Ver.1210

siRNA Synthesis Service

Custom and wide array of *siRNAs* of exceptionally high quality

- **High quality *siRNA* at an affordable price**
  - High-throughput RNA synthesis platforms produce *siRNA* of consistent and exceptionally high quality at an affordable price
- **Guaranteed highly purified *siRNA***
  - Purified by either Bioneer's proprietary BioRP column technology (free of charge) or by HPLC and PAGE (additional charge) to guarantee the highest possible purity
- **Each RNA is quality controlled**
  - Single-strand RNAs are checked via MALDI-TOF analysis (Fig. 1) and Double-stranded *siRNA* duplexes are confirmed by PAGE analysis (Fig. 2).
- **All Bioneer's *siRNA* products are manufactured in a state-of-the-art clean room**

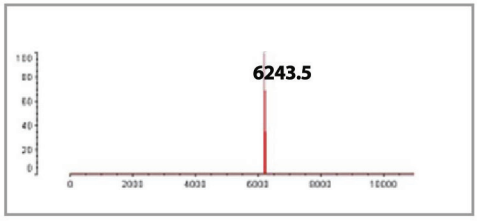


Figure 1. MALDI-TOF mass spectrometry analysis of the synthesized *siRNA*
All shipped *siRNAs* are processed through rigorous quality control (QC) procedures, including MALDI-TOF and gel analysis.

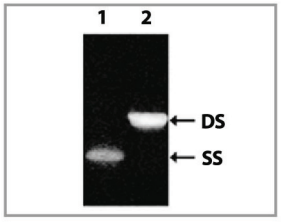
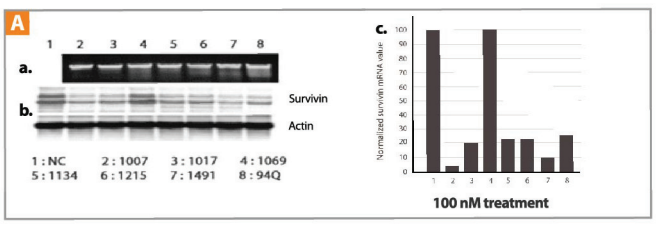


Figure 2. Complementary single-strand RNA strands were annealed to form double-stranded *siRNA*
The resulting *siRNA* was analyzed by 15 % non-denaturing PAGE. SS: single-strand RNA, DS: double-strand *siRNA*.

Turbo si-Designer

- **Bioneer's proprietary *siRNA* design algorithm**
- **Identify highly effective *siRNA* target sites with high success rates**
- **Highly effective in selecting functional *siRNAs*: 83.8% of the tested *siRNA* showed >70% knockdown and 38.1% elicited >90% knockdown**

Successful RNAi experiments in mammalian cultured cells depend upon several factors. Specifically it is important to design and identify effective and specific *siRNA* sites and to perform efficient and specific delivery of *siRNA* to the desired target cell types. To facilitate design process, Bioneer, in collaboration with the National Genome Information Center (NGIC) has developed Turbo si-Designer, (a proprietary *siRNA* selection algorithm). Turbo si-designer can identify highly effective *siRNA* target sites with superior success rates. The performance of the Turbo-si-designer was evaluated by designing hundreds of *siRNAs* and testing their knockdown efficacy by Real-Time PCR analysis. When compared with other web-based design tools, Turbo si-designer algorithm successfully predicted functional *siRNAs* at a high probability of efficient knockdown. Notably, *siRNAs* with the low NGIC score were mostly nonfunctional, indicating that ineffective *siRNAs* are efficiently removed by Turbo si-Designer (Fig. 3).



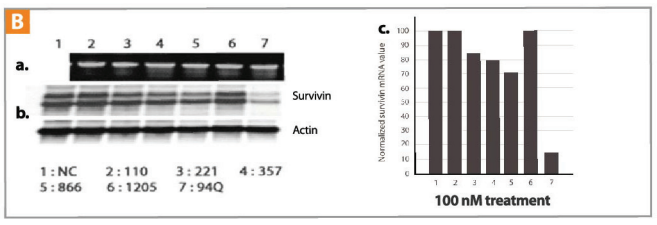


Figure 3. Knockdown efficiency of *siRNAs* designed by Turbo si-Designer was analyzed by Northern blot and Real-Time PCR analysis.
A) Knockdown efficiency of high score *siRNAs*. B) Knockdown efficiency of low score *siRNAs*. (a: siRNA 15% PAGE, b: Northern blot analysis, c: Real-Time PCR analysis)

