Efficient & specific gene silencing with siPOOLs (complex siRNA pools)

Why siPOOLs?

siPOOLs (siRNA pools) are high complexity pools of 30 optimally-designed siRNAs that efficiently remove off-target effects and improve reliability of results. With proprietary design algorithms, siRNA sequences within siPOOLs are also optimized for maximal transcript coverage, efficient hybridization and filtered against paralogues, enabling highly efficient and specific gene silencing.

Complexity is key

Seed-based off-target effects are a known flaw of RNAi experiments. The strong off-target effects of siRNAs result in weak reliability and false-positive phenotypes. The off-target effect can be minimized by pooling siRNAs in high-complexity pools. The high-complexity pooling approach enables reliable RNAi experiments.

Minimal off-target effects with siPOOLs

siPOOLs overcome the off-target effect enabling clean RNAi knockdown experiments.

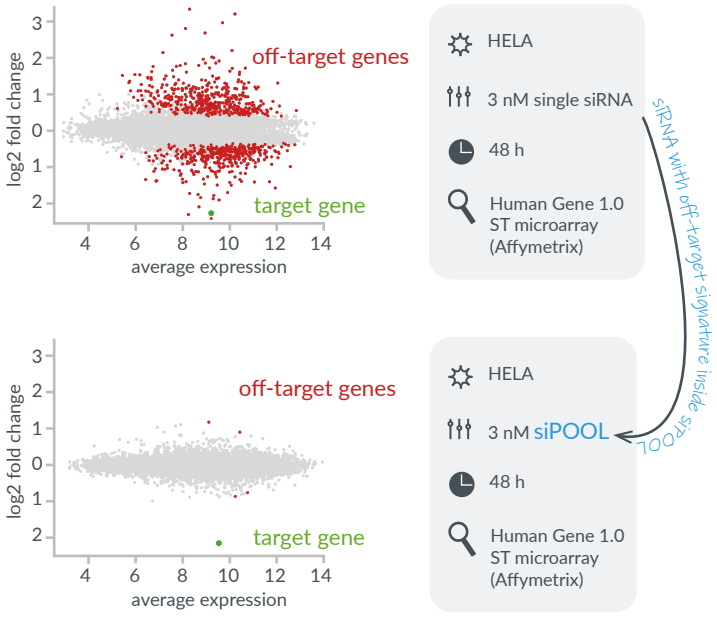


Figure 2: Minimal off-target effect. Transcriptome-wide profiling revealed a single siRNA can induce numerous off-target genes (red dots) while a siPOOL against the same target gene (green dot), and containing the non-specific siRNA, had greatly reduced off-target effects.

The siPOOL concept

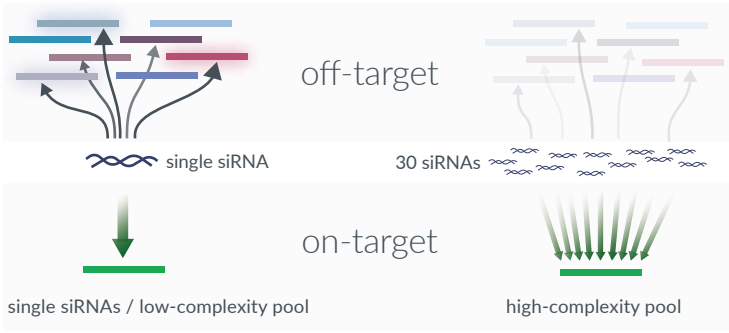


Figure 1: Left: single siRNAs and low-complexity pools of siRNAs are used at relatively high concentration to achieve an efficient knockdown. However, high concentration can lead to wide-spread off-target effects giving rise to highly variable results. **Right:** siPOOLs are a pool of 30 selected siRNAs with diverse seed sequences enabling maximal gene target coverage. The concentration of each siRNA is lowered due to the pooling approach. The low conentration leads to minimization of the off-target effect and improve silencing robustness.

How do siPOOLs improve specificity?

