

# DuoSet<sup>®</sup> IC

## Human Total Integrin $\alpha$ V $\beta$ 3

Catalog Number DYC3050-2

DYC3050-5

DYC3050E

**For the development of sandwich ELISAs to measure Integrin  $\alpha$ V $\beta$ 3 in cell lysates.**

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

**FOR RESEARCH USE ONLY.  
NOT FOR USE IN DIAGNOSTIC PROCEDURES.**

## TABLE OF CONTENTS

Contents	Page
PRINCIPLE OF THE ASSAY	2
MATERIALS PROVIDED. ....	2
OTHER MATERIALS REQUIRED	3
SOLUTIONS REQUIRED . ....	3
REAGENT PREPARATION	4
PREPARATION OF SAMPLES. ....	4
PRECAUTION	5
TECHNICAL HINTS AND LIMITATIONS. ....	5
GENERAL ELISA PROTOCOL	6
CALCULATION OF RESULTS . ....	7
TYPICAL DATA	7
CALIBRATION. ....	7
SPECIFICITY	8
SENSITIVITY. ....	8
QUANTIFICATION	9
PLATE LAYOUT . ....	10

### MANUFACTURED AND DISTRIBUTED BY:

R&D Systems, Inc.  
614 McKinley Place NE  
Minneapolis, MN 55413  
United States of America

TELEPHONE: (800) 343-7475  
(612) 379-2956  
FAX: (612) 656-4400  
E-MAIL: info@RnDSystems.com

### DISTRIBUTED BY:

R&D Systems Europe, Ltd.  
19 Barton Lane  
Abingdon Science Park  
Abingdon, OX14 3NB  
United Kingdom

TELEPHONE: +44 (0)1235 529449  
FAX: +44 (0)1235 533420  
E-MAIL: info@RnDSystems.co.uk

R&D Systems China Co. Ltd.  
24A1 Hua Min Empire Plaza  
726 West Yan An Road  
Shanghai PRC 200050

TELEPHONE: +86 (21) 52380373  
FAX: +86 (21) 52371001  
E-MAIL: info@RnDSystemsChina.com.cn

## PRINCIPLE OF THE ASSAY

This DuoSet<sup>®</sup> IC ELISA contains the basic components required for the development of sandwich ELISAs to measure Integrin  $\alpha$ V $\beta$ 3, also known as Vitronectin Receptor, in cell lysates. An immobilized capture antibody specific for Integrin  $\alpha$ V, also known as CD51, binds Integrin  $\alpha$ V heterodimers. After washing away unbound material, a biotinylated detection antibody specific for Integrin  $\beta$ 3, also known as CD61, is used to detect Integrin  $\alpha$ V $\beta$ 3 heterodimer, utilizing a standard Streptavidin-HRP format.

## MATERIALS PROVIDED

**Store the unopened kit at 2-8° C. Do not use past kit expiration date.**

Description	Part #	Storage Conditions	Vials Provided	
			Cat. # DYC3050-2	Cat. # DYC3050-5
Total Integrin $\alpha$ V $\beta$ 3 Capture Antibody	843492	2-8° C	1	2
Total Integrin $\alpha$ V $\beta$ 3 Detection Antibody	843493	2-8° C	1	2
Total Integrin $\alpha$ V $\beta$ 3 Standard	843494	2-8° C	3	5
Streptavidin-HRP	890803	2-8° C	1	1

DYC3050-2 contains sufficient materials to run ELISAs on at least two 96 well plates.\*  
DYC3050-5 contains sufficient materials to run ELISAs on at least five 96 well plates.\*

This kit is also available in an Economy Pack (R&D Systems, Catalog # DYC3050E).  
Economy Packs contain sufficient materials to run ELISAs on 15 microplates.\*  
Specific vial counts of each component may vary. Please refer to the literature accompanying your order for specific vial counts.

\*Provided the following conditions are met:

- The reagents are prepared as described in this package insert.
- The assay is run as described in the General ELISA Protocol on page 6.
- The recommended microplates, buffers, diluents, substrates, and solutions are used.

