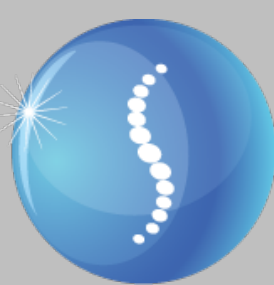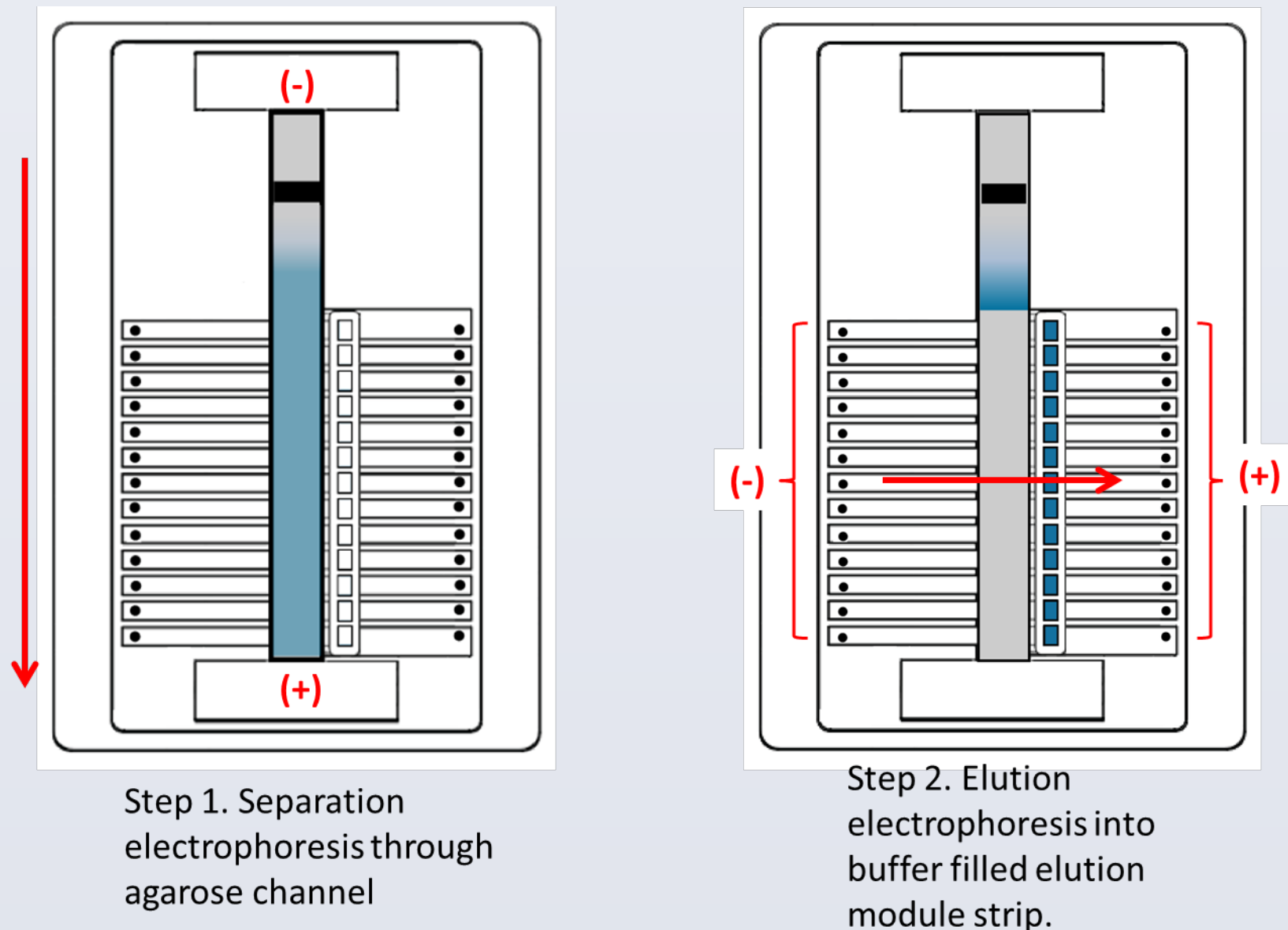# SageELF: