Comparing DNA libraries prepared with the Qsonica and Branson Instruments

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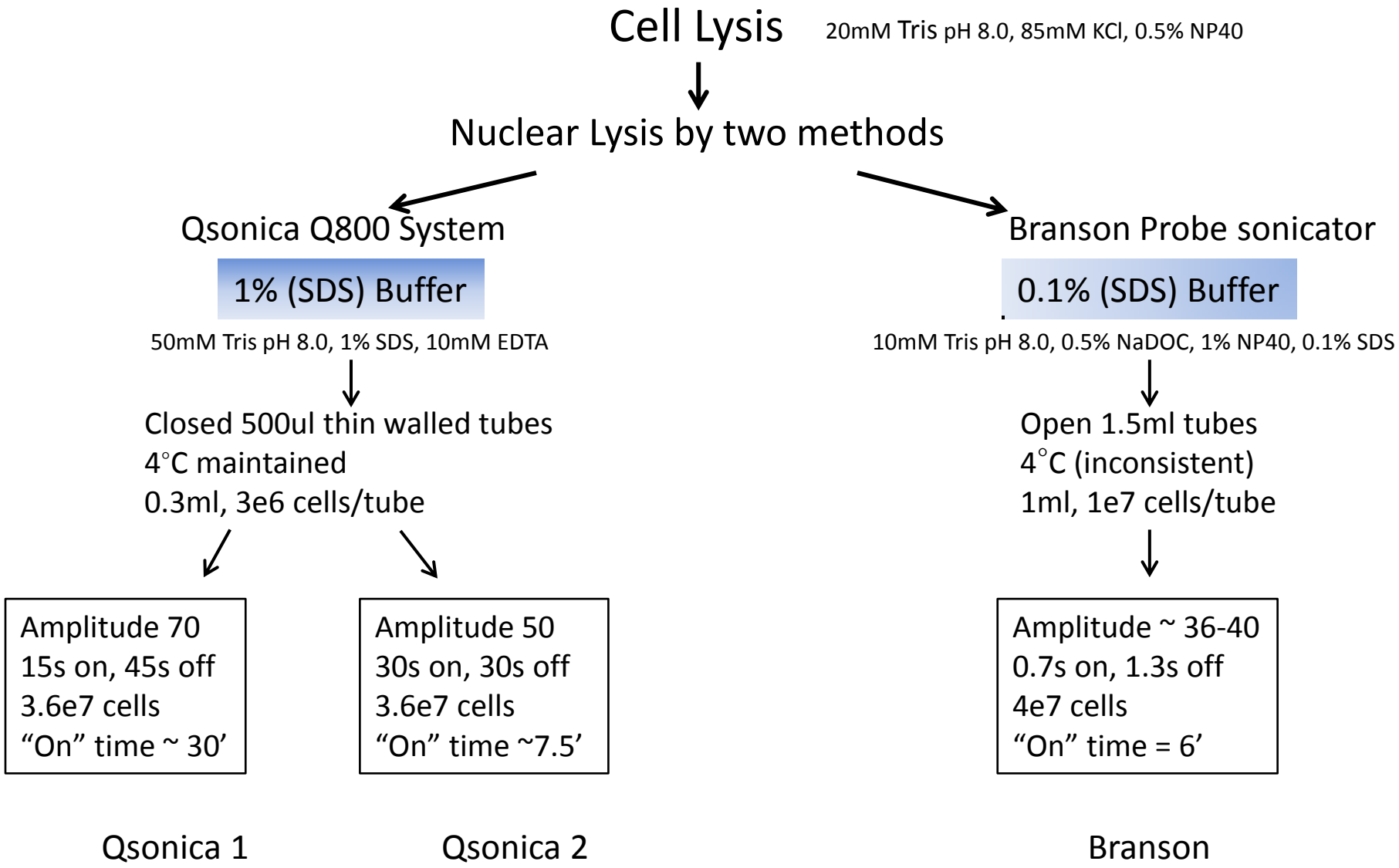
Experimental Outline

- We are using formaldehyde fixed K562 cells
- We will shear cells using the Branson Probe Sonifier or the Qsonica Q800 System and compare results
- We will perform Chromatin Immunoprecipitation using antibodies to H3K4me3 and H3K27me3
- We prepare and sequence libraries to assess how shearing instruments and parameters may affect outcome overall
- ChIPs for each condition were prepared in parallel with the same batch of cross linked cells, same antibody concentration, and the same number of cells per antibody

