CAT LRG1 SPARCL™ ASSAY
Life Diagnostics, Inc., Catalog Number: LRG-SP-8

BACKGROUND

Leucine-rich alpha-2-glycoprotein-1 (LRG1) is a 50 kDa protein that is primarily expressed in liver. In humans, it is a positive acute phase reactant; serum levels are elevated during chronic inflammatory diseases and infections (refs 1,2). Studies at Life Diagnostics indicate that LRG1 is a positive acute phase reactant in cats.

PRINCIPLE OF THE ASSAY

The cat LRG1 SPARCL™[1] (Spatial Proximity Analyte Reagent Capture Luminescence, ref 3) assay uses two LRG1 antibody conjugates; one to horseradish peroxidase (HRP), the other to acridan, a chemiluminescent substrate. When HRP and acridan conjugated antibodies bind to LRG1 they are brought into proximity. With the addition of hydrogen peroxide, HRP catalyzes oxidation of proximal acridan molecules causing a flash of chemiluminescence. Acridan conjugated antibodies distant from HRP produce no signal. This principle allows the development of a homogeneous assay that allows rapid determination of LRG1 concentrations.

The HRP and acridan conjugated antibodies provided with the kit are mixed with standards and diluted samples in wells of the 96-well white SPARCL™ plate provided with the kit[2]. After incubation for 30 minutes on a shaker at 25°C and 150 rpm, the plate is placed into a luminometer. Trigger solution containing hydrogen peroxide is injected into each well and luminescence is immediately measured. The concentration of LRG1 is proportional to luminescence and is derived from a standard curve.

MATERIALS AND COMPONENTS

Materials provided with the kit:

- Anti-LRG1 HRP stock **Store ≤** -70°C
- Anti-LRG1 acridan stock. **Store ≤** -70°C
- LRG1 stock **Store ≤** -70°C
- Diluent; CSD50-1, 2 x 50 ml
- Trigger solution; TS7-1, 7 ml
- White SPARCL™ plate (12 x 8-well)
- Clear untreated 96-well plate

Materials required but not provided:

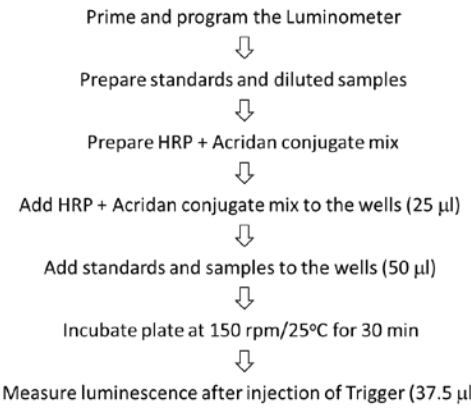
- Precision pipettes and tips
- Polypropylene microcentrifuge tubes
- Vortex mixer
- Plate incubator/shaker
- Luminometer capable of simultaneous injection/measurement
- Curve fitting software

STORAGE

Store the HRP conjugate, acridan conjugate and LRG1 stock at or below -70°C. The remainder of the kit should be stored at 2-8°C. The SPARCL™ plate should be kept in a sealed bag with desiccant and antioxidant. The kit will remain stable for at least six months from the date of purchase, provided that the components are stored as described.

GENERAL INSTRUCTIONS

1. Please take the time to completely read all instructions before starting your assay. Contact us if you need clarification.
2. All reagents used in the assay should be allowed to reach room temperature (25°C) before use.
3. It is important that standards and samples be added to the SPARCL™ plate quickly. If testing large numbers of samples, rather than pipetting standards and samples directly into the white SPARCL™ plate using a single channel pipettor, we recommend the following. First, pipette an excess volume of standards and samples into appropriate wells of the clear 96-well plate. Then use an 8- or 12-channel multipipettor to quickly and efficiently transfer 50 µl aliquots to the appropriate wells of the white SPARCL™ plate. The wells of the clear plate have a maximum volume of 300 µl.
4. Follow the sequence of events below when running the assay.



STANDARD PREPARATION

The LRG1 stock is comprised of pure cat LRG1 diluted in a stabilizing carrier protein matrix.

1. Thaw the LRG1 stock shortly before use.
2. Label five polypropylene tubes as 500, 250, 125, 62.5 and 31.25 ng/ml.
3. Into the tube labeled 500 ng/ml, pipette the volume of diluent detailed on the stock vial label. Then add the indicated volume of stock and mix gently. This provides the 500 ng/ml standard.
4. Dispense 150 µl of diluent into the tubes labeled 250, 125, 62.5, and 31.25 ng/ml.
5. Pipette 150 µl of the 500 ng/ml LRG1 standard into the tube labeled 250 ng/ml and mix. This provides the 250 ng/ml LRG1 standard.
6. Similarly prepare the remaining standards by two-fold serial dilution.

If future use of the LRG1 stock is intended, it should be stored frozen at or below -70°C.

[1] The SPARCL™ technology was developed by Lumigen Corp.

