Parallel gene synthesis in a microfluidic device

Kong *et al*, 2007

Michael Lee

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Outline

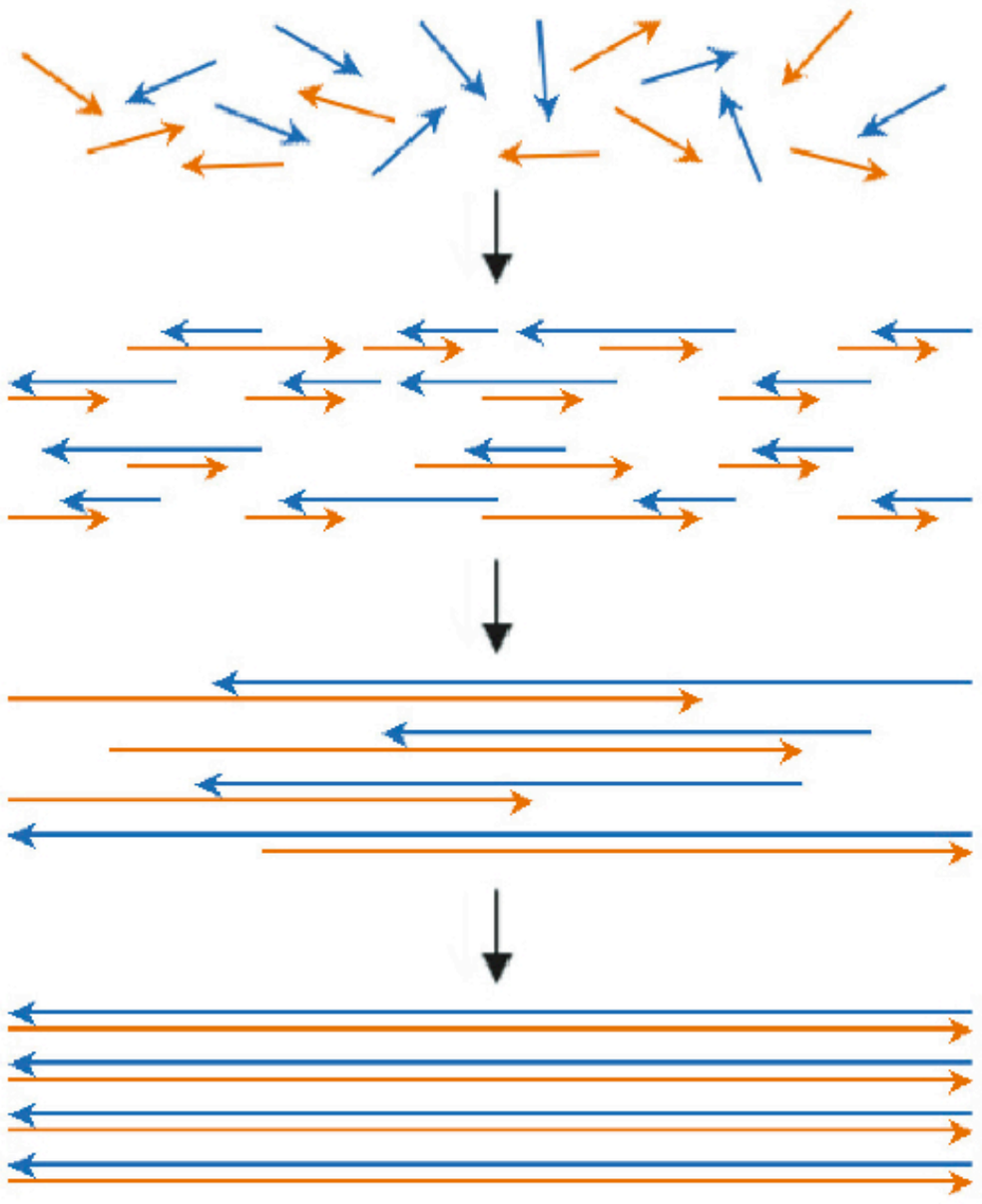
- Background
- Microfluidics
- Results
- Significance
- Future research

Why gene synthesis matters

- Gene synthesis is required for many emerging areas of research
- Gene synthesis can be prohibitively expensive

