

MSD[®] MULTI-SPOT Assay System

Human Resistin Kit

1-Plate Kit	K151FND-1
5-Plate Kit	K151FND-2
25-Plate Kit	K151FND-4



MSD Metabolic Assays

Human Resistin Kit

This package insert must be read in its entirety before using this product.

FOR RESEARCH USE ONLY.

NOT FOR USE IN DIAGNOSTIC PROCEDURES.

MESO SCALE DISCOVERY®

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Ordering Information

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Introduction

Resistin, or FIZZ-2, is a cysteine-rich plasma protein that belongs to a family of polypeptides called resistin-like molecules.¹ Although classified as an adipokine, in humans resistin is mainly produced by blood-derived leukocytes and mononuclear cells, both within and outside the adipose tissue.^{2,3} The physiological role and pathophysiologic importance of resistin in humans are unclear. Resistin antagonizes the effects of insulin on glucose metabolism in liver and skeletal muscle, interacts with and reinforces inflammatory pathways, and may promote endothelial cell activation.^{1,2} Increased resistin levels have been associated with obesity, insulin resistance, metabolic syndrome, type 2 diabetes, and increased cardiovascular risk.⁴⁻⁷

Principle of the Assay

MSD metabolic assays provide a rapid and convenient method for measuring the levels of protein targets within a single, small-volume sample. Human Resistin is a sandwich immunoassay (Figure 1). MSD provides a plate pre-coated with capture antibodies. The user adds the sample and a solution containing detection antibodies conjugated with electrochemiluminescent labels (MSD SULFO-TAG™) over the course of one or more incubation periods. Analytes in the sample bind to capture antibodies immobilized on the working electrode surface; recruitment of the detection antibodies by the bound analytes completes the sandwich. The user adds an MSD buffer that provides the appropriate chemical environment for electrochemiluminescence and loads the plate into a SECTOR® Imager where a voltage applied to the plate electrodes causes the captured labels to emit light. The instrument measures the intensity of emitted light to provide a quantitative measure of analytes in the sample.

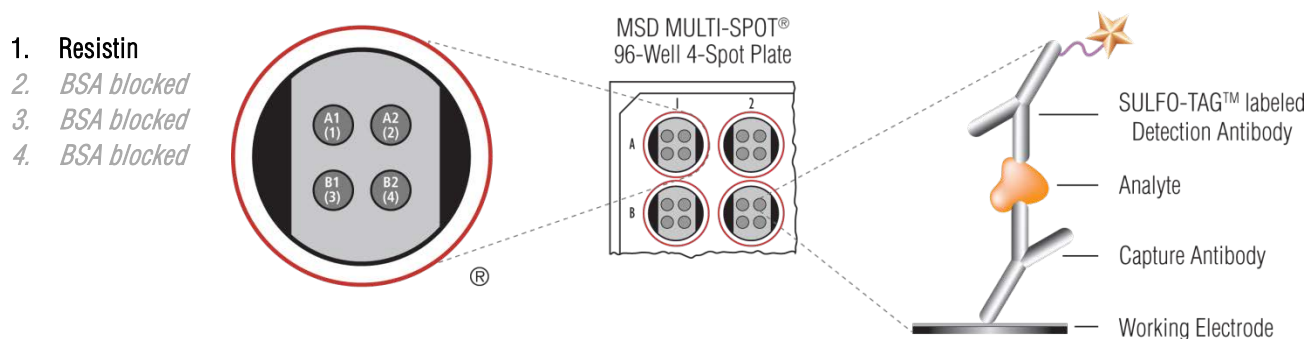


Figure 1. Spot diagram showing placement of analyte capture antibodies. The numbering convention for the different spots is maintained in the software visualization tools, on the plate packaging, and in the data files. A unique bar code label on each plate allows complete traceability back to MSD manufacturing records.

Reagents Supplied

Product Description	Storage	Quantity per Kit		
		K151FND-1	K151FND-2	K151FND-4
MULTI-SPOT® 96-Well, 4-Spot Human Resistin Plate N451FNA-1	2–8°C	1 plate	5 plates	25 plates
SULFO-TAG Anti-hu Resistin Antibody ¹ (50X)	2–8°C	1 vial (75 µL)	1 vial (375 µL)	5 vials (375 µL ea)
Human Resistin Calibrator (50 ng/mL)	≤-70°C	1 vial (60 µL)	5 vials (60 µL ea)	25 vials (60 µL ea)
Diluent 2 R60QB-5 (40 mL), R60QB-2 (200 mL)	≤-10°C	1 bottle (40 mL)	1 bottle (200 mL)	5 bottles (200 mL ea)
Diluent 3 R51BA-4(5 mL), R51BA-5 (25 mL)	≤-10°C	1 bottle (5 mL)	4 bottles (25 mL ea)	20 bottles (25 mL ea)
Read Buffer T (4X) R92TC-3 (50 mL)	RT	1 bottle (50 mL)	1 bottle (50 mL)	5 bottles (50 mL ea)

