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Mapping the yeast genome by melting in nanofluidic devices ROBERT L. WELCH, ILJA CZOLKOS, McGill University, ROB SLADEK, Genome Quebec Innovation Centre, WALTER REISNER, McGill University — Optical mapping of DNA provides large-scale genomic information that can be used to assemble contigs from next-generation sequencing, and to detect re-arrangements between single cells. A recent optical mapping technique called denaturation mapping has the unique advantage of using physical principles rather than the action of enzymes to probe genomic structure. The absence of reagents or reaction steps makes denaturation mapping simpler than other protocols. Denaturation mapping uses fluorescence microscopy to image the pattern of partial melting along a DNA molecule extended in a channel of cross-section ∼100nm at the heart of a nanofluidic device. We successfully aligned melting maps from single DNA molecules to a theoretical map of the yeast genome (11.6Mbp) to identify their location. By aligning hundreds of molecules we assembled a consensus melting map of the yeast genome with 95% coverage.

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