barrier, toxicity appears low.

Frequently asked questions

How do you administer luciferin?
Mice with lux-bearing bacteria do not need luciferin to glow. In the tumor models and transgenic models, luciferin is administered intraperitoneally (concomitant with anesthesia).

How well does luciferin distribute?
Luciferin distributes quickly and easily throughout the animal.

How do the animals respond to the repeated administration of luciferin substrate?
Luciferin does not affect the animals deleteriously (no evidence of toxicological or immunological effects).

Do you need to administer luciferin substrate to the animals before imaging?

In bacteria, the entire luciferase operon is stably integrated on the chromosome. This eliminates the need for exogenous luciferin substrate in the bacterial models. The tumor models and transgenic models rely on the exogenous administration of luciferin.