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Datasheet for 200-301-MU9

ModDetect® Phosphorothioate Clone PS03

Overview

Description:	ModDetect® Phosphorothioate Clone PS03 - 200-301-MU9
Item No.:	200-301-MU9
Size:	100 µg
Applications:	ELISA, IF, Multiplex, IHC
Host Species:	Mouse

Product Details

Background:	Current studies focusing on RNA therapeutics use as potential drugs antisense oligonucleotides (ASO), short interfering RNA (siRNA), and micro RNA (miRNA). The choice of oligonucleotide chosen for a specific treatment is dependent on many factors. However, all oligo therapeutics must be modified in some manner, as unmodified nucleotides are difficult to identify and are highly susceptible to degradation by endogenous nucleases. Modifications can be created within the sugar-phosphate backbone (first generation), the ribose sugar (second and third generation), or at multiple locations (third generation). Antibodies to modified oligonucleotides are useful for basic immunoassays including, ELISA, IHC, and IF. In addition, several types of toxicology assays (immunogenicity assays), such as antibody-drug assays (ADA) or other pharmacokinetic (PK) and pharmacodynamic (PD) studies require oligonucleotide antibodies as analytical tools for general research and preclinical trial experiments. Antibodies to an oligonucleotide therapeutic allow researchers to assess cellular uptake, tissue distribution, and can serve as a positive control for immunogenicity studies.
Synonyms:	Phosphorothioate, PS, ASO, anti-sense oligonucleotide, siRNA, RNA therapeutic
Host Species:	Mouse
Clonality:	Monoclonal
Clone ID:	PS03
Format:	IgG2a

Target Details

Immunogen Type:	Other

Immunogen:	ModDetect® Phosphorothioate Clone PS03 was prepared from cell culture supernatant produced by repeated immunizations with a proprietary oligo sequence.
Purity/Specificity:	This Protein A purified ModDetect® Phosphorothioate Clone PS03 is directed against phosphorothioate modified backbone. This product was Protein A purified from monospecific supernatant.
Relevant Links:	• 200-301-MU9 SDS

Application Details

Tested Applications:	ELISA, IF, Multiplex
Suggested Applications:	IHC (Based on references)
Application Note:	ModDetect® Phosphorothioate Clone PS03 has been validated for use in ELISA. In antigen-down or immunometric ELISAs, the ModDetect® Phosphorothioate Clone PS03 preferentially detects phosphorothioate modified phosphate groups over native phosphodiester sugar-phosphate backbones. It also works in IF and IHC assays. All assays should be optimized for sensitivity, specificity, and conditions by the user.
Assay Dilutions:	All assays should be optimized by the user. Recommended dilutions (if any) may be listed below.

Formulation

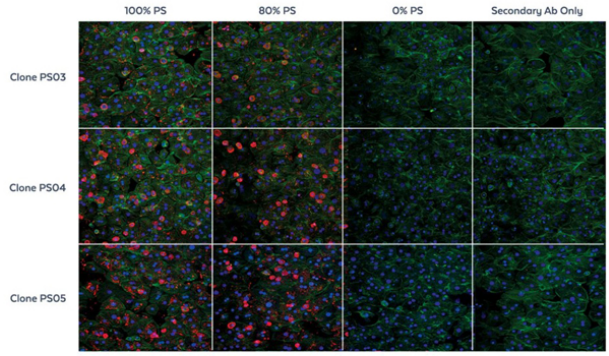
Physical State:	Liquid (sterile filtered)
Concentration:	1.040 mg/mL by UV absorbance at 280 nm
Buffer:	0.02 M Potassium Phosphate, 0.15 M Sodium Chloride, pH 7.2
Preservative:	0.01% (w/v) Sodium Azide
Stabilizer:	10 mg/mL Bovine Serum Albumin (BSA) - Immunoglobulin and Protease free

Shipping & Handling

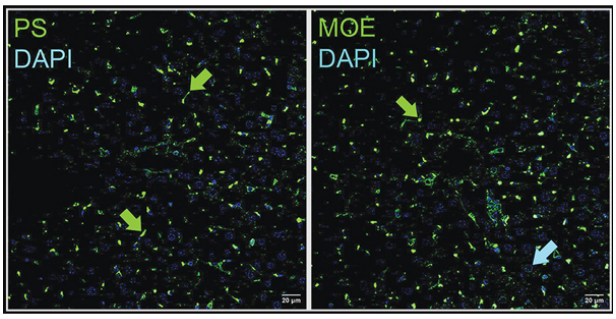
Shipping Condition:	Dry Ice
Storage Condition:	Store vial at -20° C or below prior to opening. Store the vial at -20°C or below after dilution. Avoid cycles of freezing and thawing.
Expiration:	Expiration date is one (1) year from date of receipt.