Required Material and Equipment (not supplied)

- Appropriately sized tubes for reagent preparation
- Microcentrifuge tubes for preparing serial dilutions
- Phosphate-buffered saline plus 0.05% Tween-20 (PBS-T) for plate washing
- Liquid handling equipment for desired throughput, capable of dispensing 10 to 150 µL/well into a 96-well microtiter plate
- Plate washing equipment: automated plate washer or multichannel pipette
- Adhesive plate seals
- Microtiter plate shaker
- Deionized water

Safety

Use safe laboratory practices and wear gloves, safety glasses, and lab coats when handling kit components. Handle and dispose of all hazardous samples properly in accordance with local, state, and federal guidelines.

Additional safety information is available in the product Material Safety Data Sheet, which can be obtained from MSD Customer Service.

¹ SULFO-TAG–conjugated detection antibodies should be stored in the dark.

Reagent Preparation

Bring all reagents to room temperature. Thaw the stock calibrator on ice.

Important: Upon first thaw, separate diluents 2 and 3 into aliquots appropriate for the size of your needs before refreezing.

Prepare Standards

MSD supplies calibrator for the Human Resistin Kit at 20-fold higher concentration than the recommended highest standard. We recommend a 7-point standard curve with 4-fold serial dilution steps and a zero calibrator blank. Thaw the stock calibrator and keep on ice, then add to diluent at room temperature to make the standard curve solutions.

Standard	Human Resistin (pg/mL)	Dilution Factor
Stock Calibrator	50 000	
STD-01	2500	20
STD-02	625	4
STD-03	156	4
STD-04	39	4
STD-05	9.8	4
STD-06	2.4	4
STD-07	0.61	4
STD-08	0	n/a

To prepare 7 standard solutions plus a zero calibrator blank for up to 4 replicates:

- 1) Prepare the highest standard by adding 25 μ L of stock calibrator to 475 μ L of Diluent 2. Mix well.
- 2) Prepare the next standard by transferring 100 μ L of the highest standard to 300 μ L of Diluent 2. Mix well. Repeat 4-fold serial dilutions 5 additional times to generate 7 standards.
- 3) Use Diluent 2 as the blank.

Dilute Samples

For human serum and plasma samples, MSD recommends 20-fold dilution in Diluent 2; however, you may need to adjust the dilution factor for the sample set under investigation. To dilute sample 20-fold, add 20 μ L of sample to 380 μ L of Diluent 2.

Prepare Detection Antibody Solution

MSD provides detection antibody as a 50X stock solution. The working detection antibody solution is 1X.

For 1 plate, combine:

- 60 μ L of 50X SULFO-TAG Anti-hu Resistin Antibody
- 2.94 mL of Diluent 3

Prepare Read Buffer

MSD provides Read Buffer T as a 4X stock solution. The working solution is 2X.

For 1 plate, combine:

- ❑ 10 mL of Read Buffer T (4X)
- ❑ 10 mL of deionized water

You may prepare diluted read buffer in advance and store it at room temperature in a tightly sealed container.

Prepare MSD Plate

MSD plates are pre-coated with capture antibodies (Figure 1) and exposed to a proprietary stabilizing treatment to ensure the integrity and stability of the immobilized antibodies. Plates can be used as delivered; no additional preparation (e.g., pre-wetting) is required.

Protocol

Notes

1. **Wash and Add Sample:** Wash the plate 3 times with 150–300 μL /well of PBS-T. Add 50 μL of sample (standards, controls, or unknowns) per well. Seal the plate with an adhesive plate seal and incubate for 2 hours with vigorous shaking (300–1000 rpm) at room temperature.

You may prepare detection antibody solution during incubation.

2. **Wash and Add Detection Antibody Solution:** Wash the plate 3 times with 150–300 μL /well of PBS-T. Add 25 μL of detection antibody solution to each well. Seal the plate with an adhesive plate seal and incubate for 1 hour with vigorous shaking (300–1000 rpm) at room temperature.

You may prepare diluted read buffer during incubation.

3. **Wash and Read:** Wash the plate 3 times with 150–300 μL /well of PBS-T. Add 150 μL of 2X Read Buffer T to each well. Analyze the plate on the SECTOR Imager. No incubation in read buffer is required before reading the plate.

Shaking the plate typically accelerates capture at the working electrode.

You may keep excess diluted read buffer in a tightly sealed container at room temperature for later use.

Bubbles introduced when adding read buffer will interfere with imaging of the plate and produce unreliable data. Use reverse pipetting technique to avoid creating bubbles.