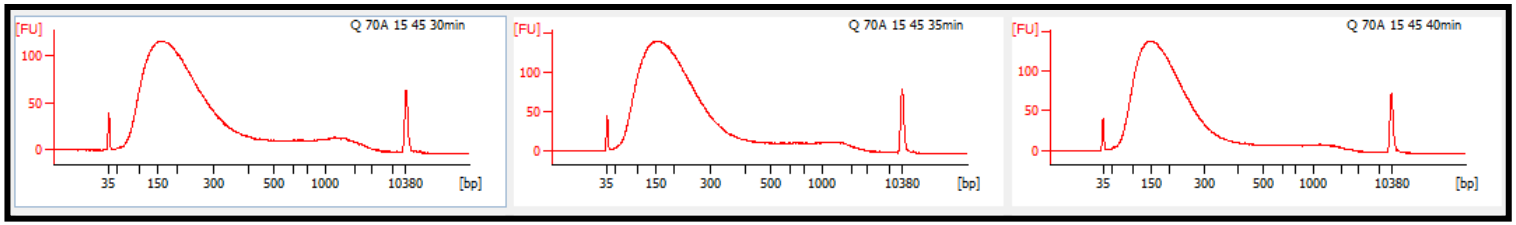
Protocol Outline



BioAnalyzer Traces of Sheared Chromatin

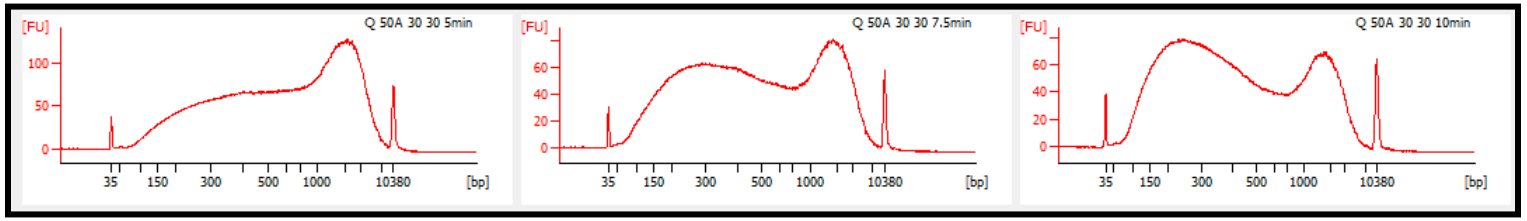
Qsonica 1: 70A, 15s on, 45s off

“On” time = 30’ **“On” time = 35’** **“On” time = 40’**

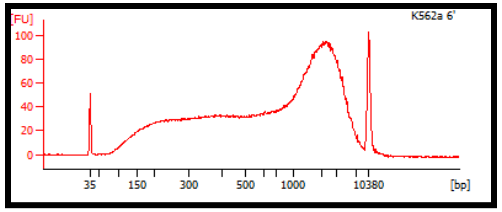


Qsonica 2: 50A, 30s on, 30s off

“On” time = 5’ **“On” time = 7.5’** **“On” time = 10’**



Branson: 40A, 0.7s on, 1.3s off, “On” time = 6’



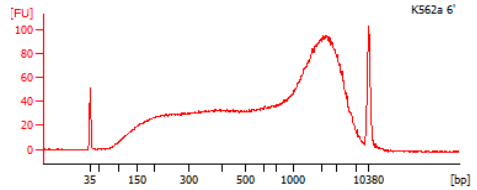
fragment size

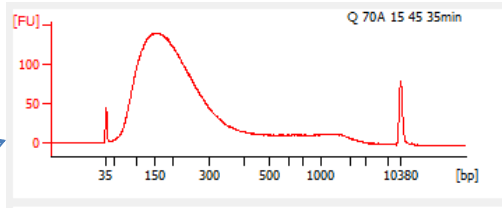
Small ⟷ Large

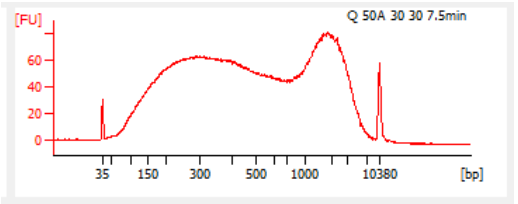
Chromatin sheared with the Qsonica 1 (35’), Qsonica 2 (7.5’) and the Branson Sonifier (6’) was used in ChIP

Conditions of each Chromatin Prep

	Sonication min	amplitude	time on	time off
Branson	6	40	0.7s	1.3s
Qsonica 1	35	70	15s	45s
Qsonica 2	7.5	50	30s	30s



