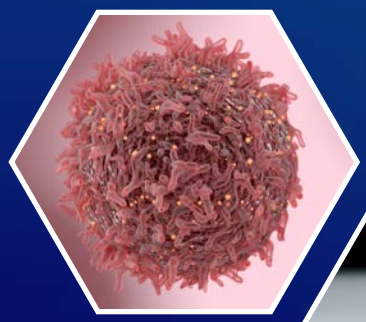
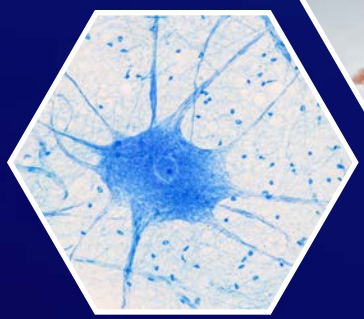
aum BIOTECH

aumbiotech.com





Single-Step RNA Silencing

- Guaranteed RNA knockdown
- Self-delivery without transfection reagents
- Alternative to siRNA, shRNA & CRISPR

Advancing Biomedical Research

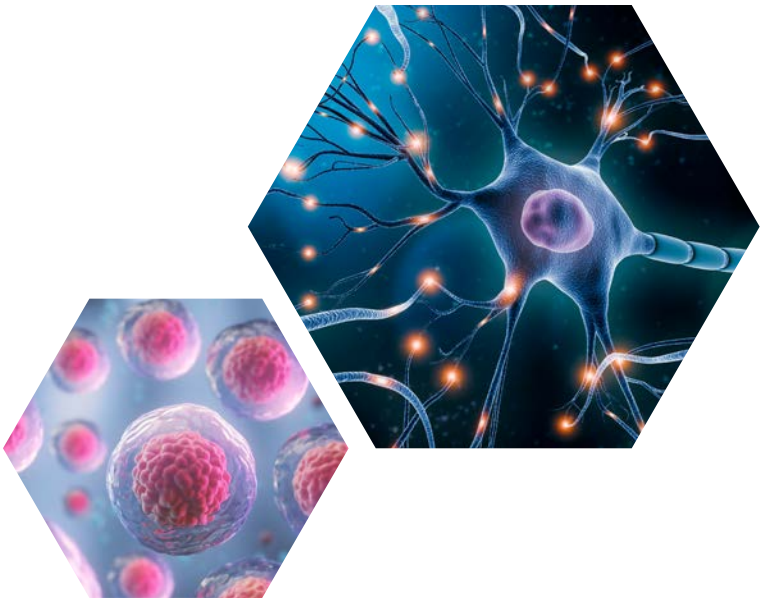
AUM*silence* ASOs for RNA Silencing

AUM BioTech's RNA silencing and regulation products, powered by AUM*silence* antisense oligonucleotide (AUM*silence* ASO), can be used to efficiently silence or regulate a variety of RNA modalities like messenger RNA, microRNA and long non-coding RNA. AUM*silence* ASOs can also be used for screening, target identification, discovery and translational research; AUM*silence* ASO technology is also being used for therapeutic development. AUM*silence* ASOs do not need any transfection or delivery agents or formulations, making them superior alternative to siRNAs, shRNA, or CRISPR approaches.

AUM*silence* ASOs can effectively and efficiently perform all these activities:

- Highly potent knockdown and effective regulation of the target RNA with no toxicity
- Ability to bind to the target RNA (mRNA, miRNA or lncRNA) in a high sequence specific manner
- Efficient delivery without an external source (e.g. without a transfection agent, formulation, conjugate, or viral vector)

Self-delivering AUM*silence* ASOs provide superior performance for a wide range of cell types including difficult-to-transfect primary cells like B-cells, T-cells, neurons, etc. as well as *in vivo* study models.



SELF DELIVERY

Lipid-based transfection and electroporation approaches are widely utilized, conventional methods to deliver siRNA into the cells. However, in many primary cells, particularly immune cells, hematopoietic cells and neurons, lipid reagents and electroporation are associated with high toxicity and poor transfection efficiency. Alternative delivery methods, such as viral vectors, require laborious optimization and viral production steps, and carry associated risk of genome integration.

