

Product survey: Gene silencing and siRNA

The Silent Revolution

Onlookers attempted – and failed – to bind and padlock the legendary magician Houdini in his famous escape shows of the early 20th century. Compared to keeping Houdini in handcuffs, “enchaining” gene transcription with siRNA is simple and becoming a standard method in many labs.

If you type in the abbreviation for RNA interference, “RNAi”, at the PubMed search prompt and restrict your query to the year 1998, you will get exactly nine hits. Amongst them is Craig Mellow’s *Science* paper describing RNAi in *C. elegans*. The groundbreaking *Nature* paper, published by Andrew Fire and Craig Mellow that kicked off the RNAi revolution, does not appear since the authors didn’t use the term RNAi in their article at all. Do the same for the year 2007, however and you will be swamped with several thousand papers dealing with RNAi, gene silencing and short interference RNA (siRNA). According to a study published in 2005 by Stacy Lawrence in *Nature Biotechnology*, papers dealing with RNAi have seen the highest annual growth rate in biotech literature. It’s a fair guess that this also holds true for the years 2006 and 2007.

Similar to PCR, RNAi is on its way to becoming one of the most extensively used standard methods in life science labs around the globe. Academic researchers interested in the function of a special gene use RNAi to generate loss-of-function phenotypes. Companies screen new genes involved in certain pathways with libraries containing thousands of short-hairpin RNA (shRNA) encoding vectors. The big pharmaceutical companies have discovered RNAi as a tool for the rapid validation of large collections of target candidates, while some biotech firms already dream of siRNA as a new class of therapeutics. Not to forget the growing number of medical researchers using RNAi to avoid the cumbersome generation of knockout animals to study disease models.

Two strategies

No wonder then, that a steadily growing number of manufacturers are jumping onto the RNAi-train that is chuffing full steam ahead, offering tools for the gene silencing and RNAi communities. One may roughly categorise their products accord-

ing to the two major RNAi strategies currently in use, namely synthetic RNAi approaches with siRNAs and vector-mediated RNAi using shRNAs. The former is based on 21-29 bp dsRNA fragments that are either chemically synthesized or cleaved out of longer dsRNAs by the double-stranded RNA-specific endonuclease Dicer. Custom synthesized siRNAs available from commercial oligo synthesis suppliers usually undergo a strict quality control including HPLC, Mass-Spectrometry and Capillary Gel Electrophoresis.

Design matters

The most crucial factor, however, is the design of the siRNA itself. Some manufacturers specialising in the chemical synthesis of si-RNAs offer free online alignment tools that allow you to check the GC-content of the selected siRNA sequence or whether the sequence perfectly matches the target mRNA. The second way of obtaining siRNAs, the enzymatical cleavage of dsRNA with Dicer, mimics the natural RNA interference process. Usually, Dicer is delivered in ready-to-use siRNA kits.

Irrespective of the method you choose, synthetic or Dicer created siRNAs, the next step is to get the siRNA molecules into the cells under study. That’s not always an easy task, especially if working with hard to-transfect cells like neurons, lymphocytes and macrophages. To facilitate passage through the cell membrane, most transfection reagents are built of mono or polycationic lipids that enclose the siRNA oligonucleotides before taking them on their trip inside the cell.

If you encounter problems transferring siRNA oligos into your cells, it is time to consider vector-based RNAi as an option. The greatest benefit of the latter method is its ability to produce stable gene knockdowns. Beyond that you might use shRNAi plasmids with an inducible promoter allowing the regulation of gene inhibition or control gene expression in vivo with tissue-specif-



The famous magician Houdini was able to unlock every chain or handcuff put around his hands and feet.

ic promoters. In most commercial sh-RNA expression vectors, two oligonucleotide segments containing the necessary hairpin sequences are annealed and ligated into a vector-cloning site. After transfection of the shRNA plasmid into the cell, the shRNA sequence is transcribed inside the cell’s nucleus and the resulting shRNA, containing a hairpin loop, is transported to the cytosol where it is processed by Dicer to start the cellular RNAi response.

shRNA silencing constructs may also be delivered into cells using viral vectors. Several viral-based gene-silencing systems are currently in use; these are mainly based on adenoviral, retroviral or lentiviral platforms. The latter are very popular as sh-RNA shuttles, since lentiviruses integrate the transported shRNA into the genome of non-dividing target cells such as macrophages and neurons.

Not just for frogs and zebrafish

The ballyhoo about siRNA has somewhat eclipsed other gene knockdown techniques, such as morpholinos. Though it has been known for almost 20 years that morpholino oligos, which are built of short chains of approximately 25 morpholino subunits, block translation initiation very efficiently, morpholinos have never reached a status similar to that of siRNA. They are mainly utilised by developmental biologists to knock down genes in the embryos of frogs, zebrafish or sea urchins.