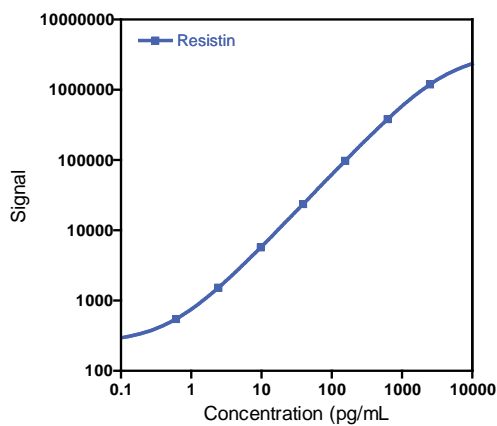
Due to the varying nature of each research application, you should assess assay stability before allowing plates to sit with read buffer for extended periods.

Curve Fitting

MSD DISCOVERY WORKBENCH® software uses least-squares fitting algorithms to generate the standard curve that will be used to calculate the concentration of analyte in the samples. The assays have a wide dynamic range (3–4 logs) that allows accurate quantification without the need for dilution in many cases. By default, the software uses a 4-parameter logistic model (or sigmoidal dose-response) and includes a $1/Y^2$ weighting function. The weighting function is important because it provides a better fit of data over a wide dynamic range, particularly at the low end of the standard curve.

Typical Data

The following standard curve graph illustrates the dynamic range of the assay. Actual signals will vary. Best quantification of unknown samples will be achieved by generating a standard curve for each plate using a minimum of 2 replicates of the standards. CVs were <10% at all levels.



Resistin	
Conc. (pg/mL)	Average Signal
0	254
0.61	548
2.4	1526
9.8	5717
39	23 565
156	97 976
625	382 372
2500	1 189 326

Sensitivity

The lower limit of detection (LLOD) is a calculated concentration based on a signal 2.5 standard deviations above the background (zero calibrator blank).

	Resistin
LLOD (pg/mL)	0.20

Tested Samples

Normal human serum, EDTA plasma, and heparin plasma samples were diluted 20-fold and tested with the Human Resistin Kit. Median and range of concentrations for each sample set are displayed below. Concentrations are corrected for sample dilution.

Sample Type	Statistic	Resistin
Serum (N=5)	Median (pg/mL)	2952
	Range (pg/mL)	730–3142
	Samples in Quantitative Range	5
EDTA Plasma (N=5)	Median (pg/mL)	2737
	Range (pg/mL)	1129–4472
	Samples in Quantitative Range	5
Heparin Plasma (N=5)	Median (pg/mL)	3281
	Range (pg/mL)	2469–4491
	Samples in Quantitative Range	5

Assay Components

Calibrator

The assay calibrator uses recombinant Human Resistin protein expressed in *E. coli*.

Antibodies

Analyte	Source Species		Assay Generation
	MSD Capture Antibody	MSD Detection Antibody	
Resistin	Mouse Monoclonal	Goat Polyclonal	B

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3. Patel L, et al. Resistin is expressed in human macrophages and directly regulated by PPAR gamma activators. *Biochem Biophys Res Commun*. 2003;300:472-6.
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7. Zhang JL, et al. Serum resistin level in essential hypertension patients with different glucose tolerance. *Diabet Med*. 2003;20:828–831.

Summary Protocol

Human Resistin Kit

*MSD provides this summary protocol for your convenience.
Please read the entire detailed protocol prior to performing
the Human Resistin assay.*

Sample and Reagent Preparation

Bring all reagents to room temperature and thaw the calibrator on ice.

Prepare standard solutions using the supplied calibrator:

- Dilute the stock calibrator 20-fold in Diluent 2.
- Perform a series of 4-fold dilution steps and prepare a zero calibrator blank.

Dilute samples 20-fold in Diluent 2 before adding to the plate.

Prepare detection antibody solution by diluting stock detection antibody 50-fold in Diluent 3.

Prepare 2X Read Buffer T by diluting stock 4X Read Buffer T 2-fold with deionized water.

Step 2: Wash and Add Sample

Wash plate 3 times with 150–300 μ L/well of PBS-T.

Add 50 μ L/well of sample (standards, controls, or unknowns).

Incubate at room temperature with vigorous shaking (300–1000 rpm) for 2 hours.

Step 3: Wash and Add Detection Antibody Solution

Wash plate 3 times with 150–300 μ L/well of PBS-T.

Add 25 μ L/well of 1X detection antibody solution.

Incubate at room temperature with vigorous shaking (300–1000 rpm) for 1 hour.

Step 4: Wash and Read Plate

Wash plate 3 times with 150–300 μ L/well of PBS-T.

Add 150 μ L/well of 2X Read Buffer T.

Analyze plate on SECTOR Imager.

Plate Diagram

