



Nori® Human Neutrophil Elastase ELISA Kit-DataSheet

Elastase is a serine protease (peptidases) that break down proteins. Some bacteria also produce elastase that is considered a virulence factor.[1,2] Elastase breaks down elastin, an elastic fibre that, together with collagen, determines the mechanical properties of connective tissue. The neutrophil form breaks down the Outer membrane protein A (OmpA) of *E. coli* and other Gram-negative bacteria. Elastase also has the important immunological role of breaking down *Shigella* virulence factors. This is accomplished through the cleavage of peptide bonds in the target proteins. The specific peptide bonds cleaved are those on the carboxyl side of small, hydrophobic amino acids such as glycine, alanine, and valine. Elastase is inhibited by the acute-phase protein α_1 -antitrypsin (A1AT), which binds almost irreversibly to the active site of elastase and trypsin. A1AT is normally secreted by the liver cells into the serum. Alpha-1 antitrypsin deficiency (A1AD) leads to uninhibited destruction of elastic fibre by elastase; the main result is emphysema. The rare disease cyclic neutropenia (also called "cyclic hematopoiesis") is an autosomal dominant genetic disorder characterised by fluctuating neutrophil granulocyte counts over 21-day periods. During neutropenia, patients are at risk for infections. In 1999, this disease was linked to disorders in the ELA-2/ELANE gene.^[3] Other forms of congenital neutropenia also appear to be linked to ELA-2 mutations. Neutrophil elastase is responsible for the blistering in bullous pemphigoid, a skin condition, in the presence of antibodies. Elastase has been shown to disrupt tight junctions, cause proteolytic damage to tissue, break down cytokines and alpha proteinase inhibitor, cleave immunoglobulin A and G (IgA, IgG), and cleave both C3bi, a component of the complement system, and CR1, a receptor on neutrophils for another complement molecule involved in phagocytosis. The cleavage of IgA, IgG, C3bi, and CR1 contributes to a decrease of the ability of neutrophils to kill bacteria by phagocytosis.

References

1. Bever,R.A. and Iglewski,B.H. (1988) *J. Bacteriol.* 170 (9), 4309-4314.
2. Rust,L., et al. (1996) *J. Bacteriol.* 178 (4), 1134-1140.
3. Horwitz M, et al. (1999). *Nat. Genet.* 23 (4): 433–6.

PRINCIPLE OF THE ASSAY

This ELISA kit is for quantification of Elastase in Human samples. This is a shorter ELISA assay that reduces time to 50% compared to the conventional method, and the entire assay only takes 3 hours. This assay employs the quantitative sandwich enzyme immunoassay technique and uses biotin-streptavidin chemistry to improve the performance and the sensitivity of the assays. An antibody specific for Human Elastase has been pre-coated onto a microplate. Standards and samples are pipetted into the wells and any Elastase present is bound by the immobilized antibody. After washing away any unbound substances, a detection antibody specific for Human Elastase is added to the wells. Following wash to remove any unbound antibody reagent, a detection reagent is added. After intensive wash a substrate solution is added to the wells and color develops in proportion to the amount of Elastase bound in the initial step. The color development is stopped, and the intensity of the color is measured.

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

Storage

Store the kit at 4°C. The kit can be used in 6 months.



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MATERIALS PROVIDED

| Description | Quantity | Description | Quantity | Description | Quantity |
|--------------------------|----------|---------------------|----------|--------------------|----------|
| Antibody Precoated Plate | 1 | 20 x PBS | 1 | Substrate Solution | 1 |
| Detection Antibody | 1 | 20 x Assay Buffer | 1 | Stop Solution | 1 |
| HRP Conjugate | 1 | 96-well plate sheet | 1 | DataSheet | 1 |
| Standard | 3 | | | | |

Bring all reagents to room temperature before use.

Reagent Preparations

Human Elastase Detection Antibody (1 vial) – The lyophilized Detection Antibody should be stored at 4°C for up to 6 months, if not used immediately. Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. The vial contains sufficient Detection Antibody for a 96-well plate. Add 200 µL of sterile 1 x PBS and vortex 30 sec. If the entire 96-well plate is used, take 200 µL of detection antibody to 10.5 mL of 1 x PBS to make **Working dilution of detection antibody** and vortex 30 sec prior to the assay. If the partial antibody is used store the rest at -20°C until use.