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Gene silencing and siRNA				
Company	Product Type	Application(s)	Miscellaneous, Specialities, Generally	Price [EUR]
Active Motif Rixensart, Belgium www.activemotif.com Contact: Bianca Garms Phone +49(0)173 6324090 garms@activemotif.com	GripNA Oligonucleotides, negative charged peptid-nucleic acids	Cell cultur, Zebrafish, Xenopus and in vitro translation systems	- Highly sequence specific - Nuclease-degradation resistant - Incl. positiv-controls - Flexible modifications - Online order	495,- (200 nmol) 140,- (each modification)
Agilent Technologies Waldbronn, Germany www.chem.agilent.com Contact: Nathalie Bontoux nathalie_bontoux@agilent.com	Agilent Small RNA Kit for 2100 Bioanalyzer	Fast & sensitive separation, detection and quantitation of small nucleic acids (miRNA, siRNA, oligonucleotides), in the size range of 6-150 nt	- Runs on the Agilent 2100 Bioanalyzer system - Qualit. size analysis of ss-/ds-oligonucl. (within a range of 6-150 nt) - Minimal sample consumption - 10-100 ng total RNA or 50 pg of purified small RNA - Fast results: 11 samples in 30 min	<740,- (Kit, 275 samples)
Applied Biosystems Huntingdon, UK www.ambion.com Contact: Edyta Bocian, Julia Neuwirt Phone: +44(0)1480 373020 eurotech@ambion.com	Silencer Select siRNA Pre-designed, validated, custom	Short term silencing in cell cultures	- 100 % guaranteed to silence - Designed with algorithm (improves prediction accuracy >25%) - Up to 100 fold more potent than other available siRNAs - Chemical modifications reduce off-target effects by up to 90% - Demonstrated improvements in consistency and reliability	189,- (e.g. Silencer Select Pre-designed siRNA, standard purity, 5 nmol) 249,- (Silencer Select Validated siRNA, standard purity, 5 nmol)
	See above	See above	- Guaranteed silencing - Spend less time designing & validating siRNAs - Designed for maximum potency and specificity - siRNAs for all human, mouse, and rat genes listed in RefSeq - Sequence is included with all Pre-designed siRNAs	154,- (e.g. Silencer Pre-designed siRNA, standard purity) 262,- (Silencer Validated siRNA, standard purity)
	Silencer In Vivo Ready	Short term silencing in vivo	- Ready for formulation or direct injection into animals - Provided in 100, 250, 1000, and 10,000 nmol sizes - HPLC purified, salt free, sterile filtered, endotoxin tested	900,- (e.g. Silencer Pre-designed siRNA, In Vivo Ready, 100 nmol)
	siRNA Libraries (> 50 siRNAs)	High throughput screening	- siRNAs meticulously designed for maximum potency/specificity - Ready-to-use siRNAs in amounts sufficient f. hundreds of transfections - 3 or more individual siRNAs/target increase screening accuracy - Available for small gene sets/for the whole human genome - Custom aliquotting, pooling, and custom libraries available	9000,- (e.g. Silencer Human Kinase siRNA Library V3, 2157 x 0.25 nmol)
	siRNA Controls	Validated siRNA for optimizing siRNA experiments	- Positive Control functionally tested in several common cell lines - Negative Controls functionally proven to have minimal effects on cell proliferation and viability - For use in human, mouse, and rat cells	220,- (Silencer Select GAPDH Positive Control siRNA, 5 nmol) 212,- (Silencer GAPDH siRNA, Human, Mouse, Rat, 5 nmol)
	siPORT NeoFX Transfection Agent	Delivery of siRNA into cells	- Works with a broad range of cell lines - Produces consistent results - Performs with high siRNA transfection efficiency - Reverse-transfects cells as they are plated, saving a day	132,- (e.g. siPORT NeoFX Transfection Agent, 0.4 ml)
	Silencer siRNA Starter Kit	Transfection Optimization	- The perfect choice for those beginning siRNA experiments - Incl. transfection agent, siRNAs, & 3 systems f. assessing knockdown - For use with human, mouse, and rat cells	494,-
pSilencer siRNA expression vectors	Long term silencing	- Available with hygromycin, puromycin, neomycin resistance markers - Efficiently express siRNA hairpins within mammalian cells	261,- (e.g. pSilencer 4.1-CMV hygro, 20 xn)	
Arrayjet Mayfield, UK www.arrayjet.co.uk Contact: Karen Allison Phone:+44(0)131 4448914 kallison@arrayjet.co.uk	Sprint Microarrayer	Pico-litre volume dispensing of biological compounds for low volume microarrays and biochips	- DNA/ RNA, Proteins, Chemical libraries	Contact local distributor
ATG:biosynthetics Freiburg, Germany Contact: Hubert Bernauer Phone: +49(0)761-8889424 order@atg-biosynthetics.com	siRNA-individual designs and miRNA and RiboSwitchDev. Libraries	See Dai et. al. (2005): RNAi-induced targeted silencing of developmental control genes during chicken embryogenesis, Devel. Biology 285, pp. 80ff.	- Synthetic Biology - Genes and - Bioinformatics - RiboSwitch Development	Individual project based pricing starting at approx. 1000,-
BioCat Heidelberg, Germany www.biocat.de Contact: Elke Gamer Phone: +49(0)6221-7141516 gamer@biocat.de	Express. Arrest Lentiviral shRNAmir Clone Collection Target, Gene-specific Clone Sets, Individual Clones in pGIPZ	Lentiviral human/mouse shRNAmir constructs in pGIPZ vector for transient or stable gene silencing	- Increased knockdown specificity and efficiency - Human and mouse genome-wide coverage - shRNAmir is cloned into lentiviral vector - Developed in collaborat. w. G. Hannon (CSHL) & S. Elledge (Harvard) - Also available as well-annotated subcollections	220,- (Individual clone) 440,- (Target gene-specific clone set) Complete collections and sub-collections: please inquire
	Expression Arrest Inducible Lentiviral Human shRNAmir Clone Collection and Individual Clones in pTRIPZ	Tet-inducible lentiviral human shRNAmir constructs in pTRIPZ for transient or stable gene silencing	- Increased knockdown specificity and efficiency - Entire human genome targeted - TurboRFP marks inducible shRNAmir expression - Inducible knockdown with virtually no leak (Tet-On) - Lentiviral delivery expands regulatable RNAi options	220,- (Individual clone) Complete collection: please inquire
	Expression Arrest RNAintro Kits (pGIPZ or pTRIPZ)	Human/mouse lentiviral shRNAmir contracts for the generation of gene silencing data	- All tools for in vitro or in vivo gene silencing in one box - Choice of three gene-specific lentiviral (inducible) shRNAmir constructs from the human or mouse genomes - Produce meaningful RNAi data with validated and optimized Reagents - Kit incl. Arrest-In Transfect. Reagent f. shRNA delivery, pos./neg. control - Rules-based shRNA design	850,- (Kit)