AUM*silence* ASOs are uniquely designed and manufactured using thrid generation chemical modifications that enhance intracellular stability of the oligos, providing very high specificity as well as high binding affinity to the target RNA. AUM*silence* ASOs can be self-delivered into cells without any transfection reagents or electroporation. AUM*silence* ASOs can be used for animal studies without the need of delivery formulations or conjugates, thus making them ideal tools for preclinical research.

Advantages of AUM*silence* ASO for RNA Silencing and Regulation Studies

1. Can be used to target mRNA, miRNA, and lncRNA
2. Gymnotic or self-delivery of AUM*silence* ASOs by the cells without a delivery agent, conjugate, or viral vector — no transfection reagent needed
3. Ideal for hard-to-transfect cells such as primary cells (T- cells, B-cells, neuronal cultures, and others)
4. Ideal for *in vivo* studies using animal and fish models
5. Suitable for preclinical research
6. Non-toxic and resistant to degradation by serum and cellular nucleases
7. Long-term sustained silencing and does not alter the biology of cells as well as the experiment
8. No RISC-associated off target effects (as in case of siRNAs)
9. Ability to bind to RNA target with high affinity and specificity
10. Single-step knockdown that saves significant time and resources

Product Catalogue

OUR FLAGSHIP PRODUCTS

For both *in vitro* and *in vivo* experiments

AUM*silence*

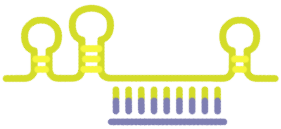
APPLICATION
mRNA knockdown

KEY FEATURES
Superior alternative to siRNA, shRNA, and CRISPR. No transfection reagents required. No toxicity.

AUM*antagomir*

APPLICATION
miRNA regulation

KEY FEATURES
Self-transfecting oligos serve as potent antagomirs by binding with miRNAs. It prevents hybridization with their target mRNAs.



AUM*lnc*

APPLICATION
lncRNA knockdown

KEY FEATURES
AUM*lnc* achieve potent RNase H-mediated cleavage of the target long non-coding RNA.

OTHER APPLICATIONS

AUM*mirblocker*

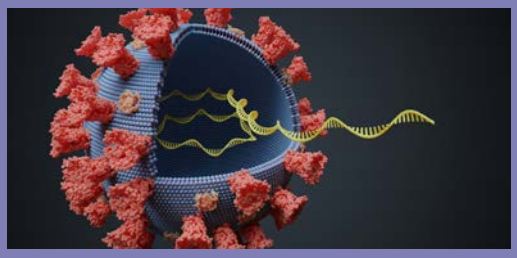
APPLICATION
miRNA regulation
KEY FEATURES
Bind with 3'UTR on mRNA and prevent inhibitory action of miRNA.

AUM*mimic*

APPLICATION
miRNA mimic
KEY FEATURES
Self-delivering oligos act as efficient miRNA mimics.

AUM*probe*

APPLICATION
Detection for *in vivo* and custom experiments
KEY FEATURES
ASOs can be fluorescently-labeled and used for various applications.



AUM*silence V+*

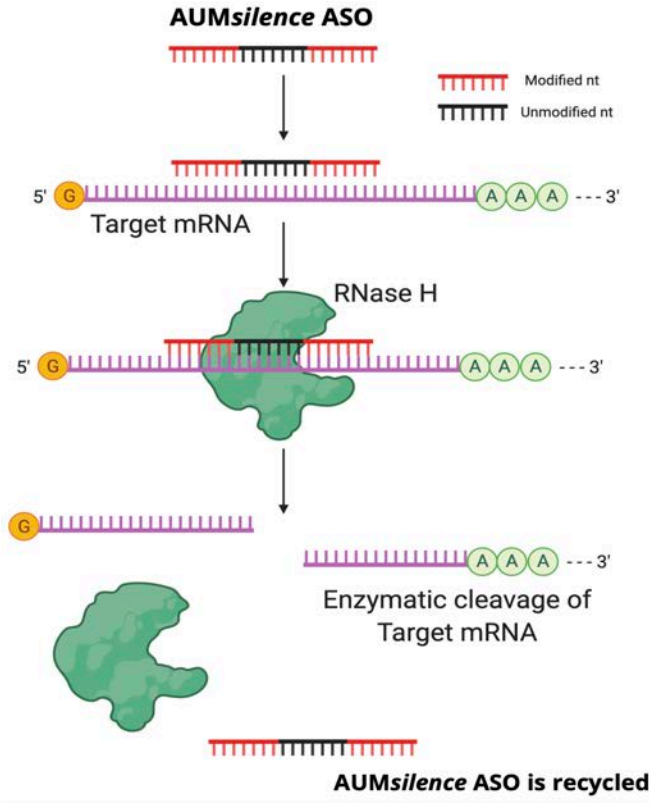
APPLICATION
Viral RNA knockdown
KEY FEATURES
Can target viral RNA and be used for inhibition of viral replication.