BIONEER
Innovation • Value • Discovery

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AccuTarget™ Genome-Wide Predesigned *siRNA* Library

- ***AccuTarget***™ **Genome-wide Predesigned *siRNA* Libraries are available for about 44,359 genes of the human, mouse, and rat genomes**
- **Three top-scoring *siRNAs* per target gene are available**
- **At least one of the three *siRNA* candidates were reduced target mRNA levels by >70 % when transfected at 100 nM concentration**

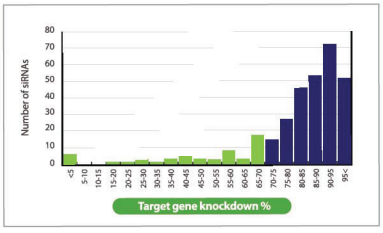


Figure 4. *AccuTarget*™ Genome-Wide predesigned *siRNA* library are highly effective.
To determine knockdown efficiency of predesigned *siRNAs*, HeLa cells were transfected with *siRNAs* at 100 nM concentration. Twenty four hours post-transfection, total RNA was isolated and the level of target mRNA was measured by QRT-PCR. This data demonstrates the effectiveness of the Turbo si-Designer algorithm: 83.8 % of tested *siRNAs* induced >70 % knockdown and 38.1% of tested siRNAs elicited >90 % knockdown.

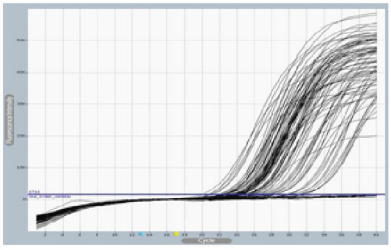
- **Validated *siRNA***
  - *siRNA* with proven knockdown efficiency
  - Greater than 70 % of knockdown is proven
  - Validated siRNA are provided as Tube types or Plate types at various scales (1, 5, 10, 20, 50 and 100 nmol)

Product	Purification	Scale
AccuTarget™ Genome-wide Predesigned *siRNA* library	BioRP/HPLC	5 nmole
		10 nmole
		20 nmole

AccuTarget™ Real-Time PCR Primer Library

- **Always ready-to-ship for 10,662 genes specific primers**
- **All primers containing 10,662 pairs verified amplification efficiency through *Exicycler*™ 96 and *AccuPower*® *GreenStar*™ qPCR PreMix**
- **New primers are continuously being updatedx**
- **High quality (100 % MALDI-TOF QC) and clean process (Manufactured clean room)**

A Fluorescence Aanalysis Data



B Melting Analysis Data

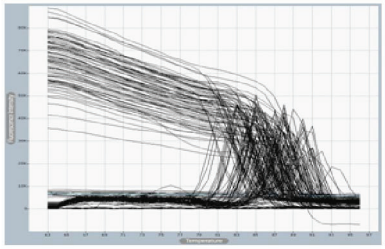


Figure 5. Real-Time PCR validation test of human Oxidoreductaseusing *AccuTarget*™ Human Oxidoreductase Real-Time PCR Primer Set.

Product	Purification	Scale
AccuTarget™ Real-Time PCR primer library	BioRP	50 rxns
		100 rxns
		200 rxns

AccuTarget™ Premade siRNA Sets

- Choose to purchase either 1, 2, or 3 *siRNA*(s) per target gene
- New library sets are continuously being updated
- To minimize the cost of a set for high throughput screening purposes the two *siRNAs* are provided at 0.1 nmole, 0.25 nmole, 0.5 nmole and 1 nmole

Gene Family Functional Class	Human Genes		Gene Family Functional Class	Human Genes	
	No. of Genes	No. of *siRNA*		No. of Genes	No. of *siRNA*
1. Antioxidant	38	144	14. Lyase	123	369
2. Apoptosis	290	870	15. Motor	122	366
3. Cancer	1158	3474	16. NF-kB pathway	37	111
4. Caspase	37	111	17. Nucleic acid binding	2589	7767
5. Cell cycle	112	336	18. Oxidoreductase	551	1653
6. Cyclase	22	66	19. Peptidase	495	1485
7. Cytochrome P450	52	156	20. Phosphatase	188	564
8. Deaminase	22	66	21. Receptor	1526	4578
9. GPCR signaling pathway	732	2196	22. Transferase	1431	4293
10. Helicase	115	345	23. Transporter	1023	3069
11. Isomerase	104	312	24. Tubulin	20	60
12. Kinase	700	2100	25. Ubiquitin	77	231
13. Ligase	272	816			