Human Elastase Standard (3 vials) – Each lyophilized Human Elastase Standard vial contains the standard sufficient for generating a standard curve. The unreconstituted standard can be stored at 4°C for up to 6 months if not used immediately. Centrifuge for 1 min at 6000 x g to bring down the material prior to open the tube. Add 500 µL of 1 x Assay Buffer to make the high standard concentration of 10 ng/ml and **vortex for 1 min**. A seven-point standard curve is generated using 2-fold serial dilutions in the Assay Buffer, **vortex 30 sec** for each of dilution step.

HRP Conjugate (55 µl) – Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. The vial contains 55 µL HRP Conjugate sufficient for one 96-well plate. If the volume is less than 55 µL, add sterile 1 x PBS to reach 55 µL and vortex 10 sec. Make 1:200 dilutions in 1 x PBS. If the entire 96-well plate is used, add 53 µL of HRP Conjugate to 10.5 mL of 1 x PBS to make **working dilution of HRP Conjugate** and vortex 30 sec prior to the assay. The rest of undiluted HRP Conjugate can be stored at 4°C for up to 6 months. **DO NOT FREEZE.**

20 x PBS, pH 7.3, 25 mL- Dilute to 1 x PBS with deionized distilled water and mix well prior to use.

20 x Assay Buffer, 20 mL- Dilute to 1 x Assay Buffer with 1 x PBS prior to use.

Substrate Solution, 10.5 mL.

Stop Solution, 5.5 mL.

Sample types: Plasma, serum, cell/tissue lysates, cell culture supernatant, synovial fluid (SF), bronchoalveolar lavage (BALF), cerebrospinal fluid (CSF), urine, other biological fluid.



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Assay Procedure

1. Lift the plate cover from the top left and cover the wells that are not used. **Vortex the standards and samples for 10 sec** before applying to the plate. Add 100 µL of **diluted sample** (see below) or **standard** per well and use duplicate wells for each standard or sample. Cover the 96-well plate and incubate 1 hour at room temperature. Attention: **MUST vortex standards and samples for 10 sec before pipetting to the wells!**
2. Aspirate each well and wash with **1 x Assay Buffer**, repeating the process one time for a total of two washes. Wash by filling each well with 1 x Assay Buffer (300 µL) using a multi-channel pipette, manifold dispenser or auto-washer. Complete removal of liquid at each step is essential for good performance. After the last wash, remove any remaining Assay Buffer by aspirating or by inverting the plate and blotting it against clean paper towels.
3. Add 100 µL of the **working dilution of Detection Antibody** to each well. Cover the plate and incubate 1 hour at room temperature.
4. Repeat the aspiration/wash as in step 2.
5. Add 100 µL of the **working dilution of HRP Conjugate** to each well. Cover the plate and incubate for 20 minutes at room temperature. Avoid placing the plate in direct light.
6. Repeat the aspiration/wash as in step 2.
7. Add 100 µL of **Substrate Solution** to each well. Incubate for up to 20 minutes (**depending on signal**) at room. Over incubation of the substrate will result in over flow of high standard and thus should be avoided. Avoid placing the plate in direct light.
8. Add 50 µL 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.

Sample dilution: Samples should be diluted with four volumes of 1 x Assay Buffer and **vortex for 1 min** prior to assay. If the OD value still exceeds the upper limit of the standard curve, further dilution is recommended till it falls in the detection range and the dilution factor must be used for calculation of the concentration.

Precaution and Technical Notes

1. It is critical to follow the procedure step by step otherwise appropriate color development may not occur as expected.
2. A standard curve should be generated for each set of samples assayed. Thorough mixing of standards at each of dilution steps is critical to acquire a normal standard curve and **vortex again (10 sec) before pipetting to the 96-well plate.**
3. HRP Conjugate contains enzyme, DO NOT mass up with Detection Antibody.
4. The Stop Solution is an acid solution, handle with caution.
5. This kit should not be used beyond the expiration date on the label.
6. A thorough and consistent wash technique is essential for proper assay performance.
7. Use a fresh reagent reservoir and pipette tips for each step.
8. It is recommended that all standards and samples be assayed in duplicate.
9. Avoid microbial contamination of reagents and buffers. This may interfere with the sensitivity of the assay.