AUM*block*

APPLICATION
Translational control and exon skipping
KEY FEATURES
Inhibit translation (steric blocking) and exon skipping.

AUM*silence*

AUM*silence* ASOs for mRNA Silencing

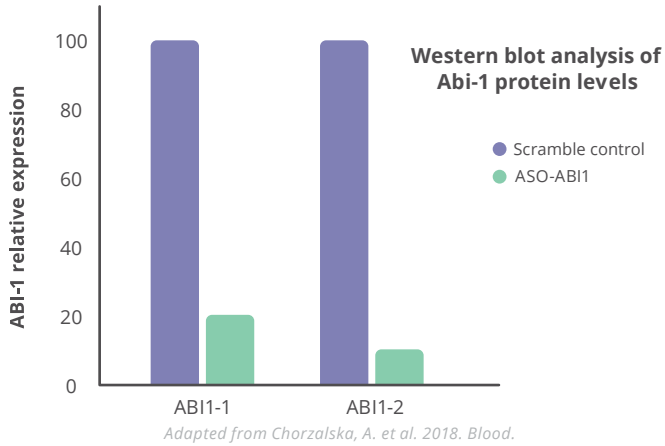


AUM*silence* ASOs provide potent and sequence specific mRNA knockdown. AUM*silence* ASOs allows simple and efficient delivery into difficult-to-transfect cells including primary cells. Additionally, AUM*silence* ASOs can also be used for animal and preclinical studies without the need of transfection reagents or additional chemical formulations or conjugations.

As opposed to the RNAi pathway (involving RISC machinery), AUM*silence* ASOs use RNase H-mediated cleavage. This mode of mRNA knockdown is simpler than siRNA-mediated knockdown and eliminates RISC-associated off-target effects often observed with siRNA. Unlike siRNAs that are processed in the cytoplasm, AUM*silence* ASO can enter the nucleus and can be used to target both cytoplasmic and nuclear RNA.

Knockdown of ABI1 by AUM*silence* ASOs in CD34+ isolated cells from bone marrow of healthy donors

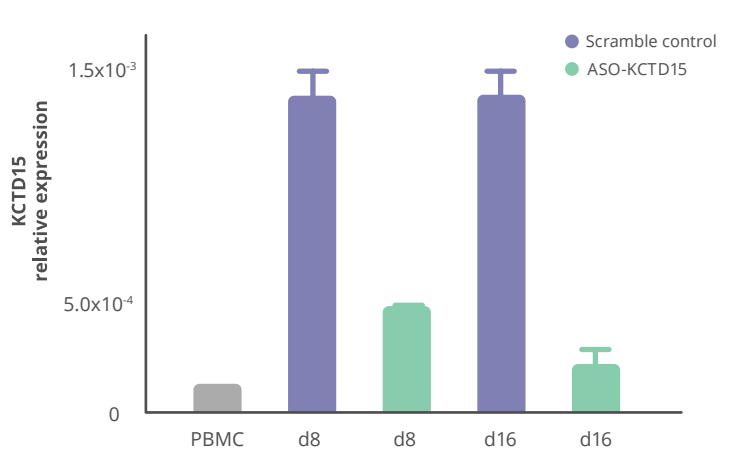
AUM*silence* ASOs penetrated 99% of CD34+ cells and mediated depletion of ABI1 protein. A 2-fold increase in CD34+ cells were detected in S-phase, confirming the direct link between Abi-1 loss and cell cycle activity.



Adapted from Chorzalska, A. et al. 2018. Blood.

AUM*silence* ASO-mediated knockdown of KCTD15 encoding gene in RS4;11 cells

AUM*silence* ASO-treated cells compared with controls showed a progressive decrease in the KCTD15 mRNA level for up to 16 days using a single dose. KCTD15 is strongly upregulated in patients with B-cell acute lymphoid leukemia and in derived continuous cell lines (e.g., RS4;11).