The high complexity pooling approach leads to a reduction of the concentration of each individual siRNA, resulting in dilution of the siRNA-specific off-target effect. In contrast, the efficiency of the gene knockdown is increased by a siPOOL due to the greater transcript coverage. As a result, loss of function phenotypes become more robust and reproducible.

Available Formats:

1. siPOOLs

2 nmol	5 nmol	10 nmol <
Catalog-No. si-G020-XXXXXX	Catalog-No. si-G050-XXXXXX	Catalog-No. si-G100-XXXXXX

2. siPOOL kits
(includes siPOOL and negative control)

5 nmol	10 nmol	20 nmol <
Catalog-No. si-k005-XXXXXX	Catalog-No. si-k010-XXXXXX	Catalog-No. si-k020-XXXXXX

interested in siRNA libraries

RNAi Screening Results You Can Trust with siPOOL (siRNA pool) libraries

Improve and economize your RNAi screening experiments

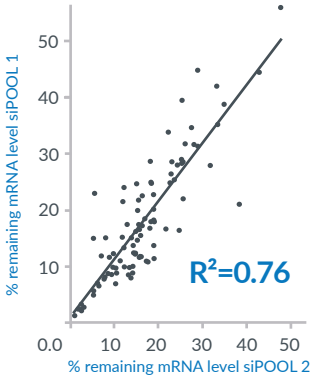
siPOOLs result in efficient gene silencing at low nanomolar concentrations

Efficient at very low concentrations, siPOOLs can be multiplexed with other treatments or siPOOLs without risk of side-effects (applicable for synthetic lethality screens). siPOOLs are highly likely to knockdown target gene at mRNA level by 70% when used under optimized transfection conditions.

Figure 3: siPOOLs result in efficient gene silencing at low nanomolar concentrations. 91% of human RBP siPOOLs tested (92 out of 101) produced ≥ 70% gene knockdown at 0,2 - 1 nM in standard cell lines (A549, RPE1, HeLa) as measured by rt-qPCR.

Best RNAi knockdown with minimal effort

A single siPOOL is sufficient to reliably silence the target gene.

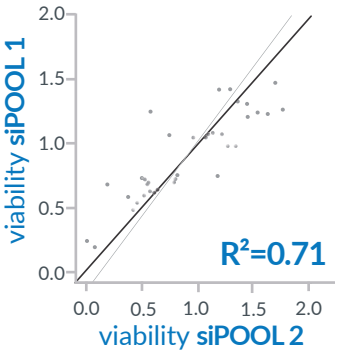


A549 HEK293 HUH7 MCF7 SW48
1 nM (96 genes)
24 h
rt-qPCR

Figure 4: Best RNAi knockdown with minimal effort. Two siPOOLs against the same gene (96 tested) give similar KD (R^2=0.76, compared to R^2=0.4 of single siRNAs). No need for screening multiple siRNAs; one siPOOL is sufficient.

Reliable phenotypes

A single siPOOL per gene is sufficient as siPOOLs produce similar phenotypes.



HELA
3 nM (36 genes)
72 h
cell viability image based read-out

Figure 5: Reliable phenotypes. Two siPOOLs against the same gene (36 tested) gave more reproducible phenotypes than single siRNAs (R^2=0.19).

Available siPOOL libraries

	Species	Cat. No. for 1 nmol
E3 Ligase siPOOL library	human	si-L010-000E3L
Kinase siPOOL library	human	si-L010-000505
RNA-binding protein siPOOL library	human	si-L010-000RBP
GPCR siPOOL library	human	si-L010-00GPCR
Ubiquitinase siPOOL library	mouse	si-L010-000UBI
Custom libraries		si-L0XX-00Cust

For custom libraries contact: info@sitools.de

Available Formats:

1. siPOOL library scales

0.1 nmol	0.25 nmol	0.5 nmol	1 nmol
Catalog-No. si-L001-XXXXXX	Catalog-No. si-L002-XXXXXX	Catalog-No. si-L005-XXXXXX	Catalog-No. si-L010-XXXXXX

2. siPOOL library layout

2D barcoded tubes	96-well plates*	384-well plates*

*customizable plate layout possible