Product	Purification	Scale
AccuTarget™ Premade *siRNA* sets	BioRP/HPLC	1 *siRNA* (0.25, 0.5, 2 nmole)
		2 *siRNA* (0.25, 0.5, 2 nmole)
		3 *siRNA* (0.25, 0.5, 2 nmole)
AccuTarget™ Human Druggable Set	BioRP/HPLC	2 nmole (minimum order 10 *siRNAs*)

AccuTarget™ Control siRNAs

- Positive control *siRNA* (Human GAPDH, GFP, Luciferase) and Negative control *siRNA* (commonly used for Human, Mouse and Rat) are available
- Fluorescently labeled *siRNA* can be used for monitoring transfection efficiency *AccuTarget*™ control *siRNA* (Positive & Negative)
- Convenient and cost-effective
- Various scales (1, 5, 10, 20 nmol) and the option of purification methods (BioRP or HPLC)

Positive Control *siRNA*

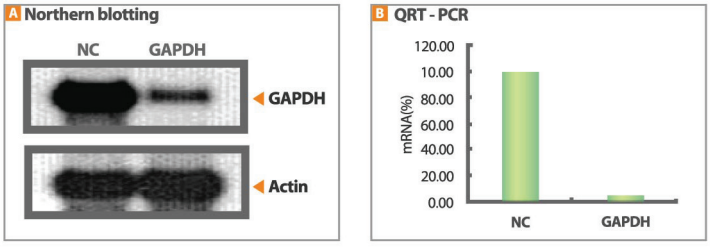


Figure 6. HeLa cells were transfected with GAPDH and NC (Negative Control) *siRNA*. Twenty four hours post-transfection, total cellular RNA was isolated from transfected cells and subjected to Northern blot and Real-Time PCR analyses. Highly efficient knockdown of GAPDH mRNA can be easily achieved using our positive control GAPDH *siRNA*.

Negative Control *siRNA*

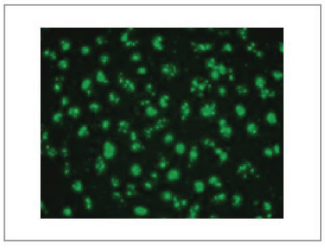


Figure 7. HeLa cells transfected with FITC-labeled NC *siRNA* (Cat No.: SN-1021) was observed by confocal microscopy. The fluorescent cells indicate that the target cells were successfully transfected with the *siRNA*.

Product	Purification	Scale
AccuTarget™ Negative control *siRNA*	BioRP/HPLC	5 nmole
		10 nmole
		20 nmole
AccuTarget™ Positive control *siRNA* (Human GAPDH, GFP, Luciferase *siRNA*)	BioRP/HPLC	5 nmole
		10 nmole
		20 nmole
AccuTarget™ Fluorescein labeled negative control	HPLC	5 nmole
		10 nmole
		20 nmole
AccuTarget™ GAPDH Control siRNA Set, 5 nmole(Positive) + 2 nmole(Negative)	BioRP/HPLC	(5P + 2N) nmole
AccuTarget™ GFP Control siRNA Set, 5 nmole(Positive) + 2 nmole(Negative)	BioRP/HPLC	(5P + 2N) nmole
AccuTarget™ Luciferase Control siRNA Set, 5 nmole(Positive) + 2 nmole(Negative)	BioRP/HPLC	(5P + 2N) nmole

AccuTarget™ Custom Designed *siRNA* Synthesis

- **High-throughput synthesis system (384 parallel synthesizer) and automatic purification system (BioRP & HPLC)**
- **High quality (100 % MALDI-TOF QC) and clean process (Manufactured clean room)**
- **100 % satisfaction guarantee**

Bioneer's High-throughput RNA synthesis platforms produce *siRNA* of consistent and exceptionally high quality at an affordable price. Custom synthesized *siRNAs* are provided in various formats and amounts, and many different types of modifications including fluorescent labels.

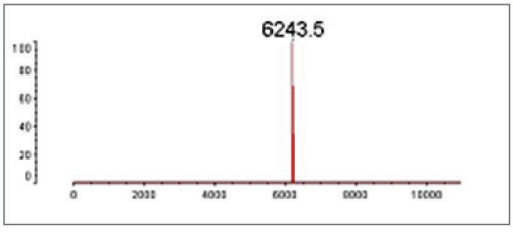


Figure 8. MALDI-TOF mass spectrometry analysis of the synthesized *siRNA*.
All shipped *siRNAs* are processed through quality control (QC) procedures, including MALDI-TOF and gel analysis.