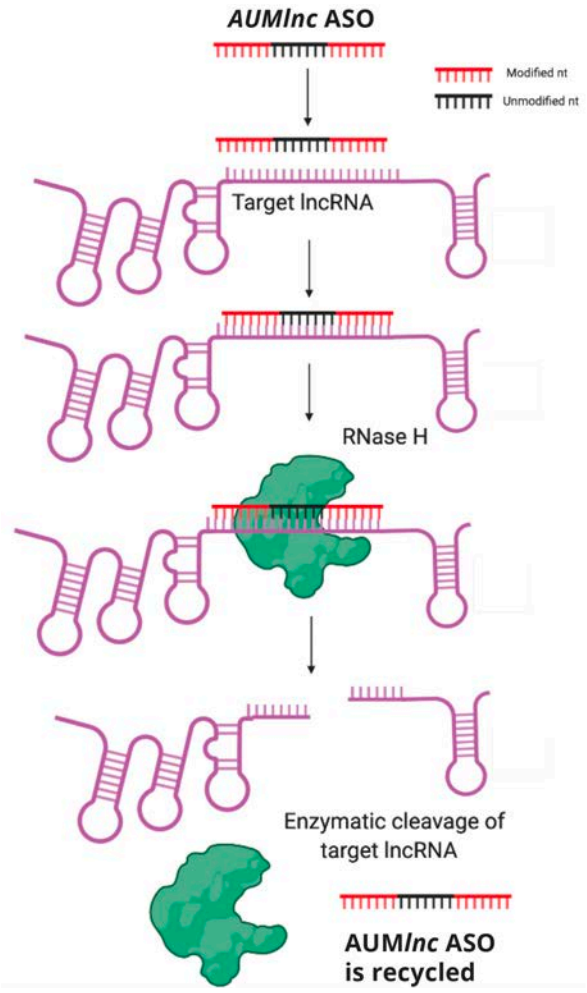
Adapted from Smaldone, G. et al. 2019. Scientific Reports.

AUM*lnc*

AUM*lnc* ASOs for lncRNA Silencing and Regulation

AUM*lnc* ASOs provides potent long non-coding RNA (lncRNA) knockdown. AUM*lnc* ASOs allows simple and efficient delivery into difficult-to-transfect cells including primary cells. Additionally, AUM*lnc* ASOs can also be used for animal and preclinical studies without the need of transfection reagents or additional chemical formulations.

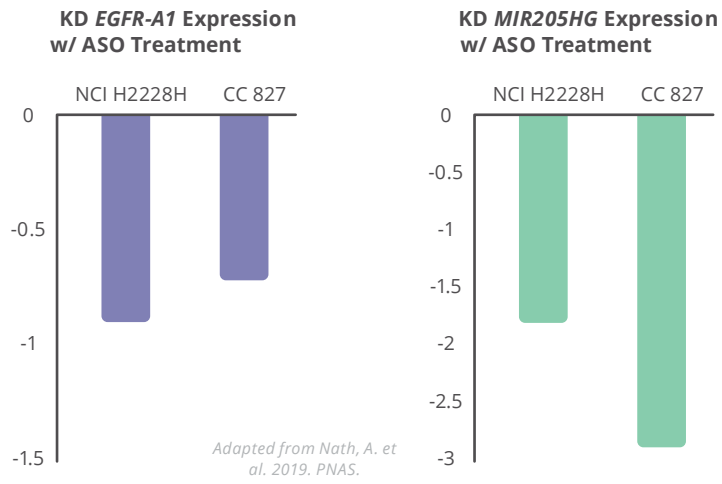
As opposed to the RNAi pathway (involving RISC), AUM*lnc* single-stranded ASOs use RNase H-mediated cleavage. This mode of lncRNA knockdown is simpler than siRNA-mediated knockdown and eliminates RISC-associated off-target effects often observed with siRNA. Self-delivering AUM*lnc* ASOs can enter the nucleus and can be used to target both cytoplasmic and nuclear RNA.



Achieve potent RNase H-mediated cleavage of the target long non-coding RNA

AUM*silence* ASO-mediated lncRNA knockdown of EGFR-AS1 and MIR205HG genes in Erlotinib sensitive cells (HCC 827 & NCI H2228)

qRT-PCRT analysis showed a significant decrease in EGFR-AS1 (blue) and MIR205HG (red) expression in cells treated with EGFR-AS1 or MIR205HG ASO compared to scrambled control. ASO-treated cells showed reduction in growth and higher proliferation rates. These in vitro experiments validated EGFR-AS1 and MIR205HG as determinants of Erlotinib response .