Gene silencing and siRNA

Company	Product Type	Application(s)	Miscellaneous, Specialities, Generally	Price [EUR]
BioCat Contact see page 50	TRC Lentiviral shRNA Clone Collections & Individual Clones (human, mouse)	Human/mouse shRNA constructs for genome-wide transient or stable gene silencing	<ul style="list-style-type: none"> - shRNA cloned into lentiviral vector enabling transduction of primary and non-dividing cell lines - Developed by the RNAi consortium - Amenable to in vitro and in vivo applications - Also available as well-annotated subcollections 	220,- (Individual clone) 395,- (Target gene-specific clone set) Collections: please inquire
	GeneNet Lentiviral siRNA Libraries (human, mouse)	For high-throughput gene knockdown studies on a genome-wide basis	<ul style="list-style-type: none"> - Human and mouse genome-wide coverage - shRNA cloned into FIV- or HIV-based lentivectors - High-throughput identification of functional siRNAs - Available in pre-packaged, ready-to-use format or as plasmid libraries 	Please inquire
	Expression Arrest Drosophila RNAi Library (Releases 1.0 and 2.0) -DNA Template	Over 15,000 dsDNA templates ready for in vitro transcription to double-strandedRNA (dsRNA) constructs	<ul style="list-style-type: none"> - Dual T7 promoters for direct use in transcription - Sufficient material to generate over 600 ug of dsRNA in 1 IVT reaction - Releases 1.0 and 2.0 also available separately - Available as a ready-to-go dsRNA construct library 	Please inquire
	Expression Arrest C. elegans ORF-RNAi Feeding Library and Individual Clones	Feeding-ready ORF-RNAi clones targeting over 11,000 genes of the C. elegans genome	<ul style="list-style-type: none"> - Full coding regions - Feeding-ready - Plasmid preps of the ORF-RNAi clones can be used as templates for in vitro dsRNA synthesis, for soaking or for injection - Derived from C. elegans ORFeome-RNAi Library v1.1 - ORFs are contained in the double T7-promoter vector pL4440-dest and are provided in the RNAi feeding bacterial strain HT115(DE3) 	130,- (Individual clone) Complete collection: please inquire
	Expression Arrest Zebrafish Morpholino-Library and Individual Morpholinos	Modified antisense oligos designed and synthesized to rapidly reduce gene expression levels	<ul style="list-style-type: none"> - Specific and prolonged reduction of target gene expression - Specifically targeted to start site of each gene sequence - Morpholino blocks translational start site of the target gene - Highly nuclease resistant - Custom morpholinos are also available 	245,- (Individual morpholino, 50 nMol DNA) Complete morpholino library: please inquire
	GeneSilencer siRNA Transfection Reagent	Transfection Reagent optimized for siRNA delivery into mammalian cells	<ul style="list-style-type: none"> - High transfection efficiency - Low cytotoxicity - Functional gene silencing post siRNA delivery - Compatibility with diverse growth conditions (with and without serum) - Easy-to-use protocols for adherent and suspension cells 	Depending on pack size
	Turbo Dicer siRNA Generation Kit	Synthesis of target gene-specific dsRNA and subsequent generation of siRNA pool	<ul style="list-style-type: none"> - Highly effective, specific gene silencing using a siRNA pool - Dicer enzyme digests dsRNA within 2 hours - Less off-target effects - Recombinant Turbo Dicer Enzyme also available separately 	695,-
Biomol Hamburg, Germany www.biomol.de Contact: Edgar Lipsius Phone: +49(0)40-853260-37 e_lipsius@biomol.de	SureSilencing shRNA Plasmid Kits Recombinant plasmid	Knocks down expression of specific genes by RNA interference/ Allows exploration of short-term or long-term gene-suppression effects	<ul style="list-style-type: none"> - 2 of 4 provided pre-designed plasmids are guaranteed to silence the target gene by at least 70 % - U1 promoter mediated transcription - Plasmids are available with either Puromycin-/Neomycin resistance or GFP gene for stable or transient transfection - Experimentally verified shRNA design algorithm 	999,- (Prices valid for Germany)