## OTHER MATERIALS REQUIRED

- Aprotinin (Sigma # A6279)
- Leupeptin (Tocris # 1167)
- NP-40 Alternative (EMD/Calbiochem # 492016)
- Sodium Azide (NaN<sub>3</sub>) (Sigma # S2002)
- Sodium Orthovanadate (Na<sub>3</sub>VO<sub>4</sub>) (Sigma # S6508), activated
- Deionized or distilled water
- Pipettes and pipette tips
- 96 well microplates [Costar EIA Plates (Catalog # 2592 or R&D Systems Catalog # DY990) are suggested]
- Plate sealers (R&D Systems, Catalog # DY992)
- Squirt bottle, manifold dispenser, or automated microplate washer

## SOLUTIONS REQUIRED

**PBS** - 137 mM NaCl, 2.7 mM KCl, 8.1 mM Na<sub>2</sub>HPO<sub>4</sub>, 1.5 mM KH<sub>2</sub>PO<sub>4</sub>, pH 7.2-7.4, 0.2 µm filtered.

**Wash Buffer** - 0.05% Tween<sup>®</sup> 20 in PBS, pH 7.2-7.4 (R&D Systems, Catalog # WA126).

**Block Buffer** - 1% BSA\*, 0.05% NaN<sub>3</sub> in PBS, pH 7.2-7.4.

**IC Diluent #12\*\*** - 1% NP-40 Alternative, 20 mM Tris (pH 8.0), 137 mM NaCl, 10% glycerol, 2 mM EDTA, 1 mM activated sodium orthovanadate.

**IC Diluent #14** - 20 mM Tris, 137 mM NaCl, 0.05% Tween 20, 0.1% BSA\*, pH 7.2-7.4.

**Lysis Buffer #9\*\*** - 1% NP-40 Alternative, 20 mM Tris (pH 8.0), 137 mM NaCl, 10% glycerol, 2 mM EDTA, 1 mM activated sodium orthovanadate, 10 µg/mL Aprotinin, 10 µg/mL Leupeptin.

**Note:** *Lysis Buffer #9 consists of IC Diluent #12 plus 10 µg/mL Aprotinin and 10 µg/mL Leupeptin. Approximately 50 mL of IC Diluent #12 is required to run the assay on one 96 well plate.*

**Substrate Solution** - 1:1 mixture of Color Reagent A (H<sub>2</sub>O<sub>2</sub>) and Color Reagent B (Tetramethylbenzidine) (R&D Systems, Catalog # DY999).

**Stop Solution** - 2 N H<sub>2</sub>SO<sub>4</sub> (R&D Systems, Catalog # DY994).

\*The use of R&D Systems Reagent Diluent Concentrate 2 (Catalog # DY995) or Millipore Bovine Serum Albumin, Fraction V, Protease free (Catalog # 82-045) is recommended. All buffers containing BSA must be stored at 2-8° C.

\*\*Sample Diluent Concentrate 2 (2X) (R&D Systems, Catalog # DYC002), prepared as described in the DYC002 package insert.

*All trademarks and registered trademarks are the property of their respective owners.*

## REAGENT PREPARATION

Bring all reagents to room temperature before use.

**Total Integrin  $\alpha$ V $\beta$ 3 Capture Antibody** (Part 843492) - Each vial contains 1440  $\mu$ g/mL of mouse anti-human Integrin  $\alpha$ V antibody when reconstituted with 200  $\mu$ L of PBS. After reconstitution, store at 2-8° C for up to 30 days or aliquot and store at  $\leq$  -20° C in a manual defrost freezer or at  $\leq$  -70° C for up to 3 months.\*

**Total Integrin  $\alpha$ V $\beta$ 3 Detection Antibody** (Part 843493) - Each vial contains 7.2  $\mu$ g/mL of biotinylated goat anti-human Integrin  $\beta$ 3 antibody when reconstituted with 1.0 mL of IC Diluent #14. After reconstitution, store at 2-8° C for up to 30 days or aliquot and store at  $\leq$  -20° C in a manual defrost freezer or at  $\leq$  -70° C for up to 3 months.\*

**Total Integrin  $\alpha$ V $\beta$ 3 Standard** (Part 843494) - Each vial contains 180 ng/mL of recombinant human Integrin  $\alpha$ V $\beta$ 3 when reconstituted with 500  $\mu$ L of IC Diluent #12. **Use within one hour of reconstitution. Use a fresh standard for each assay.** A seven point standard curve using 2-fold serial dilutions and a high standard of 20,000 pg/mL is recommended.