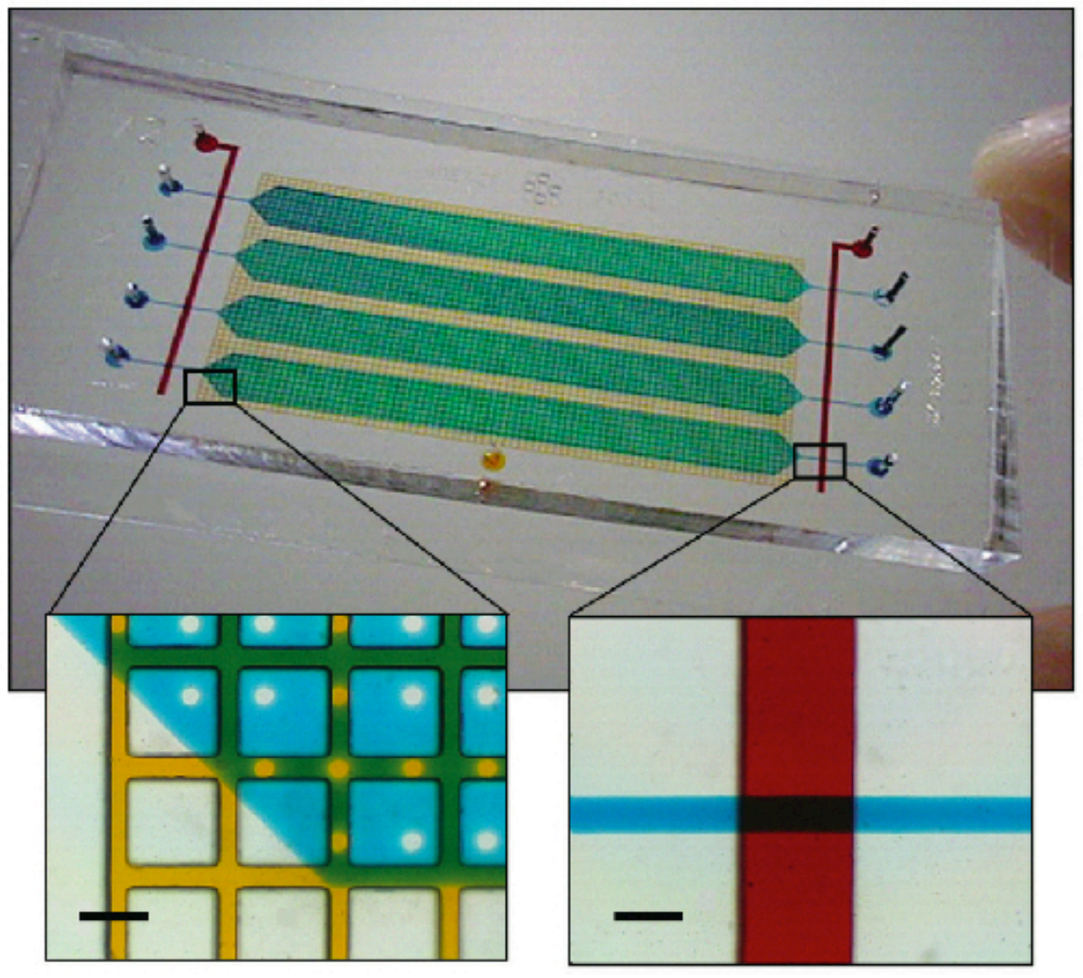
PCR-based gene assembly

- Short (~50nt) oligonucleotides are assembled and amplified in PCR reactions
- Expensive in standard reaction volumes



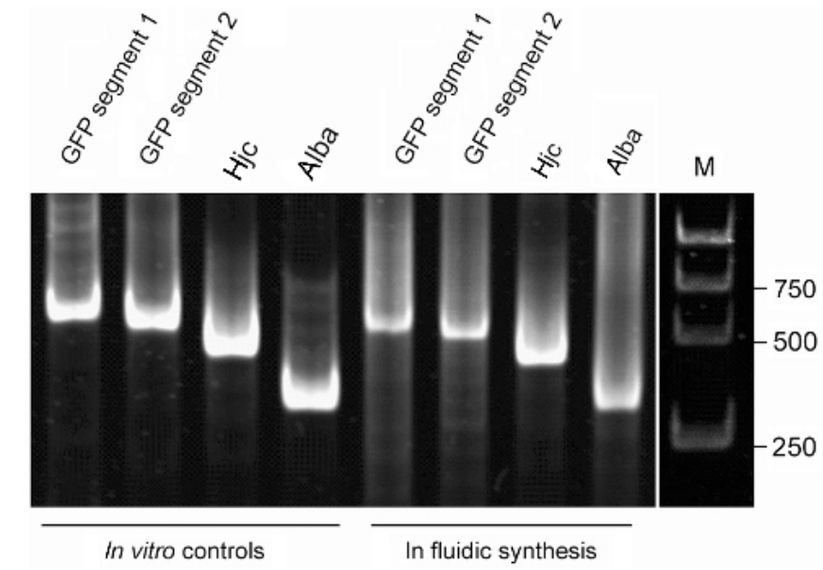
Assembly in a microfluidic device

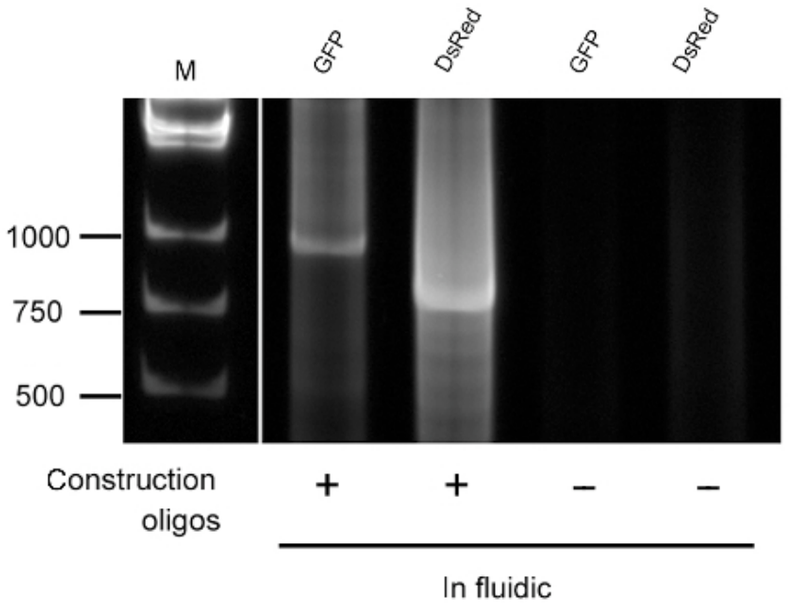
- Reducing reaction volumes down to nanoliter scale reduces cost
- Low quantities of oligos are still at high enough concentrations for reactions



Results

- Successful gene assembly in a microfluidic device
- Error rate of 1 in 560 bases (as compared to 1 in 450 for standard reactions)





Significance

- Making gene synthesis cheaper makes research easier
- First step towards an integrated device for gene synthesis and expression

Future research

- Couple with a protein expression microfluidic device
- Incorporate error correction
- Increase the size of DNA constructs possible

Questions?