	GeneSuppressor Construct. Kits/Clon. vector	Clon. of siRNA templates/Spec. gene suppress. in a wide variety	<ul style="list-style-type: none"> - Contains linearized suppressor plasmid, sequencing primers, controls - U6 or CMV promoter mediated transcription 	315,- to 716,-
	GeneSuppressor Ready-Gene Kits Recombinant plasmid	Specific gene suppression in a wide variety of cells	<ul style="list-style-type: none"> - Contains recombinant suppressor plasmid, negative control plasmid and antibody specific to the target gene - U6 promoter mediated transcription 	609,- to 781,-
	Interferin Transfection Reagent Transfection Reagent	siRNA transfection	<ul style="list-style-type: none"> - Over 90 % gene silencing at 1 nM siRNA in cell lines & primary cells - Simple protocol - Excellent cell viability - Compatible with serum and antibiotics - Also suitable for HTS 	39,- (100 µl) / 158,- (500 µl) 264,- (1 ml) / 1039,- (5 ml)
Bioneer Corporation Daejeon, South Korea www.bioneer.com Contact: Chung, Sorim Phone: +82-42-936-8500 siRNA-support@bioneer.com	<ul style="list-style-type: none"> - Custom siRNA - Predesigned siRNA - Validated siRNA - siRNA Libraries - Control siRNA 	<ul style="list-style-type: none"> - Gene silencing - Functional genomics - Drug target validation - Gene therapy 	- Complimentary siRNA design service available (Turbo si-Designer)	102,- (Cust siRNA) 32,30 (- 5' Fluorescein modification) 81,60 (- Negative Control) 159,80 (Fluorescein-labeled Negative Control)
Carl Roth Karlsruhe, Germany www.carlroth.de Contact: Stefanie Seipp Phone: +49(0)9721/ 5606-1038 s.seipp@carlroth.de	Roti-Fect PLUS	Lipofection of eucaryotic primary cells and cell lines	<ul style="list-style-type: none"> - Efficient release of nucleic acids - No serum-inhibition - 1 ml is sufficient for ca. 500 assays in 24well-format - Detailed manual incl. Instructions for Use, pipetting guideline and trouble shooting - For regular need special prices available 	65,80 (0,2 ml) 249,90 (1 ml)
	Roti-Fect	Lipofection of eucaryotic cell lines	<ul style="list-style-type: none"> - No serum-inhibition - 1 ml suff. for ca. 400 assays in 24well-format - Manual incl. instructions for use, pipetting guideline, trouble shooting - Special prices available - High and wide operating plateau 	49,95 (0,2 ml) 115,- (0,5 ml) 179,- (1 ml)
Clontech - TakaraBio Europe Contact: Phone: 0808 234 8063 (UK) 0800 182 5178 (Germany) 0800 296 141 (Austria) 0800 563 629 (Switzerland) tech@clontech-europe.com	Expression of shRNA with fluorescent reporter	Express both shRNAs from the human U6 promoter and also ZsGreen or DsRed-Express from a CMV promoter	<ul style="list-style-type: none"> - Endless amplification of silencing construct - Easy transfection with standard reagents - Monitor expression of your silencing construct - Ligation-ready vectors for plasmid or viral delivery 	Please inquire
	Retroviral transient or stable expression of shRNAs	Study long-term effects of gene silenc. in cell culture mod., incl. difficult-to-transfect cell lines	<ul style="list-style-type: none"> - Stably express shRNA in your cells - Select and enrich for high expression clones - Study long-term silencing 	Please inquire
	Knockout Inducible RNAi systems/Regulated Gene Silencing	System to regulate knockd. of gene expr. Avail. with Puro-/Hygromycin selection resistance	<ul style="list-style-type: none"> - Ideal for cases where gene suppression may be lethal - Extremely tight on/off regulation - Fast response times and high levels of shRNA induction 	Please inquire