**Streptavidin-HRP** (Part 890803) - 1 mL of Streptavidin conjugated to horseradish-peroxidase. Store at 2-8° C. **DO NOT FREEZE.**

\*Provided this is within the expiration date of the kit.

## PREPARATION OF SAMPLES

**Cell Lysates** - Rinse cells two times with PBS, making sure to remove any remaining PBS after the second rinse. Solubilize cells at  $1 \times 10^7$  cells/mL in Lysis Buffer #9 and allow samples to sit on ice for 15 minutes. Assay immediately or store at  $\leq$  -70° C. Before use, centrifuge samples at 2000 x g for 5 minutes and transfer the supernate to a clean test tube. Sample protein concentration may be quantified using a total protein assay. If needed, further dilutions should be made in IC Diluent #12.

## **PRECAUTION**

The Stop Solution suggested for use with this kit is an acidic solution. Wear protective gloves, clothing, eye, and face protection. Wash hands thoroughly after handling.

## **TECHNICAL HINTS AND LIMITATIONS**

- This DuoSet IC ELISA should not be used beyond the expiration date on the kit label.
- Individual results may vary due to differences in technique, plasticware and water sources.
- It is important that the diluents selected for reconstitution and for dilution of the standard reflect the environment of the samples being measured. The diluents suggested in this protocol should be suitable for most cell lysates.
- The type of enzyme and substrate and the concentrations of capture/detection antibodies used can be varied to create an immunoassay with a different sensitivity and dynamic range. A basic understanding of immunoassay development is required for the successful use of these reagents in immunoassays.
- A thorough and consistent wash technique is essential for proper assay performance. Wash Buffer should be dispensed forcefully and removed completely from the wells by aspiration or decanting. Remove any remaining Wash Buffer by inverting the plate and blotting it against clean paper towels.
- Use a fresh reagent reservoir and pipette tips for each step.
- It is recommended that all standards and samples be assayed in duplicate.
- Avoid microbial contamination of reagents and buffers. This may interfere with the sensitivity of the assay. Buffers containing protein should be made under aseptic conditions and stored at 2-8° C or be prepared fresh daily.

# GENERAL ELISA PROTOCOL

A plate layout is provided to record standards and samples assayed.

## Plate Preparation

1. Dilute the Capture Antibody to the working concentration of 8.0  $\mu\text{g}/\text{mL}$  in PBS without carrier protein. Immediately coat a 96 well microplate with 100  $\mu\text{L}$  per well of the diluted Capture Antibody. Seal the plate and incubate overnight at room temperature.
2. Aspirate each well and wash with Wash Buffer, repeating the process two times for a total of 3 washes. Wash by filling each well with Wash Buffer (400  $\mu\text{L}$ ) using a squirt bottle, manifold dispenser, or autowasher. Complete removal of liquid at each step is essential for good performance. After the last wash, remove any remaining Wash Buffer by aspirating or by inverting the plate and blotting it against clean paper towels.
3. Block plates by adding 300  $\mu\text{L}$  of Block Buffer to each well. Incubate at room temperature for 1-2 hours.
4. Repeat the aspiration/wash as in step 2. The plates are now ready for sample addition.