[2] The white SPARCL™ plate provided with the kit has been treated with a reagent that reduces background chemiluminescence. Untreated plates cannot be used.

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SAMPLE PREPARATION

In studies at Life Diagnostics we found \LRG1 levels of ~4 μg/ml in serum from healthy cats. Levels as high as 50 μg/ml were found in acute phase serum.

To obtain values within range of the standard curve we recommend that serum be tested at a dilution of 100-fold initially. Only use the diluent provided with the kit. Do not test samples at dilutions lower than 50-fold.

CONJUGATE MIX PREPARATION

Instructions for preparation of the conjugate mix are detailed on the box that contains the HRP and acridan conjugates. Prepare the mix shortly before use using the diluent provided with the kit.

LUMINOMETER SETUP

1. The luminometer must be capable of injection and simultaneous measurement of luminescence without any delay.
2. Prime the luminometer injection port with at least 1 ml of trigger solution.
3. Place the injection needle into the injection port, (necessary for BMG luminometers).
4. Program the luminometer to inject 37.5 μl of trigger solution per well and to measure from time zero for 1 second (50 x 0.02 second intervals).
5. Define the format of the assay using the luminometer software.
6. Because the white SPARCL™ plate is provided as a 12 x 8-well strips, allowing use of fewer than 96-wells, make sure that the luminometer is programmed to inject trigger solution only into the wells being used.
7. We use a BMG LUMIstar Omega set at a gain of 3600. Optimal gain should be determined by the end user.
8. There are a number of manufacturers of luminometers that are equipped to run a SPARCL™ assay. Please contact Life Diagnostics or Lumigen (www.lumigen.com) to discuss your luminometer.

PROCEDURE

1. Before starting the assay ensure that the luminometer is primed with trigger solution and that the injection needle is positioned in the injection port.
2. Secure the desired number of SPARCL™ 8-well strips in the holder. Immediately seal unused strips in the resealable bag with desiccant and antioxidant. Store unused strips at 2-8°C.
3. Aliquot 25.0 μl of conjugate mix into each well.
4. Dispense 50.0 μl of standards and diluted samples into the wells (we recommend that standards and samples be tested in duplicate).
5. Incubate on an orbital micro-plate shaker at 150 rpm 25°C for 30 minutes.
6. After the 30-minute incubation, place the plate in the luminometer and measure luminescence after injection of trigger solution (37.5 μl).
7. Remove the plate from the luminometer and discard the used strips. Keep the plate frame if future use is intended.

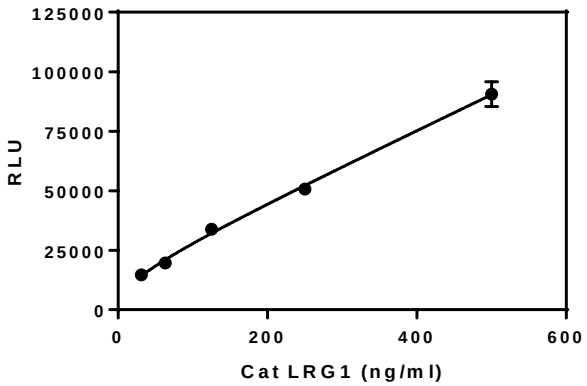
CALCULATION OF RESULTS

1. Before calculating results, review the raw data. If artefacts (RLU spikes) are apparent immediately after injection of trigger solution, eliminate that portion of the luminescence profile from analysis for all wells. We routinely use the sum of RLU values from a 100-980 ms data collection window.
2. Determine the sum of RLU values within the data collection window for the standards and samples.
3. Using graphing software, construct a standard curve by plotting the sum of the RLU values for the standards versus the concentration and fit to a single site, total and nonspecific binding model.
4. Derive the corresponding concentration of LRG1 in the samples from the standard curve.
5. Multiply the derived concentration by the dilution factor to determine the concentration of LRG1 in the original sample.
6. If the sum of the RLU values of diluted samples fall outside the standard curve, samples should be appropriately diluted and re-tested.

TYPICAL STANDARD CURVE

A typical standard curve is shown below. This curve is for illustration only and should not be used to calculate unknowns. A standard curve should be run with each experiment.

LRG1 (ng/ml)	RLU
500	90559
250	50721
125	33819
62.5	19653
31.25	14607



REFERENCES

1. Ha YJ. et. al. Usefulness of serum leucine-rich alpha-2-glycoprotein as a disease activity biomarker in patients with rheumatoid arthritis. J Korean Med Sci. 29:1199-1204 (2014)
2. Weivoda S. et. al. ELISA for human leucine-rich alpha-2-glycoprotein-1 employing cytochrome c as the capturing ligand. J Immunol Methods. 336:22-29 (2008)
3. Akhavan-Tafti H. et al. A homogeneous chemiluminescent immunoassay method. J Am Chem Soc. 20;135(11):4191-4 (2013)

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For technical assistance please email us at
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