Images

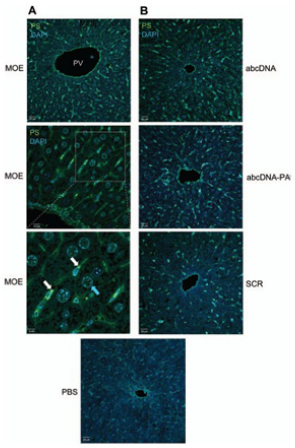
Vial
ModDetect® Phosphorothioate Clone PS03



Immunofluorescence Microscopy
Biodistribution of ONT drug using selected Anti-PS monoclonal antibodies.
Human hepatocytes were treated with ASO by free uptake and then stained by immunofluorescence microscopy with DAPI (blue), phalloidin (green), and anti-PS antibody (red). ModDetect® Anti-PS antibodies were used at a dilution range of 1:200 to 1:1000. The top panel of images represents staining using clone PS03 (p/n 200-301-MU9), the middle panel clone PS04 (p/n 200-301-MV0), and the bottom panel clone PS05 (p/n 200-301-MV1), respectively. Tissue was treated either with 100% modified ASO, 80% modified ASO, unmodified ASO, or with secondary antibody only as a negative control. Panels for 100% and 80% modified drug show clear staining of cells containing the ASO. The larger cells stained red are believed to be apoptotic hepatocytes.

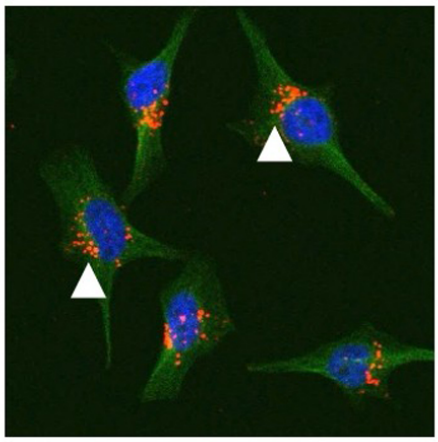


Immunofluorescence Microscopy
Immunohistochemistry of a systemically delivered ASO in mice.
A 2′-MOE modified gapmer with PS bonds (MOE/PS) was delivered subcutaneously to mice and fixed liver tissue immunostained with ModDetect® anti-PS clone PS03 (p/n 200-301-MU9) or anti-MOE clone MOE4 (p/n 200-301-NF2) antibodies independently as indicated. Representative positive immunostaining (green arrows) indicates accumulation of the ASO in nonparenchymal cells surrounding hepatocytes (blue arrows indicate example large hepatic nuclei, DAPI). Images taken by confocal microscopy at 20x. Scale bars as indicated. FIG. 5A.
PMID: 40685980.

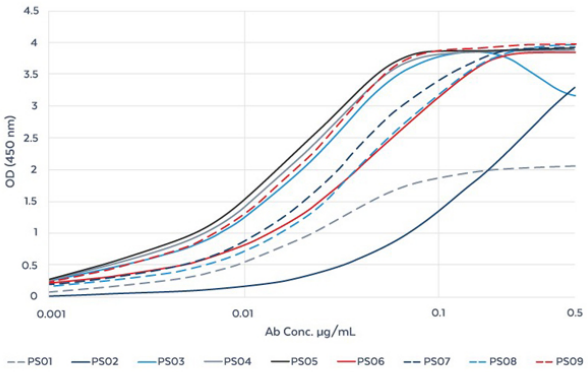


Immunofluorescence Microscopy
Immunohistochemistry of ASOs in liver after systemic delivery.

(A) Immunostaining of representative liver sections with an anti-PS antibody (p/n 200-301-MU9) after 4 weekly doses of a Malat-1 20-MOE gapmer. A region of tissue is shown with a portal vein (PV, top panel) with higher magnification (lower panels) showing anti-PS signal accumulation in non-parenchymal cells (white arrows) and not hepatocytes (blue arrow indicates a hepatocyte nuclei stained with DAPI).
(B) Immunostaining of liver tissue after 4 weekly doses of the ASOs indicated showing accumulation in non-parenchymal cells. No positive staining is observed from mice dosed with PBS. Scale bars as indicated. 20-MOE, 20-O-methoxyethylribose; PS, phosphorothioate. FIG. 5.
PMID: 41711123

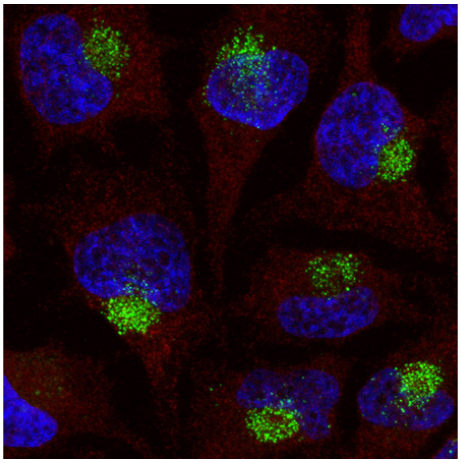


Immunofluorescence Microscopy
ModDetect® PS03 (p/n 200-301-MU9) detects ASO59. (A) IF of HeLa cells following free uptake (1 µM) of ASO59 for 24 h. Arrowheads highlight the ModDetect® PS03 signal. Images are at 20ξ magnification with zoomed-in frames. PS03 (red), Tubulin (green), DAPI (blue). Citation Krainer A. Figure S5.