## Assay Procedure

1. Add 100  $\mu\text{L}$  of sample or standards in IC Diluent #12 per well. Use IC Diluent #12 as the zero standard. Cover with a plate sealer and incubate 2 hours at room temperature.  
**Note:** *A seven point standard curve using 2-fold serial dilutions and a high standard of 20,000 pg/mL is recommended.*
2. Repeat the aspiration/wash as in step 2 of Plate Preparation.
3. Immediately before use, dilute the Detection Antibody to a working concentration of 200 ng/mL in IC Diluent #14. Prepare only as much Detection Antibody as required to run each assay. Add 100  $\mu\text{L}$  of the diluted Detection Antibody to each well. Cover with a new plate sealer and incubate 2 hours at room temperature.
4. Repeat the aspiration/wash as in step 2 of Plate Preparation.
5. Immediately before use, dilute the Streptavidin-HRP to the working concentration specified on the vial label using IC Diluent #14. Add 100  $\mu\text{L}$  of the diluted Streptavidin-HRP to each well. Incubate for 20 minutes at room temperature. Avoid placing the plate in direct light.
6. Repeat the aspiration/wash as in step 2 of Plate Preparation.
7. Add 100  $\mu\text{L}$  of Substrate Solution to each well. Incubate for 20 minutes at room temperature. Avoid placing the plate in direct light.
8. Add 50  $\mu\text{L}$  of Stop Solution to each well. Gently tap the plate to ensure thorough mixing.
9. Determine the optical density of each well immediately, using a microplate reader set to 450 nm. If wavelength correction is available, set to 540 nm or 570 nm. If wavelength correction is not available, subtract readings at 540 nm or 570 nm from the readings at 450 nm. This subtraction will correct for optical imperfections in the plate. Readings made directly at 450 nm without correction may be higher and less accurate.

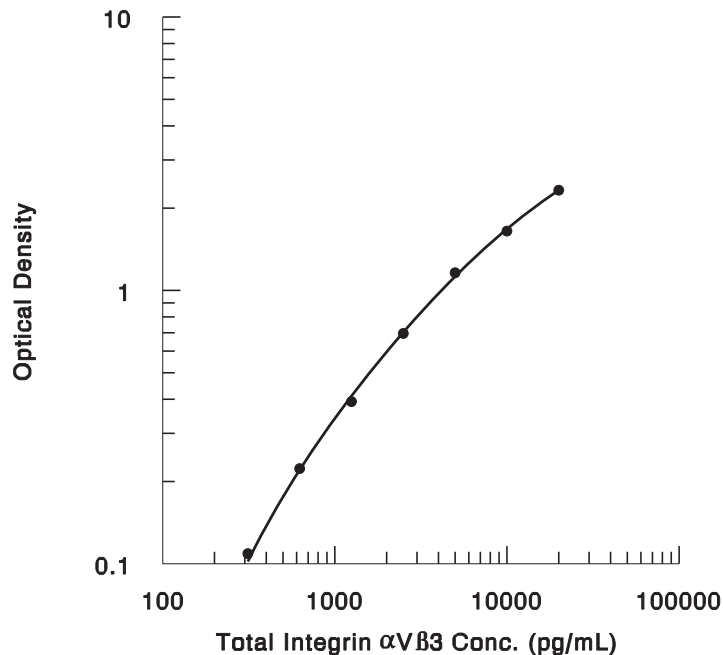
## CALCULATION OF RESULTS

Average the duplicate readings for each standard and sample, and then subtract the average zero standard optical density.

Create a standard curve by reducing the data using computer software capable of generating a four parameter logistic (4-PL) curve-fit. As an alternative, construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis and draw a best fit curve through the points on the graph. The data may be linearized by plotting the log of the Integrin  $\alpha V\beta 3$  concentrations versus the log of the O.D. and the best fit line can be determined by regression analysis. This procedure will produce an adequate but less precise fit of the data.

## TYPICAL DATA

A standard curve should be generated for each set of samples assayed. The graph below represents typical data generated when using the Human Total Integrin  $\alpha V\beta 3$  DuoSet IC ELISA. The standard curve was calculated using a computer generated 4-PL curve-fit. This standard curve is for demonstration purposes only.



## CALIBRATION

The Human Total Integrin  $\alpha V\beta 3$  DuoSet IC ELISA is calibrated against a highly purified CHO cell-expressed recombinant human Integrin  $\alpha V\beta 3$  produced at R&D Systems. Samples containing natural Integrin  $\alpha V\beta 3$  showed linear dilution parallel to the standard curve obtained using the Total Integrin  $\alpha V\beta 3$  Standard. These results indicate that O.D. values from this DuoSet IC ELISA can be used to determine the relative concentration of Integrin  $\alpha V\beta 3$  in natural samples.