Protocols

AUM*silence* ASOs are uniquely designed and manufactured using state-of-the-art chemical modifications that allow for highly efficient cell delivery in the absence of transfection reagents, thus eliminating cell toxicity associated with lipid transfection reagents and electroporation. AUM*silence* ASOs have effective self-delivery and superior performance and work in a wide range of cell types, difficult-to-transfect primary cells (B-cells, T-cells, neurons, etc.), as well as in vivo study models.

In vivo-ready AUM*silence* ASO is engineered to be simple and effective for self-delivery into animals without the need of special formulations or conjugations. Self-delivering AUM*silence* ASOs can be efficiently taken up by the target tissues, and can significantly increase their stability and their resistance to endonucleases.

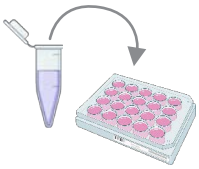
AUMsilence ASOs *In Vitro*

1. 

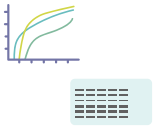
   Seed cells in the desired format for appropriate time (40-60% confluency recommended for most cell types) before treatment

2. 

   Reconstitute lyophilized AUM*silence* ASOs in the appropriate amount of water or buffer to make desired stock

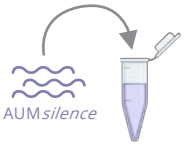
3. 

   Add AUM*silence* ASOs to the cells and media to the desired final concentration

4. 

   Analyze AUM*silence* ASO-treated cells at desired time points (typical time points range between 24-96 hours but can extend as per experimental

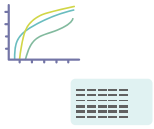
AUM*silence* ASOs *In Vivo*

1. 

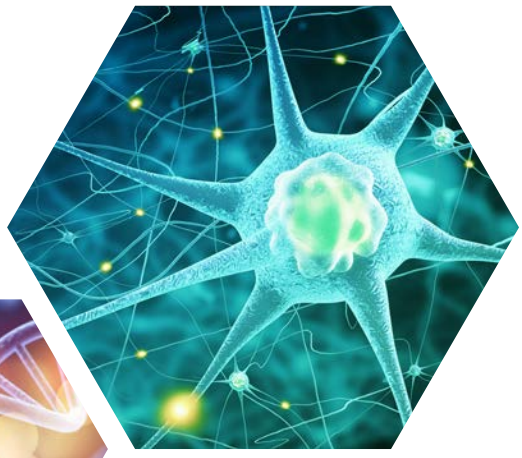
   Prepare a AUM*silence* ASO stock solution by reconstituting lyophilized AUM*silence* ASOs at the desired concentration

2. 

   Administer reconstituted AUM*silence* ASOs to animal via the preferred route

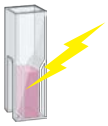
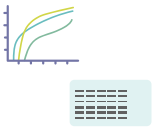
3. 

   Assay for gene knockdown in your target cells

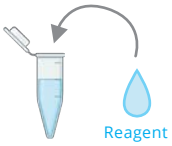
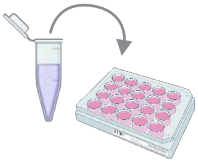


Compared to...

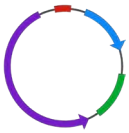
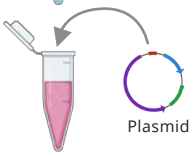
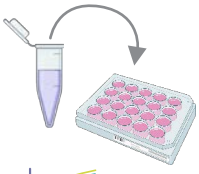
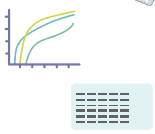
Electroporation Workflow

1.  Seed cells in the desired format
2.  Add siRNA to the buffer
3.  Add siRNA solution mixture to electroporation cuvette
4.  Electroporate
5.  Transfer the electroporated cells into culture medium
6.  Analyze cells 24-72 hours after electroporation or as needed