Gene silencing and siRNA				
Company	Product Type	Application(s)	Miscellaneous, Specialities, Generally	Price [EUR]
Clontech Contact see page 51	Knockout RNAi Clone and Confirm PCR kits	High quantities of transfection-suitable shRNA expression cassettes from a single round	- Allows quick screening for efficacious shRNA sequences - Requires only one round of PCR using standard provided primers - Fluorescent markers to track delivery efficiency	Please inquire
Eppendorf www.eppendorf.com/worldwide Contact: Sonja Voss Phone: +49(0)4053801707 voss.s@eppendorf.de	Multiporator Electroporation and electrofusion system	Electroporation of eukaryotic cells / Electroporation of bacteria, yeasts and other microorganisms / Electrofusion of eukaryotic cells	- Compact unit – small and portable Soft Pulse technology - Directly adjustable voltage and time constant - Upgrade with optional functional modules	5.500,- to 12.500,- (depending on configuration)
Fermentas St.Leon-Rot, Germany Contact: Frank Schestag Phone: +49(0)6227 356790 frank.schestag@fermentas.de	SP6 RNA Polymerase	>200	- Incorporates modified or labeled nucleotides	54,- (2000u)
	T3 RNA Polymerase	>200 / >1000	See above	20,50 (2000u)/82,- (10000u)
	T7 RNA Polymerase	>500 / >1000	See above	23,50 (5000u)/94,- (2x5000u)
	Transcript Aid T7. High Yield/Transcription Kit	50	- High yield of RNA - Convenient format: all reagents and RNA Ladder included	260,- (50 react.)
	GeneRuler/DNA Ladder/ Ultra Low Range	100	- For siRNA sizing - Ready-to-use - Supplied with conventional blue loading dye or w. orange loading dye	66,- (100 Appl.)
IBA Göttingen, Germany Contact: Kai Franke Phone: +49(0)551 50672-0 info@iba-go.com	RNA Synthesis includ. 2' modified RNAs for stabilization in cell culture	Gene Silencing and Antisense	- Dye Labelled RNAs, highly purified	starting at 9,- (Coupling prices/ base)
	MATra-si reagent	Magnet assisted transfection of siRNA	- Easy protocol, for gene silencing	170,- (for 200 µl reagent, for 200 µg nucleic acid)
ImaGenes Berlin, Germany Contact: Melanie Busse Phone: +49(0)30-9489 2462 m.busse@imagenes-bio.de	Mission shRNA (sh-RNA clones, Gene Family Panels, entire TRC library)	Transient or stable post-transcriptional Gene Silencing in human and mouse	- Highly specific, reliable gene knockdown (3-5 shRNA constr./tar. gene - All shRNA clones are sequence verified - Vector-based system provides renewable resource compared to siRNA - Integration of shRNA into the genome of the host (long term express.)	495,- (per target set, 3-5 shRNAs, dependent on the gene) Prices for Gene Family Panels, entire TRC library upon request
	siRNAs	Transient post-transcriptional gene knockdown	- Easy handling - Possibility to design siRNA according to own requirements	90,- (2 OD dsRNA)
	Mission siRNA predesigned	See above	- siRNA designed using best-in-class Rosetta siRNA design algorithm - siRNA of increas. target specificity & knockd. for low abund. messages	155,- (2 OD dsRNA)
Integrated DNA Technologies www.idtdna.com Contact: Lynette Brown Phone: +1-319-665-7208 lbrown@idtdna.com	Dicector Dicer-substrate siRNA (DsiRNA) duplex.	RNAi	- Have shown as much as 10-fold higher potency than traditional 21-mer siRNAs	135,- (2 nmole) / 200,- (10 nmole) / 300,- (40 nmole)
	TriFECTa DsiRNA kit	RNAi	- Target-specific duplexes and controls for RNAi experiments	500,-
	Dicector Validated RNAi Controls	RNAi	- Efficiency control duplexes, Positive and negative control duplexes, primer sets and plasmids	19,- to 150,- (Depending on particular control and amount)
	miRCat small RNA Cloning Kit	miRNA	- Permits cloning from any RNA source in any species, for the discovery of new small RNAs	675,-
Merck Chemicals www.merckbio.eu Contact: customer.service@merckbio.eu	RiboJuice	siRNA Transfection Reagent	- Minimal toxicity - Tested for a wide range of mammalian cell lines - Efficient transfer of siRNA - Compatible with GeneJuice to cotransfect siRNA and plasmid DNA - Non-liposomal siRNA transfer	167,- (0.3 ml) 398,- (1 ml)
Millipore Schwalbach, Germany www.millipore.com Contact: Florian Meier Phone: +49(0)6196 494 299 www.technischerservice@millipore.com	SMARTpool siRNA (5nmol)	RNAi	- 4 pooled siRNA duplexes targeted against a specific gene - Efficient more than 97% of the time	444,-
	siRNA / siAB Assay Kit	RNAi and Western-Blot	- Combination of SMARTpool siRNA and a validated antibody - Incl. a SMARTpool siRNA negative and a western-blot positive control	746,-
	pKD Mammalian Expression Plasmids	RNAi mediated by Plasmids	- shRNA expression plasmid - H1 or U6 promoter driven expression	401,-
	AdenoSilence RNAi Virus Products	RNAi mediated by Adenovirus	- Adenoviral shRNA expression vectors - U6 promoter driven expression	649,-
	siIMPORTER	siRNA transfection Reagent	- Lowest cytotoxicity - Efficient in many different mammalian cell lines - Compatible with or without serum in cell culture medium	344,-
	Polybrene Infect. Reag.	Infection enhancer	-	21,-
MoBiTec Göttingen, Germany www.mobitec.com Contact: Phone: +49(0)551 707 22-0 info@mobitec.de	TransIT-TKO Transfection Reagent TransIT-siQUEST	siRNA transfection reagent for mammalian cells	- Broad Spectrum siRNA Delivery - Low Cellular Toxicity - High Knockdown Efficiency - Reproducible Results	224,-
	TransIT-QR Delivery Solution	in vivo delivery solution that delivers DNA or siRNA to the livers of laboratory mice using hydrodynamic tail vein injection	- Naked Nucleic Acid Delivery - Versatile Platform - Low Toxicity	105,-