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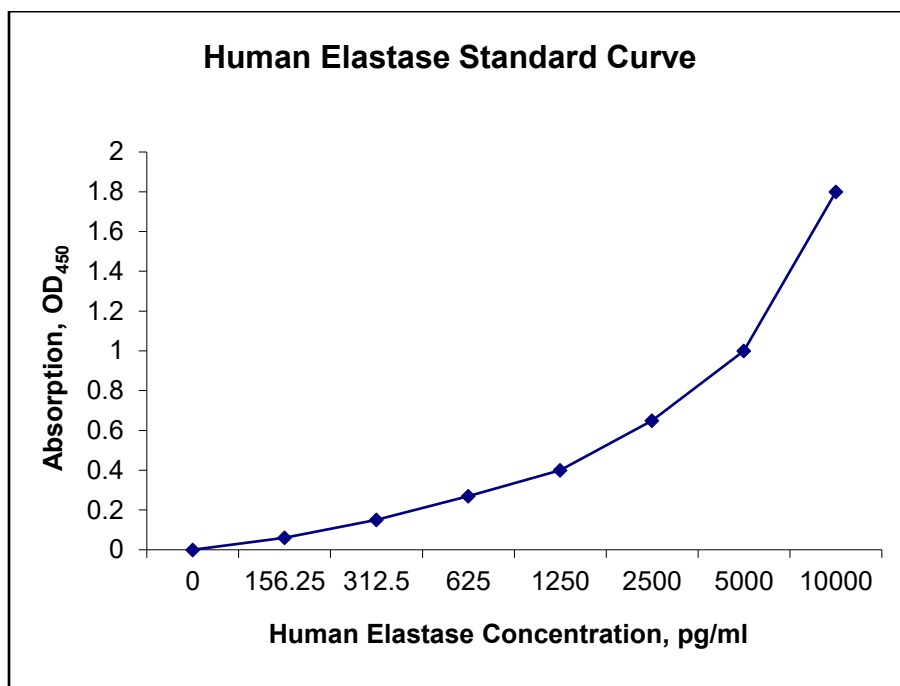
Calculation of Results

Average the duplicate readings for each standard, control, and sample and subtract the average zero (blank) 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 Elastase 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. If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.

The Standard Curve

The graph below represents typical data generated when using this Human Elastase ELISA Kit. The standard curve was calculated using a computer generated 4-PL curve-fit. For this case, a Bio-Rad iMark™ Microplate Reader and a Microplate Manager 6 Software were used to generate this curve. The correlation coefficient (r^2) is 0.999-1.000.





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Specificity

The following recombinant Human proteins prepared at 10 ng/ml were tested and exhibited no cross-reactivity or interference.

ApoAI, BMP4, CRP, HGF, HSP27, IL-1 α , IL-23, IFN γ , MMP-2, PDGF, PLA2G7, prolactin, TGF β 1, TLR3, TNF- α , VEGF.

Calibration

This kit is calibrated against a highly purified recombinant Human Elastase.

Detection Range

156-10,000 pg/ml

Assay Sensitivity

30 pg/ml

Assay Precision

Intra-Assay %CV: 6; Inter-Assay %CV: 9

Sample types: Plasma, serum, cell/tissue lysates, cell culture supernatant, synovial fluid (SF), bronchoalveolar lavage (BAF), cerebrospinal fluid (CSF), urine, other biological fluid.