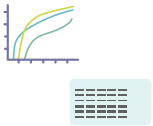
Transfection Workflow Using Lipids

1.  Seed cells in the desired format
2.  Dilute transfection reagent as recommended by the manufacturer
3.  Dilute siRNA as recommended by the manufacturer
4.  Combine the siRNA solution with the transfection reagent
5.  Incubate as per manufacturer's protocol
6.  Add the siRNA-transfection reagent complex to the cells
7.  Analyze cells 24-72 hours after or as needed

shRNA Plasmid Transduction

1.  Clone shRNA into the appropriate plasmid
2.  Seed cells in the desired format the day before treatment
3.  Dilute transfection reagent as recommended by the manufacturer
4.  Dilute plasmid DNA as recommended by the manufacturer
5.  Combine the diluted plasmid DNA with diluted transfection reagent
6.  Incubate as per manufacturer's protocol
7.  Add the plasmid-transfection reagent complexes to the cells
8.  Analyze shRNA-transfected cells as needed

shRNA Viral Vector Transduction

1.  Package shRNA into viral particles
2.  Transduce cells with viral particles
3.  Select transduced cells with antibiotic (5-7 days)
4.  Select clones
5.  Analyze shRNA-transfected cells as needed

Key Attributes of AUM*silence* ASO

A COMPARISON

AUM*silence*	vs	siRNA
Not required	Transfection reagents	Required
None	Toxicity	Probable due to use of transfection reagents
Easy and convenient 1-step process	Transition from cell culture to *in vivo* models	Require extensive optimization use of delivery reagents
Very high	Transfection reagents	Moderate
High	Stability	Low to moderate
Very high	Efficiency in hard-to-transfect cells	Moderate
No	RISC-associated off-target effects	Yes
High-binding affinity and specificity to the target RNA	Specificity	siRNA-grade binding affinity and specificity

AUM*silence*	vs	shRNA
Not required	Viral vectors	Required
None	Toxicity	Can be toxic
Easy and convenient process	Transition from cell culture to *in vivo* models	Require extensive optimization and need viral vectors
Easy to use and no viral vectors required	Basic cell lines	Need viral vectors and optimization
Easy to use and no viral vectors required	Primary cells and hard-to-transduce cells	No transduction needed
Very high	Time	Longer protocols and optimization
No	RISC-associated off-target effects	Yes
High-binding affinity and specificity to the target RNA	Specificity	shRNA-grade binding affinity and specificity

AUM*silence*	vs	CRISPR KO	CRISPRi
mRNA / lncRNA / miRNA	Targets	Genomic DNA	Genomic RNA
RNA	Target restrictions	PAM sequence	PAM sequence
Self-delivery	Cell delivery	Viral lipofection nucleofection	Required
RNase H catalysis or steric blocking high	Mode of action	Cas9 catalysis	Steric blocking
Reversible knockdown	Phenotype	Irreversible knockout	Reversible knockdown
High (>80%)	Efficiency	Low	Varies
1-2 days	Time	1-3 months	3-5 days
Low	Cost	High	High

Contact Us

For questions on products and protocols, please reach out to us through any of our channels. We have technical support 24/7 on our website.