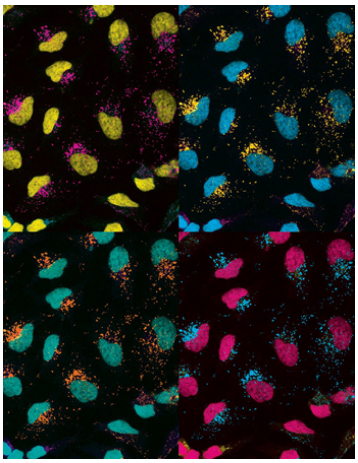
ELISA

ELISA profiles of 9 ModDetect® Phosphorothioate Detection reagents reactive to control oligonucleotides. Fully PS-modified positive control ASOs were used to show differential sensitivity and specificity of ModDetect® Phosphorothioate clones selected for validation. Clones were not reactive with the same sequence synthesized with PO backbones (data not shown). Each well was coated in duplicate with 5 µg/mL of BSA-oligo conjugate. The starting dilution of antibody was 5 µg/mL and the X-axis represents the Log10 of a 3-fold dilution. This titration is a 4-parameter curve fit where the IC50 is defined as the titer of the antibody. Assay performed using 3% fish gel, Mouse IgG (gamma 1, 2a, 2b and 3 chain) Antibody Peroxidase Conjugated (p/n 610-403-C46) and TMB ELISA Peroxidase Substrate (p/n TMBE-1000).

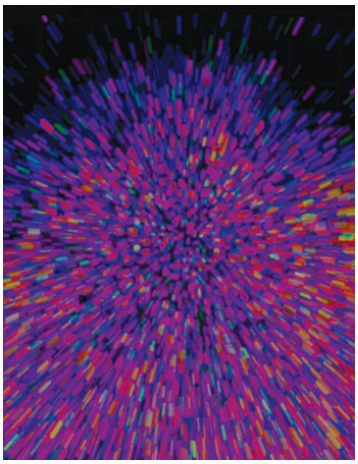


Immunofluorescence Microscopy

Immunofluorescence microscopy using anti-PS monoclonal antibody clone PS03. HeLa cells were cultured and treated with 100 nM of a fully-PS modified 16-mer MALAT-1 ASO by gymnosis for 72 h. After fixation with paraformaldehyde, cells were incubated with a 1:1,000 dilution of anti-PS monoclonal antibody clone PS03 (green) in PBS and an anti-alpha tubulin (red) antibody followed by counterstaining of nuclei with DAPI (blue). Cytoplasmic accumulation of signal indicative of endosomal compartmentalization is observed. Data generated by Inês Fial, Nucleic Acid Therapy Accelerator (NATA).
Fig. 3. PMID: 39993214



Immunofluorescence Microscopy
Immunofluorescence using ModDetect®. Immunoassays, enabled by highly specific monoclonal antibodies to chemical modifications common to many oligonucleotide therapeutics, empower researchers to consider novel approaches to assess the safety and efficacy of this class of drugs. This image, featured on the cover of OTS Nucleic Acid Therapeutics, Vol. 35, No. 1, February 2025, shows immunofluorescent staining of HeLa cells after gymnotic uptake of a 16-mer LNA gapmer ASO followed by incubation with a monoclonal antibody specific for phosphorothioate modified inter nucleotide linkages. The punctate staining represents the localization of drug within cells. Nuclei are also counterstained. Image provided by Ineˆs Fial, Nucleic Acid Therapy Accelerator (NATA). The caption and Warholian cover were provided by corresponding author, Carl Ascoli of Rockland Immunochemicals, Inc., Limerick, PA, on behalf of the co-authors of the Issues in Development paper, 'Bioanalytical Assays for Oligonucleotide Therapeutics: Adding Antibody-based Immunoassays to the Toolbox as an Orthogonal Approach to LC-MS/MS and Ligand Binding Assays' (Chimento et al., PMID: 39993214).



Immunocytochemistry
Immunocytochemistry using ModDetect®. This image, featured on the cover of OTS Nucleic Acid Therapeutics, Vol. 35, No. 4, August 2025, features a three-dimensional reconstruction with pseudo-color rendering of a spheroid culture with staining for cell nuclei and immunocytochemistry using antibodies to detect endosomes and the phosphorothioate (PS) modification of an antisense oligonucleotide. These cultures were used as part of a benchmarking study in cells and tissue to assess the ModDetect series of antibodies raised against PS and 2'-MOE.
Image provided by Peter Oliver of the Medical Research Council Nucleic Acid Therapy Accelerator, Research Complex at Harwell, Didcot, UK.

References

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