Gene silencing and siRNA				
Company	Product Type	Application(s)	Miscellaneous, Specialities, Generally	Price [EUR]
MoBiTec Contact see page 52	Label IT miRNA Labeling Kits	Rapid and sensitive non-enzymatic labeling of microRNA (miRNA) for microarray analysis	- Sensitive - Reproducible - Labels miRNAs from all organisms including plants - One-step Labeling Reaction	222,-
	Label IT siRNA Tracker Intracell. Localizat. Kits	Efficient, direct labeling for in vitro / in vivo tracking of siRNA	- Versatile Labeling - One-step Chemical Method - High Efficiency Labeling	286,-
	siXpress PCR Vector Systems	Vector system for efficient in situ expression of siRNA and knockdown.	- Synthesize multiple siRNA expression cassettes by PCR in hours - Option of cloning PCR generated expression cassette i. supplied vector - Systems provided with primers, template, controls and TransIT-LT1	437,-
	Gene Trans II Transfection Reagent	Broad spectrum transfection reagent	- Ideally suited for oligonucleotide transfection - Minimized cytotoxicity - Transfections can be easily carried out with or without serum	209,-
Eurofins MWG Ebersberg, Germany www.eurofins-mwg.com Contact: Annett Brühnschwein Phone: +49(0)8092-8289-77 info@mwgdna.com	siMAX siRNA/Customised siRNA 21mer & 27mer/Pre-Designed siRNA 21mer & 27mer/siRNA modifications/siRNA Design Tools	-	- Free online Design Tool - Easy online ordering - 3 different scales available - HPLC purification & desalting available - Free MALDI TOF and CGE documentation	95,- up to 510,- (Customised & Pre-Designed 21mer) 160,- up to 566,- (Customised & Pre-Designed 27mer) 30,- to 300,- (Depending on type of modification & scale)
PAA Laboratories Cölbe, Germany www.paa.com Contact: Andreas Jahn Phone: +49(0)6421-175390 info@paa.com	Nanofectin siRNA Transfection Reagent	siRNA transfection siRNA/DNA co-transfection	- 85% Gene Silencing - Non Toxic - With or without serum	225,- (1 ml) 46,- (200µl)
Promega Mannheim, Germany www.promega.com/de Contact: Uwe Mohr Phone: +49(0)621-8501-290 de_techserv@promega.com	psiCHECK-1 and 2 Vector: siRNA expression vector with control gene	RNAi optimization by co-expression of target shRNA and luciferase reporter genes	- Accurate quantitation of siRNA effects - Normalization via second reporter - in vivo monitoring of RNAi in live cells	313,-
	siSTRIKE U6 Hairpin Cloning System: siRNA clon. & express. system	Easy cloning/expression of siRNA in linearized vector	- Optimized for stable transfection of siRNA expressing constructs - Different selection marker for stable transfection or hMGFP marker - All cloning reagents included	210,- (Each) 321,-
	GeneClip U1 hairpin Cloning System: siRNA clon. & express. system	Easy cloning/expression of siRNA in linearized vector	- See above	236,- (Each) 344,-
	CodebreakersiRNA Transfection Reagent	Eukaryotic transfection of siRNA	- Functions well in full medium with and w/o serum	200,- 364,-
Qiagen www.qiagen.com Contact: Bettina Haedrich Bettina.Haedrich@qiagen.com Contact: Constanze Kinder Constanze.Kinder@qiagen.com	FlexiPlate siRNA	Gene silencing for pathway analysis, Follow-up screening experiments	- For highly flexible, economical RNAi screening	Varies
	FlexiTube siRNA	Gene silencing for functional genomics and pathway analysis	- For efficient RNAi analysis using economical 1-nmol siRNA amounts	Varies
	HiPerFect Transfection Reagent	Low- or high-throughput RNAi	- For transfection of eukaryotic cells with siRNA - Especially suitable for transfection using low siRNA concentrations	Varies
Sigma-Aldrich Taufkirchen, Germany www.sigma.com Contact: Rainer Ebel Phone: +49(0)89-6513-1452 Rainer.ebel@sial.com	MISSION shRNA Gene Target Sets	Stable and Transient Gene Knock Down	- 3 to 5 not pooled clones per gene designed by "The RNAi Consortium" - Complete portfolio covers app. 16.000 hum. & 16.000 murine genes - Different formats available (Bact. Stock, DNA Plasm., Lentivir. particl.) - Extensive quality control and licence coverage (IP) - Online shRNA search tool (www.sigma.com/yfg)	496,- (Bacterial Stock Target) 596,- (Plasmid Target) 696,- (Lentiviral Particl. Target) Special pric. f. academ. institut. RNAi Partnership program avail.
	MISSION shRNA Gene Family Sets	Stable and Transient Gene Knock Down	- Pre-assembl. gene family sets against annotated funct. gene categor. - Different formats available - Human sets available - Extensive quality control and licence coverage (IP)	Price on request/Special pricing for academic institutions/RNAi Partnership program available
	MISSION shRNA Whole Genome Libraries	Stable and Transient Gene Knock Down	- Complete shRNA collect. of "The RNAi Consortium" f. hum./mur. genes - shRNA Bacterial Glycerol Stock or shRNA Lentiviral Transduct. Particles - All the clones are not pooled - Extens. qual. control & license cover.	Price on request/Special pricing for academic institutions/RNAi Partnership program available
	MISSION Lentiviral Packaging Mix	Packaging Mix to produce lentiviral shRNA particles	- VSV-G envelope for transduction of virtually any mammalian cell type - High-titer lentiviral particles - Optimized, easy to use protocol - In vitro or in vivo transduction applications	350,- (0,25 ml) 1.200,- (1,70 ml)
	MISSION shRNA Controls	Controls for shRNA experiments	- MISSION pLKO.1-puro empty vector Control - MISSION Non-Target shRNA Control - MISSION TurboGFP Control - Controls available as purified Plasmid DNA or Lentiviral particle	296,- (MISSION) 496,- (Plasmid DNA)
	MISSION shRNA Custom Capabilities	Custom Service for custom specific requests around shRNA	- Large-Scale Lentiviral Manufacturing - Custom Gene Family Sets - QC Assays & Specifications - Other service - Send Your Constructs for Lentiviral Manufacture	Price on request
	LentiExpress Technology	shRNA Screening	- Ready-to-use, pre-arrayed lentiviral-based shRNA screens - MISSION LentiExpress Human Kinase shRNA Set & Optimization Plate	Price on request