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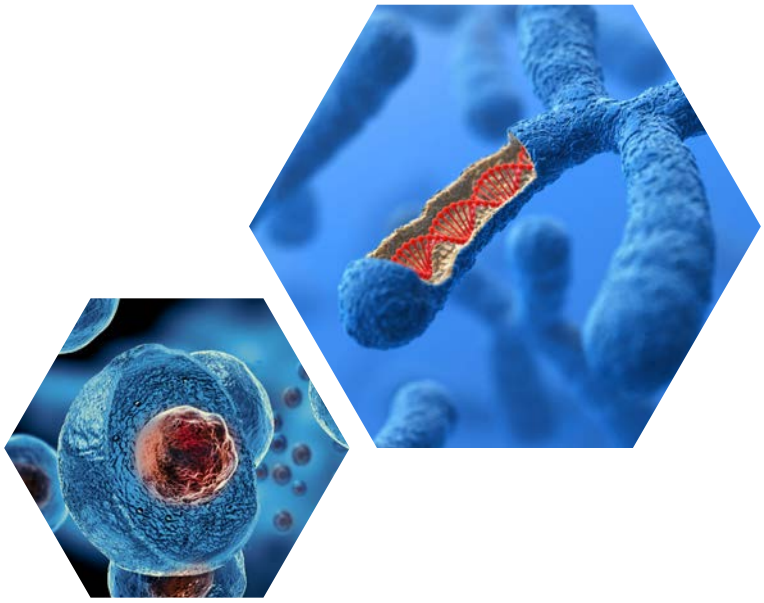
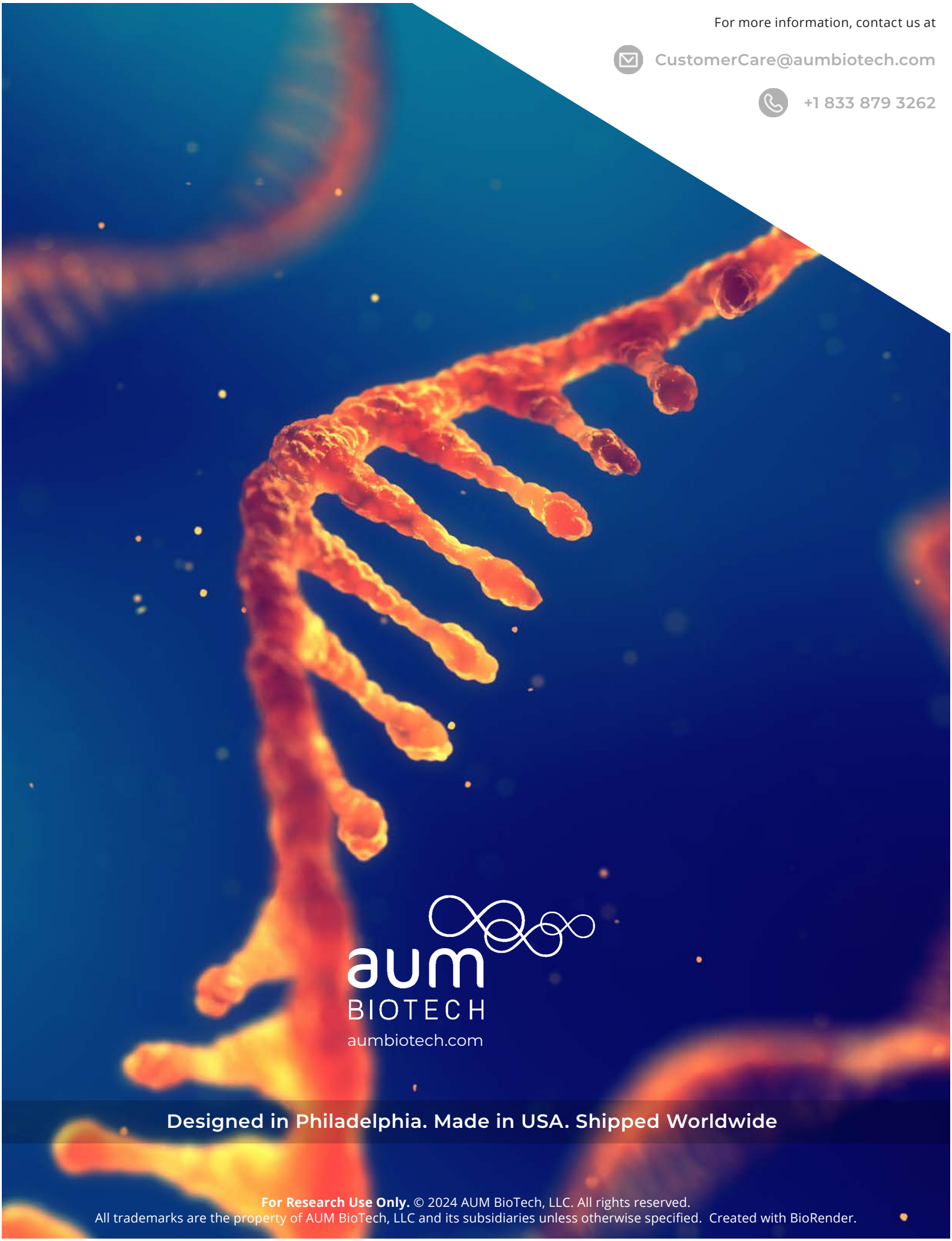


Handle with Care

1 AUM*silence* ASOs are shipped in lyophilized form. Upon arrival, store them in -20°C.

2 When ready to use, resuspend AUM*silence* ASOs in sterile water or your favorite buffer at the desired concentration. Aliquot resuspended AUM*silence* ASOs in working aliquots to avoid multiple freeze-thaw cycles.



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