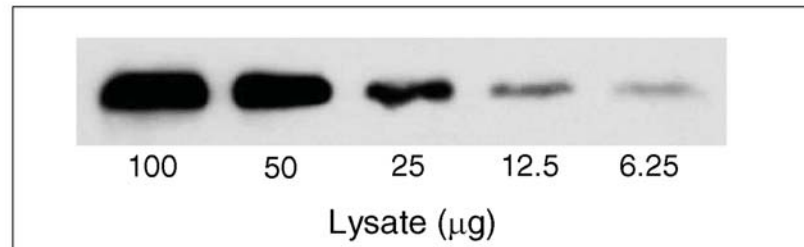


## SPECIFICITY

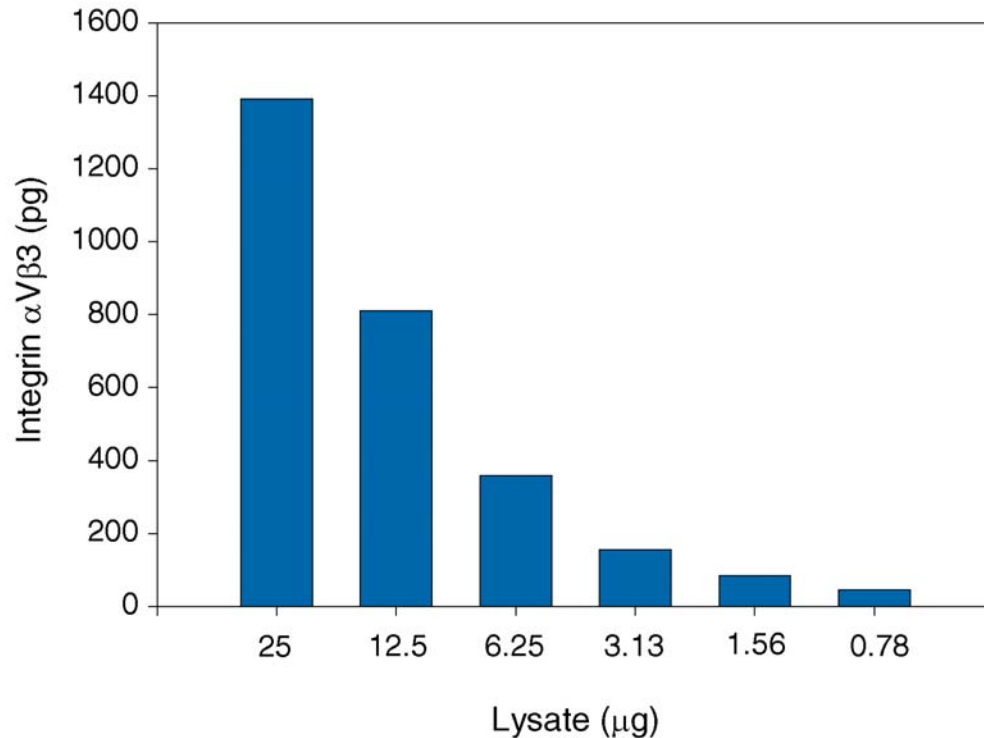
To determine specificity, recombinant human (rh) Integrin  $\alpha$ V $\beta$ 6, rhIntegrin  $\alpha$ V $\beta$ 8, and rhIntegrin  $\alpha$ 2 $\beta$ 3 were assayed at 200 ng/mL and did not cross-react or interfere in the assay.