One input, Many tight size fractions
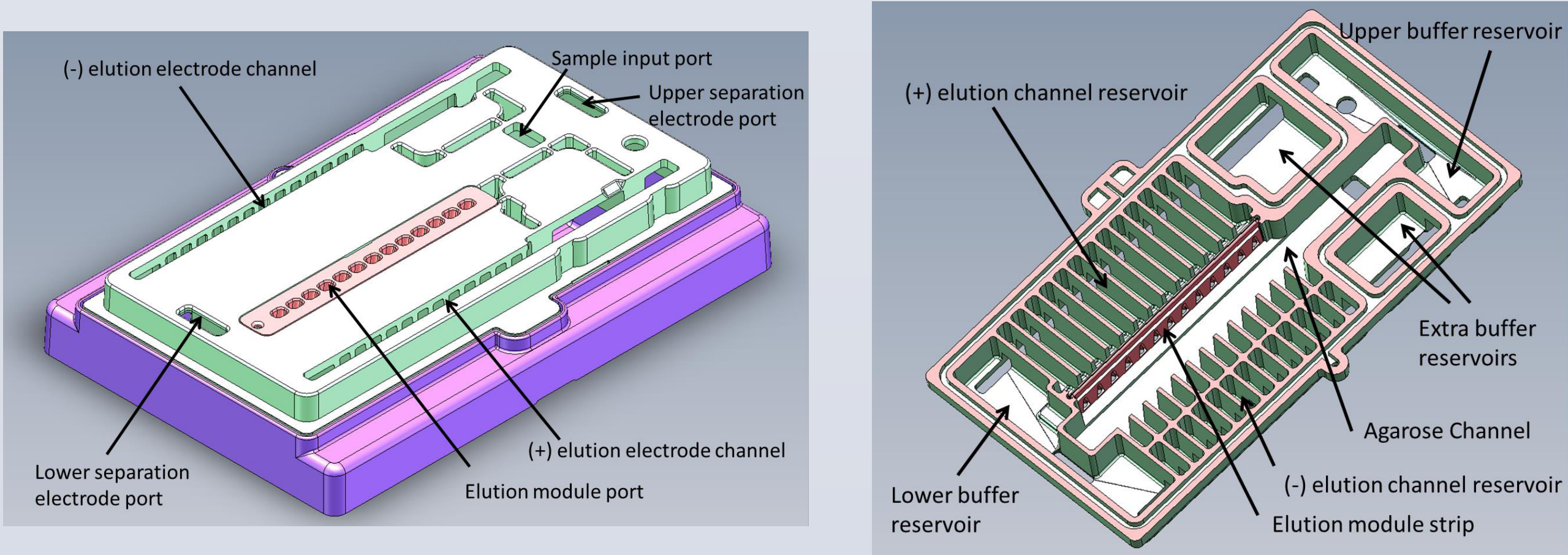
sage science

