

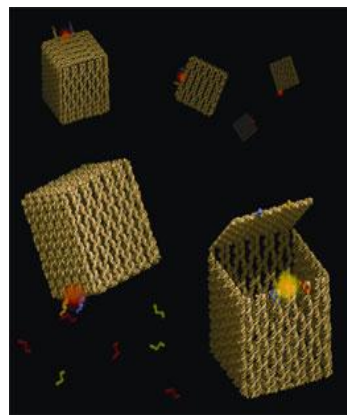
SIROCCO

Silencing RNAs: organizers and coordinators of complexity in eukaryotic organisms

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DNA Origami



Jørgen Kjems of Aarhus University has shown he can manipulate DNA as well as RNA (Andersen et al [Self-assembly of a nanoscale DNA box with a controllable lid](#). Nature. 2009 May 7; 459(7243): 73-6.) In a project running parallel to SIROCCO in his lab, Jørgen and his colleagues have constructed DNA boxes with hinged lids just 30 nanometers per side. Oligonucleotides were folded into longer strands to form the box structure - each box is large enough to hold a single ribosome. As Jørgen explains, "all single-stranded DNA molecules can self-assemble, or direct themselves into a particular structural configuration. We first used a computer program to predict what sequences to synthesize that would direct the molecules to assemble into this structure. Then, we used one long, naturally occurring molecule from a virus, and about 220 short artificially synthesized molecules that bound to the long molecule to build a box 42 by 36 by

36 nanometres. It may be possible to put an enzyme into the box that produces a signal only when the lid is open and the substrate becomes available. The box could effectively become a sensor to signal the presence of a gene from a virus or a bacterium, for example. We are also experimenting with hiding a drug in the box that can kill a cell when the box opens."

Multiplexing in highthroughput sequencing

Next-generation sequencers have sufficient power to analyze simultaneously DNAs from many different specimens, a practice known as multiplexing. The current practice of appending molecular barcodes prior to pooling is practical for parallel analysis of up to many dozen samples. Greg Hannon and his colleagues at Cold Spring Harbor report a strategy that permits simultaneous analysis of tens of thousands of specimens. The approach relies on the use of combinatorial pooling strategies in which pools rather than individual specimens are assigned barcodes. To test the system the authors pooled, sequenced, and decoded identities within two sets of 40,000 bacterial clones comprising approximately 20,000 different artificial microRNAs targeting Arabidopsis or human genes and achieved greater than 97% accuracy in these trials.

[DNA Sudoku--harnessing high-throughput sequencing for multiplexed specimen analysis.](#)

Erlich Y, Chang K, Gordon A, Ronen R, Navon O, Rooks M, Hannon GJ.

Genome Res. 2009 May 15. [Epub ahead of print]

	5		7					8
		3		5	4			7
2		9	3				5	4
		5	1		2	4		
3	4							7
		1	4	3		9		5
		2						5
	3		6		5	8		2
5	9			2	3			



RESEARCH SPOTLIGHT



[Altered interactions within FY/AtCPSF complexes required for Arabidopsis FCA-mediated chromatin silencing.](#) Manzano D, Marquardt S, Jones AM, Bäurle I, Liu F, Dean C. Proc Natl Acad Sci U S A. 2009 May 13. [Epub ahead of print]

[FRIGIDA delays flowering in Arabidopsis via a co-transcriptional mechanism involving direct interaction with the nuclear cap binding complex.](#) Geraldo N, Bäurle I, Kidou SI, Hu X, Dean C. Plant Physiol. 2009 May 8. [Epub ahead of print]

[Mechanisms of miRNA-mediated post-transcriptional regulation in animal cells.](#) Chekulaeva M, Filipowicz W. Curr Opin Cell Biol. 2009 May 16. [Epub ahead of print]

[Multiple independent domains of dGW182 function in miRNA-mediated repression in Drosophila.](#) Chekulaeva M, Filipowicz W, Parker R. RNA. 2009 May;15(5):794-803. Epub 2009 Mar 20.

[Fe65 is required for Tip60-directed histone H4 acetylation at DNA strand breaks.](#) Stante M, Minopoli G, Passaro F, Raia M, Vecchio LD, Russo T. Proc Natl Acad Sci U S A. 2009 Mar 31;106(13):5093-8. Epub 2009 Mar 12.

[Mutations in the seed region of human miR-96 are responsible for nonsyndromic progressive hearing loss.](#) Mencía A, Modamio-Høybjør S, Redshaw N, Morín M, Mayo-Merino F, Olavarrieta L, Aguirre LA,

del Castillo I, Steel KP, Dalmay T, Moreno F, Moreno-Pelayo MA. Nat Genet. 2009 May;41(5):609-13. Epub 2009 Apr 12.

[An ENU-induced mutation of miR-96 associated with progressive hearing loss in mice.](#) Lewis MA, Quint E, Glazier AM, Fuchs H, De Angelis MH, Langford C, van Dongen S, Abreu-Goodger C, Piipari M, Redshaw N, Dalmay T, Moreno-Pelayo MA, Enright AJ, Steel KP. Nat Genet. 2009 May;41(5):614-8. Epub 2009 Apr 12.

[Self-assembly of a nanoscale DNA box with a controllable lid.](#) Andersen ES, Dong M, Nielsen MM, Jahn K, Subramani R, Mamdouh W, Golas MM, Sander B, Stark H, Oliveira CL, Pedersen JS, Birkedal V, Besenbacher F, Gothelf KV, Kjems J. Nature. 2009 May 7;459(7243):73-6.

[Small RNAs and the control of transposons and viruses in Drosophila.](#) van Rij RP, Berezikov E. Trends Microbiol. 2009 Apr;17(4):163-71. Epub 2009 Mar 18.

[Oncogenic ras blocks the camp pathway and de-differentiates thyroid cells via an impairment of pax8 transcriptional activity.](#) Baratta MG, Porreca I, Di Lauro R. Mol Endocrinol. 2009 Mar 12. [Epub ahead of print]

Lab Exchanges

The costs of travel and accommodation for lab visits within the SIROCCO consortium can be covered by the management budget.

If you're planning a visit to another SIROCCO lab contact Aileen fah37@cam.ac.uk to make the arrangements.

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