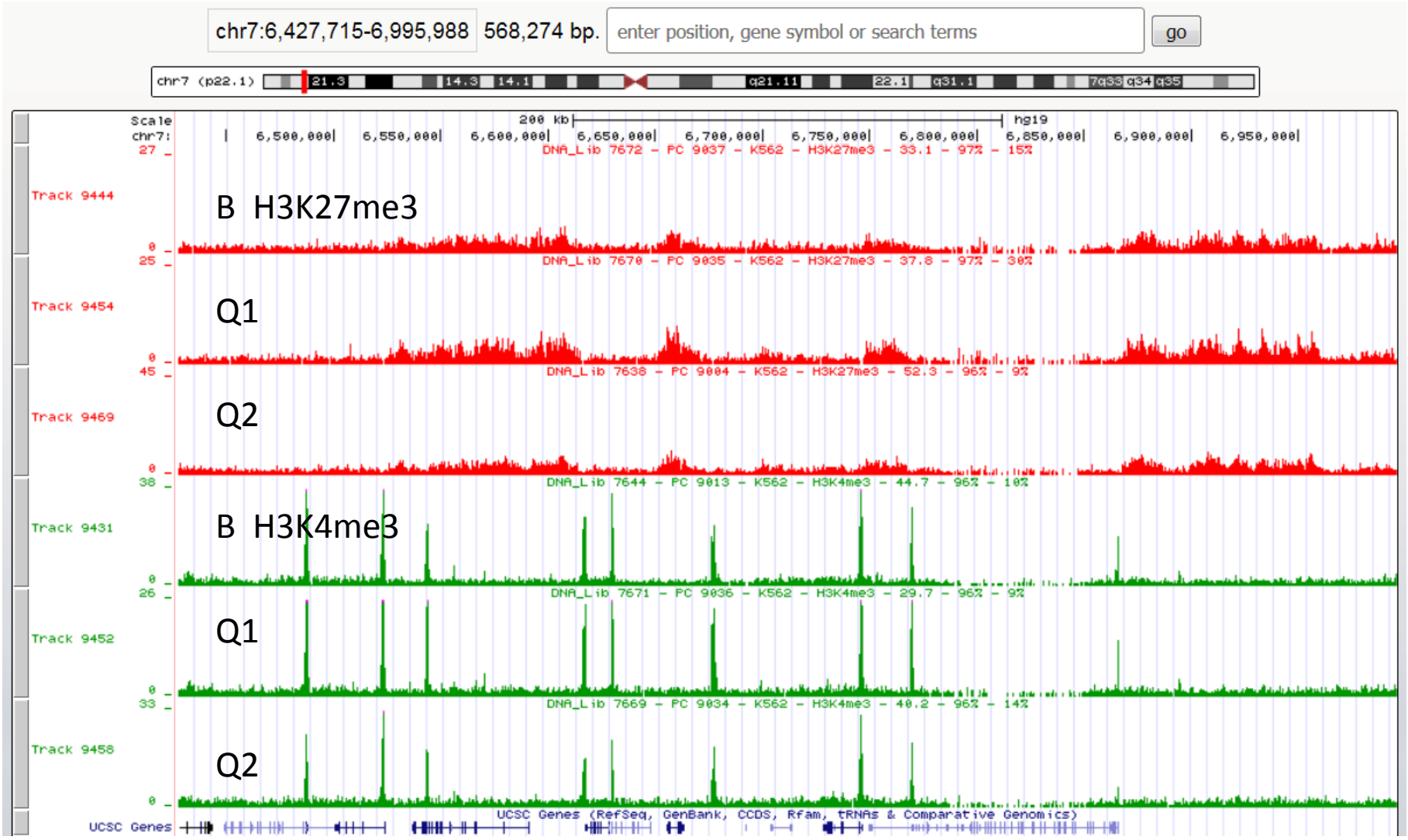




% material in size range

	Sonication min	80-150bp	151-700bp	701-8500bp
Branson	6	6	59	26
Qsonica 1	35	30	63	4
Qsonica 2	7.5	12	44	43

Comparison of Tracks obtained



Summary and Conclusion

- The Qsonica instrument is capable of producing a range of fragment size distributions, depending on the operating parameters.
- Excellent ChIP-seq results can be obtained using the Qsonica instrument, for both “active” and “repressive” histone modifications. These are similar to the results obtained using Branson probe sonification.
- Mononucleosome enriched chromatin obtained using the Qsonica (Q1) may represent the ideal parameter set for repressive histone modifications.