Gene silencing and siRNA				
Company	Product Type	Application(s)	Miscellaneous, Specialities, Generally	Price [EUR]
Sigma-Aldrich Contact see page 53	MISSION pre-designed siRNA	Transient Gene Knock Down	<ul style="list-style-type: none"> - Pre-designed siRNA powered by Rosetta Inpharmatics - Increased target specificity, due to siRNA seed region optimization rules - Efficient knockdown of low abundance messages - Extensive quality control and licence coverage (IP) - Online siRNA search tool 	155,- (2 O.D., desalted) 250,- (5 O.D., desalted) 310,- (10 O.D., desalted) Special pricing for academic institut. RNAi Partnership program avail.
	MISSION Pre-arrayed siRNA Libraries	Transient Gene Knock Down for siRNA screening	<ul style="list-style-type: none"> - siRNA designed using the powerful Rosetta siRNA Design Algorithm - 3 individual siRNA duplexes per gene spotted in 96 well microplates - MISSION siRNA Human, Rat, Druggable Genom & Gene Family Panels - MISSION siRNA Mouse Kinase Library 	Price on request Special pricing for academic institutions/RNAi Partnership program available
	Custom siRNA Synthesis	Transient Gene Knock Down	<ul style="list-style-type: none"> - Custom made siRNA oligos - Large-Scale siRNA synthesis available - Duplex/single strand form, different scales and different purifications - Modified nucleotides (2'OMe or LNA) and several labels - Extensive quality control and licence coverage (IP) 	Price depending on scale, purification and modification
	N-TER, Nanoparticle siRNA Transfection System	Peptide based siRNA transfection reagent	<ul style="list-style-type: none"> - Peptide-based system, non-liposomal, non-endosomal delivery - High transfection efficiency, even at low concentrations - Easy-to-use, simple workflow - Low toxicity - Highly reproducible by forming stable nanoparticles 	72,- (120 µl) 180,- (400 µl) 340,- (1 ml)
	mirPremier microRNA Isolation Kit	miRNA isolation	<ul style="list-style-type: none"> - Isolate miRNA/small RNA within 30 min - Obtain highly-purified miRNA with no contaminated large RNA - Streamlined protocol without need of hazardous organic solvents - Purify miRNA/small RNA from difficult-to-extract tissues 	45,- (10 Preps) 195,- (50 Preps)
Stratagene An Agilent Technologies Company www.stratagene.com Contact: Cedric Lemarie Phone: 00800 7400 7400 cedric.lemarie@agilent.com or Tech_europe@stratagene.com	GeneEraser siRNA transfection reagent	siRNA transfection reagent	<ul style="list-style-type: none"> - High siRNA transfection efficiency in a variety of cell lines - Knock out target gene at low siRNA concentration - Reduce cell damage compared to other reagents - Easy to use, works well in the presence of serum 	244,- (0.4ml) 495,- (1.0 ml)
	RNAMaxx High Yield Transcription K	RNA transcription kit	<ul style="list-style-type: none"> - Yields significantly higher quantities of RNA compared to traditional transcription methods - Generates RNA transcripts from a broad spectrum of template sizes - Incorporates modified nucleotides for the creation of labeled probes - Produces sense and antisense transcripts for use in RNAi studies 	258,- (50 reactions)
	High-Specificity miRNA QRT-PCR Detection Kit	miRNA detection kit	<ul style="list-style-type: none"> - Detects mature miRNA - Sensitive detection down to 100 copies - Differentiate miRNA that differ by a single nucleotide - Highly accurate results in 3 hours miRNA Specific Forward Primers 	474,- (200 rxns)