Introduction

The SageELF system uses a two-dimensional process to separate DNA through an agarose column in a first direction, and then move the separated DNA fragments sideways into a linear array of buffer-filled elution modules that are positioned alongside the separation column. Each disposable cassette will process a single sample, and the instrument will process two cassettes per run. The instrument can operate in direct current mode for samples up to mid-single kilobases in size, or in pulsed field mode for samples up to 100's of kilobases in size. Fractionation range is controlled by selection of voltage protocol, gel concentration, and run timing. Internal standards can be used to improve run-to-run reproducibility, and the instrument can read fluorescein-labeled markers.
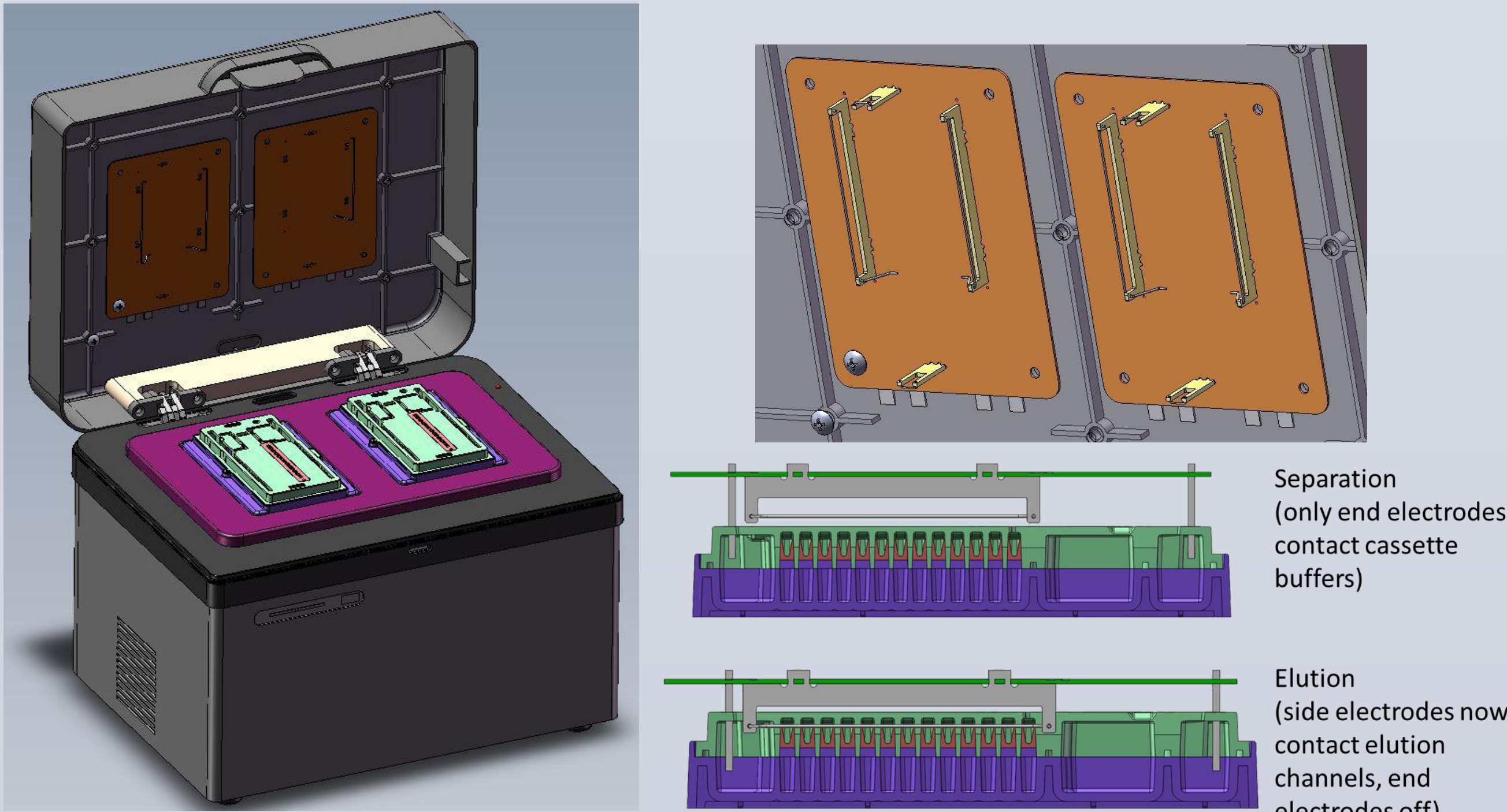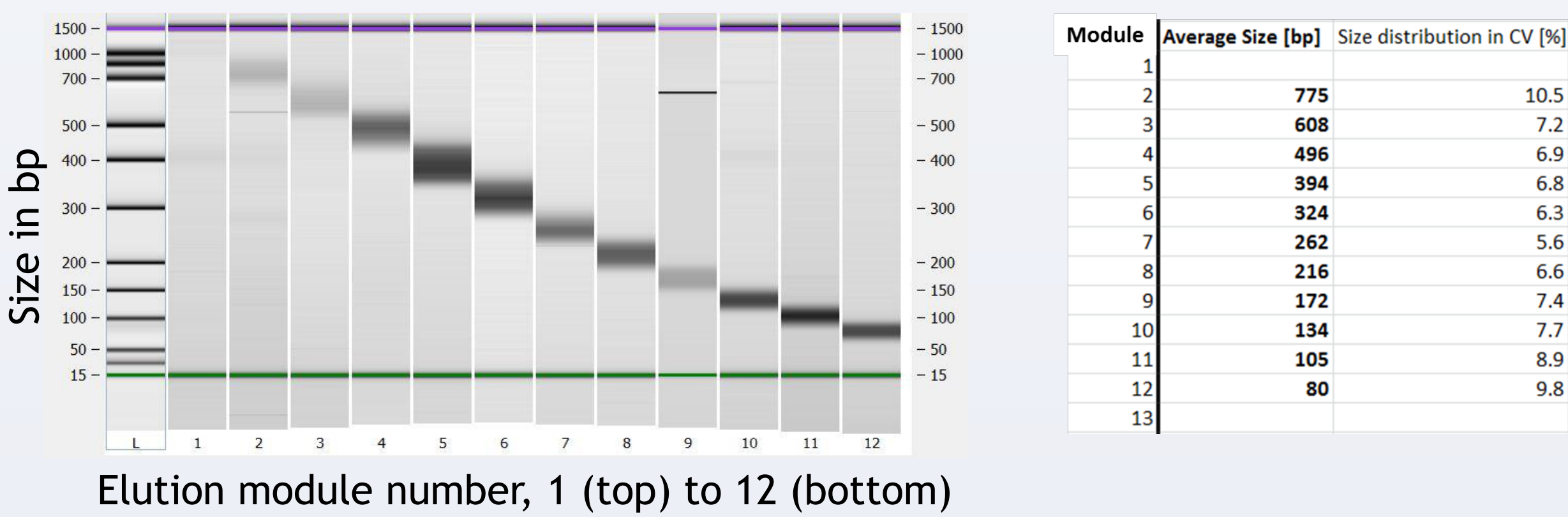
ELF Concept