Figure 9. All *siRNAs* are manufactured in clean room

Product	Purification	Scale
AccuTarget™ Custom designed *siRNA* synthesis	BioRP/HPLC	10 nmole
		20 nmole
		50 nmole
		100 nmole

miRNA Synthesis Service

AccuTarget™ Human *miRNA* Mimic & Inhibitor Library

Ready-to-transfect *miRNA* mimics behave like endogenous *miRNAs* and inhibitors suppress target *miRNA* activity to study loss-of-function effects after transfection into cells.

- **Purification**
  - For your more demanding applications, Bioneer's automated HPLC and Bio-RP purification methods ensure high quality, high-throughput *miRNA* mimics and inhibitors at an affordable price
- **Affordable pricing**
  - Bioneer provides a variety of high quality *miRNA* products at an affordable price
- **Synthesis and QC**
  - Bioneer *miRNA* mimics and inhibitors are produced in clean room facility by fully automated high-throughput *miRNA* production system. Bioneer *miRNA* products are assessed by MALDI-TOF Mass spectrometry analysis. Mass spec data is provided with every *miRNA* mimic and inhibitor. Additionally, *miRNA* mimics are tested by gel electrophoresis to verify that both RNA strands annealed properly

AccuTarget™ Custom *miRNAs*

Product	Purification	Scale
AccuTarget™ Human *miRNA* mimic	BioRP	5 nmole
	BioRP	10 nmole
	BioRP	20 nmole
AccuTarget™ Human *miRNA* inhibitor	BioRP	5 nmole
	BioRP	10 nmole
	BioRP	20 nmole

AccuTarget™ library *miRNAs*

Product	Purification	Scale
AccuTarget™ Human *miRNA* mimic	BioRP	0.25 nmole
	BioRP	0.5 nmole
	BioRP	1 nmole
AccuTarget™ Human *miRNA* inhibitorr	BioRP	2 nmole
	BioRP	0.25 nmole
	BioRP	0.5 nmole

AccuTarget™ *miRNA* Mimic Controls

- **Excellent performance**
  - *miRNA* Houskeeping Positive controls targeting GAPDH with clear read-out of mimic function (knockdown efficiency of >90 %) *miRNA* mimic Negative controls with minimal sequence identity with *miRNAs* in human, mouse and rat
- **Monitoring of transfection rate**
  - Fluorescently labeled Negative controls for conveniently monitoring cellular uptake and/or transfection efficiency
- **Competitive pricing**
  - Great value for your research dollar

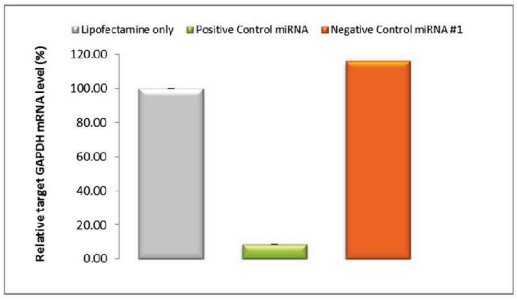


Figure 10. Performances of *miRNA* mimic Positive and Negative controls. *AccuTarget*™ miRNA Positive & Negative controls were transfected at 20 nM using Lipofectamine™ RNAiMAX into HeLa cell lines and assessed for their ability to decrease target mRNA levels. Down-regulation of GAPDH was determined using the Real-Time quantitative RT-PCR at 48 hours post-transfection using Bioneer's *Exicycler*™ 96 qPCR instrument.

AccuTarget™ Control *miRNAs*

Product	Purification	Scale
AccuTarget™ *miRNA* Housekeeping Positive control (GAPDH)	BioRP	5 nmole
	BioRP	10 nmole
	BioRP	20 nmole
AccuTarget™ *miRNA* mimic Negative control #1	BioRP	5 nmole
	BioRP	10 nmole
	BioRP	20 nmole
AccuTarget™ *miRNA* mimic Negative control #2	BioRP	5 nmole
	BioRP	10 nmole
	BioRP	20 nmole
AccuTarget™ Fluorescein-labeled *miRNA* mimic Negative Control *siRNA* #1	BioRP	5 nmole
	BioRP	10 nmole
	BioRP	20 nmole
AccuTarget™ Fluorescein-labeled *miRNA* mimic Negative Control *siRNA* #2	BioRP	5 nmole
	BioRP	10 nmole
	BioRP	20 nmole

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