	Quantos Cell Proliferation Assay Kit	High-throughput screening	<ul style="list-style-type: none"> - Quick, reproducible and accurate measurement of cell number - Accurate at higher densities without additional reagents - Incl. protocols for multiple formats (96 wells to 6-well plates/cuvettes) - Greater accuracy - Protocols optimized for adherent & suspens. cells 	305,55 (1000 rxns)
Thermo Fisher Scientific www.thermo.com/perbio Contact: Carolin Kutzki perbio.eurotech@thermofisher.com	DharmaFECT Transfection Reagents	Lipid-mediated delivery of siRNA into mammalian cells	<ul style="list-style-type: none"> - Specifically designed for siRNA delivery - High efficient, easy to optimize reagent - Very robust - Showing low toxicity 	89,76 (0,2 ml) 248,74 (0,75 ml)
	DharmaFECT Duo Co-Transfection Reagent	Lipid-mediated co-transfection of siRNA and plasmid into mammalian cells	<ul style="list-style-type: none"> - High level of siRNA delivery to achieve high gene knockdown in combination with superior delivery of plasmid 	89,76 (0,2 ml) 248,74 (0,75 ml)
	siGENOME siRNA reagents: SMARTpools siRNAs and individuals	in vitro and in vivo Gene silencing with synthetic siRNAs in human, mouse and rat	-	278,69 (SMARTpool 5 nmol) 509,95 (Set of four 2 x 4 nmol) 166,38 (Individual 5 nmol)
	ON-TARGETplus siRNA reagents: SMARTpool- and individuals	in vitro and in vivo Gene silencing with synthetic siRNAs in human, mouse and rat	<ul style="list-style-type: none"> - Novel chemically modified individual and pooled siRNAs designed with superior algorithm for high functionality and highest specificity/reduced off-target effects 	361,04 (SMARTpool 5 nmol) 593,98 (Set of four 2 x 4 nmol) 199,66 (Individual 5 nmol)
	SMARTvector shRNA Lentiviral Particles	in vitro/in vivo stable gene silencing w. lentivir. based shRNA constructs in hum., mouse, rat	<ul style="list-style-type: none"> - Optimized miRNA Scaffold - Functional and specific - First miRNA scaffold specific shRNA design algorithm - Purified, high-titer >108 virus preparation 	1908,59 (Set of 3 25 µl) 4491,64 (Set of 3 100 µl) 2099,92 (Individual 100 µl)
	siCONTROL siRNAs	in vitro and in vivo Gene silencing with synthetic siRNAs in human, mouse and rat	<ul style="list-style-type: none"> - Pre-designed and validated control siRNAs - Negative, positive and transfection controls - Standard and ON-TARGETplus design for reduced off-target effects 	114,80 (5 nmol ab)
	Custom siRNAs	in vitro and in vivo Gene silencing with synthetic siRNAs	<ul style="list-style-type: none"> - Custom synthesized siRNAs with various modifications eg fluorescent labels, amino-linker, modified nucleotides or RNA/ DNA mixes 	377,65 (DyLight 547 modified siRNA, 40 nmol)
VWR International Darmstadt, Germany www.vwr.com Contact: Matthias Dornheim Phone: +49(0)2173-3942422 biotech@de.vwr.com	HuSH - 29shRNA (29mer)	RNAi	<ul style="list-style-type: none"> - 4 unique gene-specific shRNA plasmids & 2 negative control plasmids - 29mer are up to 100 time more efficient than 21mer - 70% knock-down guaranteed 	695,-
	TransIT transfection reagents	Transfection	<ul style="list-style-type: none"> - High efficiency of transfection - Low price per transfection - Specialized kits for different cell lines (TKO, Jurkat, Neural, CHO ...) 	258,- to 299,- (per ml)
	Label ITsiRNA track. kits	Intracellular localization	<ul style="list-style-type: none"> - Efficient and non-destructive, direct labelling and delivery of siRNA 	311,- to 388,-