Step 1. Separation electrophoresis through agarose channel

Step 2. Elution electrophoresis into buffer filled elution module strip.

ELF Cassette

(-) elution electrode channel
Sample input port
Upper separation electrode port
Lower separation electrode port
(+) elution electrode channel
Elution module port
Upper buffer reservoir
(+) elution channel reservoir
Extra buffer reservoirs
Agarose Channel
Lower buffer reservoir
(-) elution channel reservoir
Elution module strip

ELF Instrument

Separation (only end electrodes contact cassette buffers)

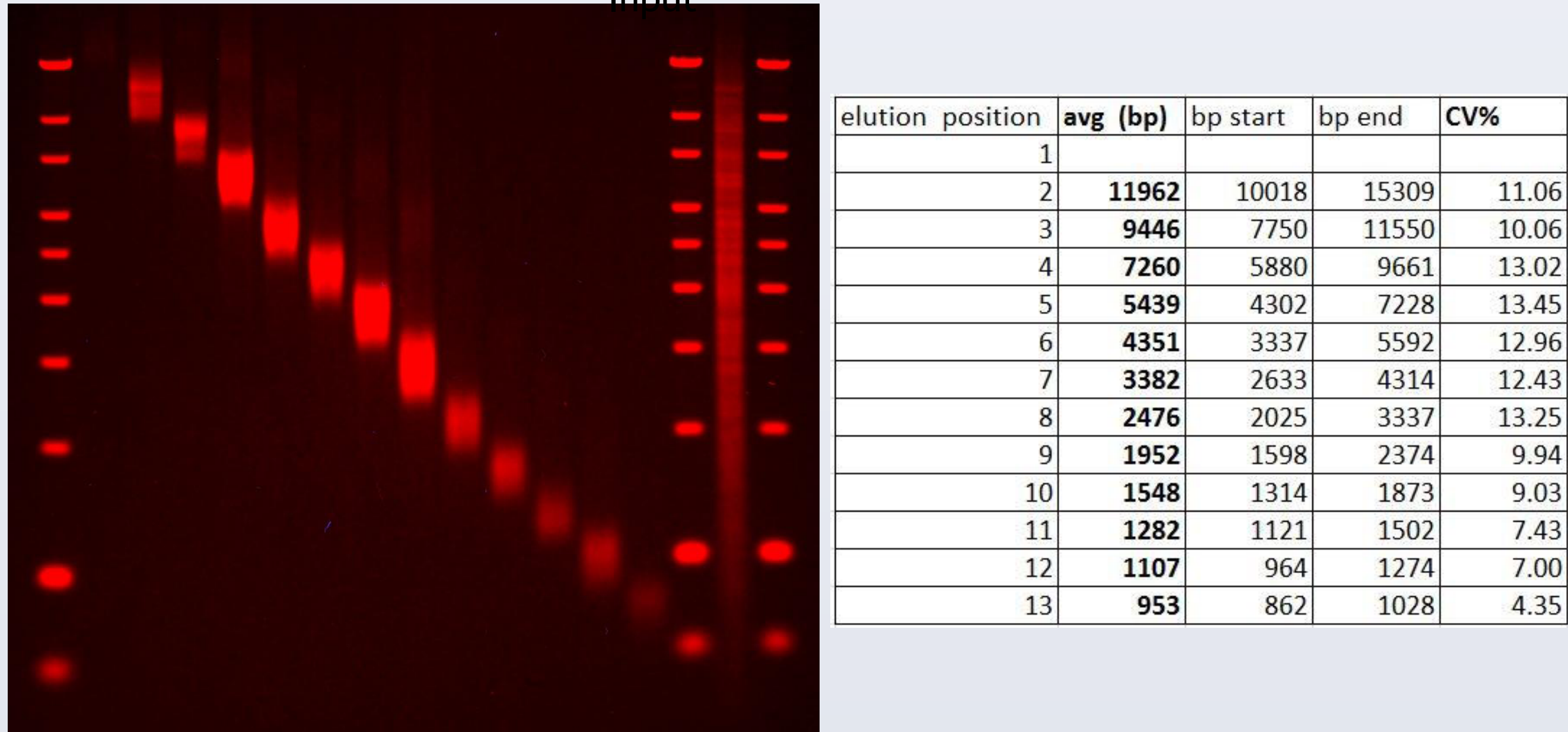Elution (side electrodes now contact elution channels, end electrodes off)