## SENSITIVITY

A

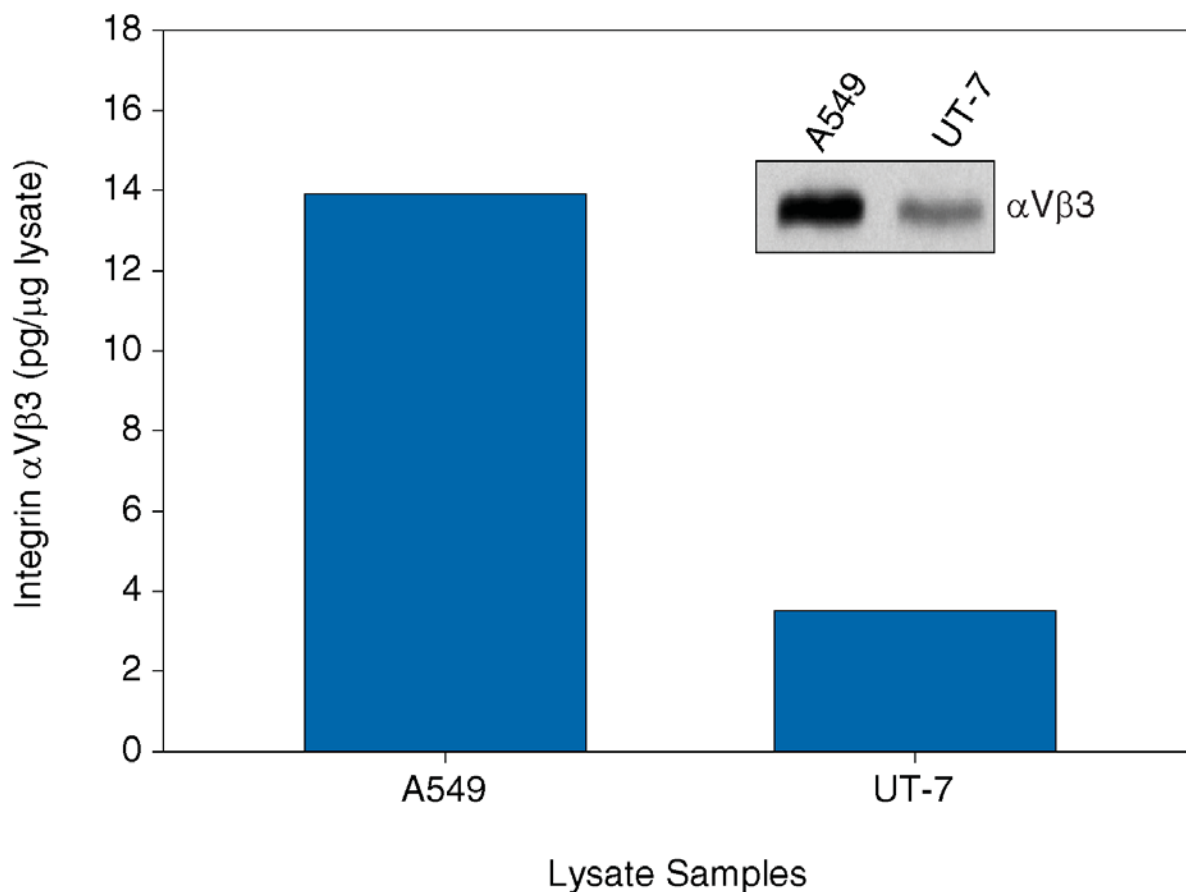


B



**Figure 1: The Human Total Integrin  $\alpha$ V $\beta$ 3 DuoSet IC ELISA is more sensitive than immunoprecipitation (IP)-Western blot analysis.** Lysates prepared from A549 human lung carcinoma cells, were serially diluted and analyzed by (A) IP-Western blot and (B) this DuoSet IC ELISA. IPs were performed using an anti-Integrin  $\alpha$ V monoclonal antibody and goat anti-mouse IgG agarose. Immunoblots were incubated with a biotinylated anti-Integrin  $\beta$ 3 polyclonal antibody (R&D Systems, Catalog #BAF2266) to detect total Integrin  $\alpha$ V $\beta$ 3. Bands were visualized by chemiluminescent detection. Human Integrin  $\alpha$ V $\beta$ 3 can be detected with this DuoSet IC ELISA by using approximately 2 to 4 times less lysate than is needed for a conventional IP-Western blot.

## QUANTIFICATION



**Figure 2: The Human Total Integrin  $\alpha V\beta 3$  DuoSet IC ELISA measures the level of Integrin  $\alpha V\beta 3$ .** Lysates were prepared from A549 human lung carcinoma cells and UT-7 human acute myeloid leukemia cells. ELISA and IP-Western blot (inset) analyses were performed using 25  $\mu$ g and 100  $\mu$ g of cell lysate, respectively. The IP-Western blot was performed as described in Figure 1.

# PLATE LAYOUT

Use this plate layout as a record of standards and samples assayed.

1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
	A	B	C	D	E	F	G	H									

# NOTES