Related products

1. GR239031 96-well microplate sealer plastic, pack of 100, \$99
2. GR238016 50 ml Reagent Reservoir, 100/case, 5 packs/case (pack of 20), \$99
3. GR238002 Microplate 12x8-Well Strip High Binding, Case of 50, \$488
4. GR238003 Microplate 12x8-Well Strip Medium Binding, Case of 50, \$342
5. GR238032 42592 Costar Stripwell Microplate 1 x 8 Flat Bottom, High Binding, Case of 100, \$1080
6. GR238001 468667 Thermo Microplate 12x8-Well Strip Nunc Maxisorp F8, Case of 60, \$697
7. GR238004 Tissue Culture 96-well Microplate, individually packed, Case of 50, \$286

DECLARATION

THIS REAGENT IS FOR IN VITRO LABORATORY TESTING AND RESEARCH USE ONLY. DO NOT USE IT FOR CLINICAL DIAGNOSTICS. DO NOT USE OR INJECT IT IN HUMANS AND ANIMALS.

**FOR LABORATORY RESEARCH USE ONLY
NOT FOR USE IN FELINES AND ANIMALS**



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Troubleshooting Guide

| Problem | Possible causes | Solution |
|---------------------------|--|--|
| Poor standard curve | <ul style="list-style-type: none"> Inaccurate pipetting Insufficient vortexing OD₄₅₀ too high for the high standard point Air bubbles in wells. Standard defect or not fully recovered | <ul style="list-style-type: none"> Check pipette calibration and ensure equal dispensing. Vortex 30 sec for each of standard dilution steps and vortex again (10 sec) before pipetting to the 96-well plate. Reduce substrate incubation time Remove air bubbles in wells by pipette tip. Change a standard vial or spin down the vial before reconstitution |
| Low signal | <ul style="list-style-type: none"> Improper preparation of reagents and storage Too brief incubation times Inadequate reagent volume or improper dilution Standard defect and sample overdiluted | <ul style="list-style-type: none"> Briefly spin down vials before opening. Reconstitute the powder thoroughly. Proper storage of plate and strip and detection antibody after first usage as shown in the datasheet. Microplate shaker may improve signals. Ensure sufficient incubation time including substrate incubation. Increase sample incubation to 2 hours. Change a Standard vial. Sample undilute or less dilution |
| Overflow in the standards | <ul style="list-style-type: none"> Substrate incubation too long Air bubbles in wells | <ul style="list-style-type: none"> Observe the color development every 1-2 mins and reduce substrate incubation time. Stop the reaction by adding 50 µl of Stop Solution when it turns to dark blue in the highest concentration of standard wells. Remove air bubbles in wells |
| Large CV | <ul style="list-style-type: none"> Inaccurate pipetting and mixing Improper standard/sample dilutions. Air bubbles in wells. | <ul style="list-style-type: none"> Check pipettes and ensure the pipette is calibrated properly. Ensure accurate pipetting and thorough mixing and equal dispensing. Wet tips before pipetting. Use reverse, instead of forward, pipetting. Use the correct dilution buffers Remove air bubbles in wells by pipette tip. |
| High background | <ul style="list-style-type: none"> Reagent reservoir issue Plate is insufficiently washed and air bubbles in wells. Contaminated Assay Buffer Pipet tip contaminated | <ul style="list-style-type: none"> Use a new reagent reservoir for Substrate Solution. Increase wash to 4 times before adding substrate and ensure plate washer functions normally. Remove air bubbles in wells by pipette tip. Use squirt bottle for washing. Make fresh Assay Buffer and wash thoroughly. Use new pipette tips for blank wells. |
| No signal detected | <ul style="list-style-type: none"> The procedure was misconducted. Failures of spin down the contents in Detection Antibody and Standards. Failure of Substrate or HRP Samples overdiluted | <ul style="list-style-type: none"> Ensure the step-by-step protocol. Spin vials of Detection antibody and Standard to complete recover the content. Mix 100 µl of Substrate with 0.5 µl HRP and deep blue color should develop in 2 min. Try a new standard vial and use positive control. Try not dilute samples |
| Low sensitivity | <ul style="list-style-type: none"> Improper dilutions of standards Improper storage of the ELISA kit | <ul style="list-style-type: none"> Ensure accurate and thorough dilutions of standards at each step. Store detection antibody at -20°C after reconstitution, others at 4°C. Keep substrate solution protected from light. |