The ELF instrument will run 2 cassettes (1 sample/cassette). The electrodes are contained in the instrument lid, and are exposed when the lid is closed. The instrument has an on-board computer, and is supplied with a monitor and keyboard. Dimensions: 9.9"(high), 13.3"(wide), 11.5"(deep).
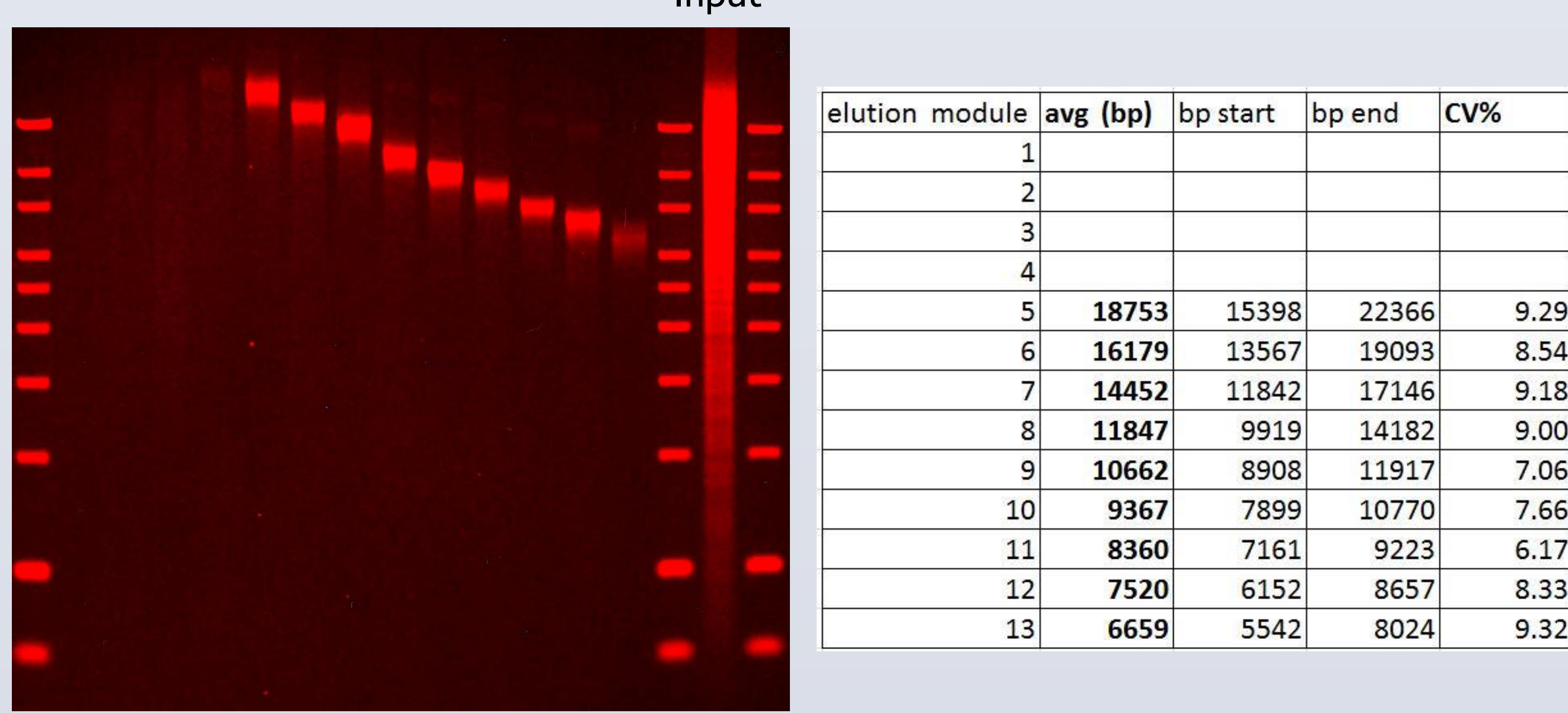
Examples of ELF performance

2% agarose gel, continuous field, sample of Ecoli genomic DNA digested with 4base cutters
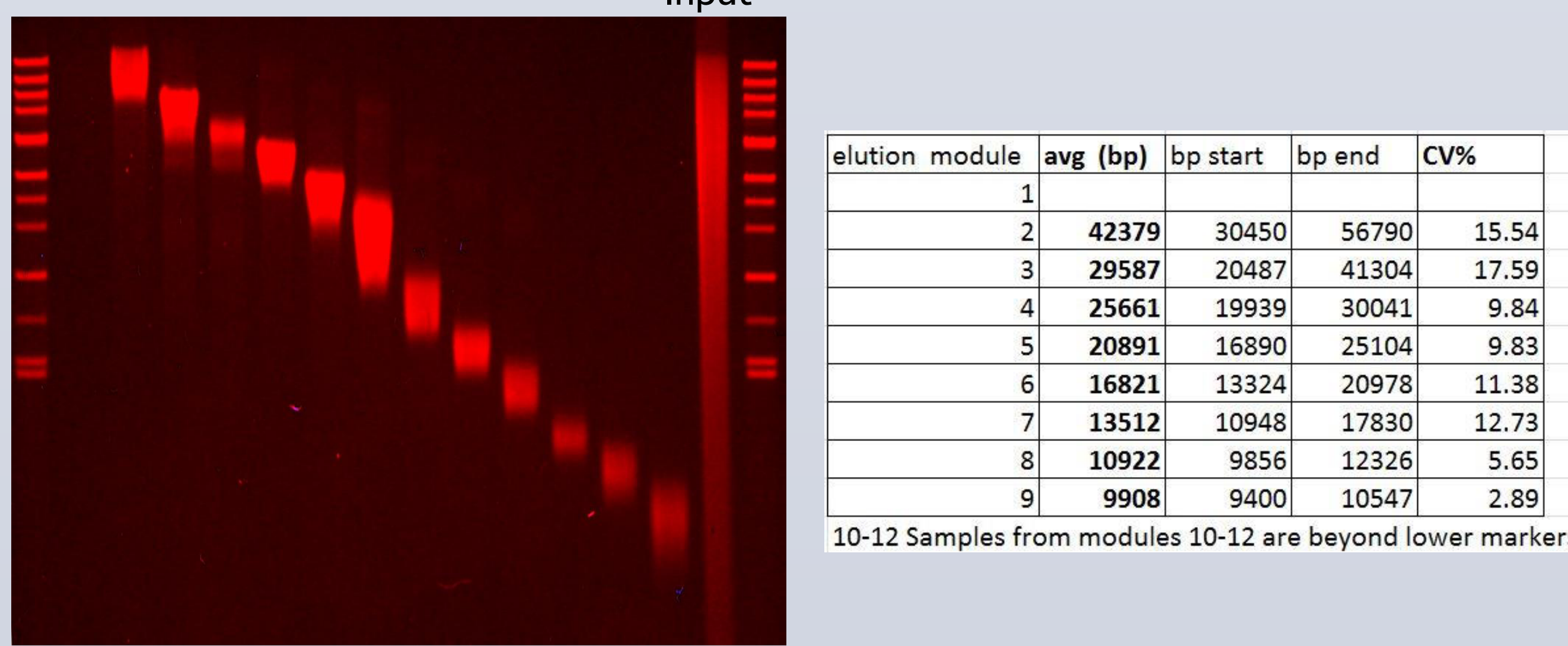

Elution module number, 1 (top) to 12 (bottom)

Module	Average Size [bp]	Size distribution in CV [%]
1		
2	775	10.5
3	608	7.2
4	496	6.9
5	394	6.8
6	324	6.3
7	262	5.6
8	216	6.6
9	172	7.4
10	134	7.7
11	105	8.9
12	80	9.8
13		

0.75% agarose gel, pulsed field prog. 1, restricted Ecoli gDNA, 2.5 hours

elution position	avg (bp)	bp start	bp end	CV%
1				
2	11962	10018	15309	11.06
3	9446	7750	11550	10.06
4	7260	5880	9661	13.02
5	5439	4302	7228	13.45
6	4351	3337	5592	12.96
7	3382	2633	4314	12.43
8	2476	2025	3337	13.25
9	1952	1598	2374	9.94
10	1548	1314	1873	9.03
11	1282	1121	1502	7.43
12	1107	964	1274	7.00
13	953	862	1028	4.35

0.75% agarose gel, pulsed field prog. 1, restricted Ecoli gDNA, 5 hours

elution module	avg (bp)	bp start	bp end	CV%
1				
2				
3				
4				
5	18753	15398	22366	9.29
6	16179	13567	19093	8.54
7	14452	11842	17146	9.18
8	11847	9919	14182	9.00
9	10662	8908	11917	7.06
10	9367	7899	10770	7.66
11	8360	7161	9223	6.17
12	7520	6152	8657	8.33
13	6659	5542	8024	9.32

075% agarose gel, pulsed field prog. 2, restricted Ecoli genome DNA, 6 hours

elution module	avg (bp)	bp start	bp end	CV%
1				
2	42379	30450	56790	15.54
3	29587	20487	41304	17.59
4	25661	19939	30041	9.84
5	20891	16890	25104	9.83
6	16821	13324	20978	11.38
7	13512	10948	17830	12.73
8	10922	9856	12326	5.65
9	9908	9400	10547	2.89

10-12 Samples from modules 10-12 are beyond lower markers

Contact

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