Experimental

Chemicals:

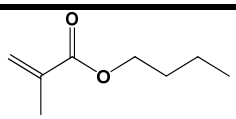
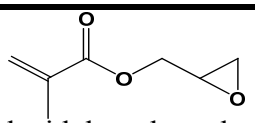
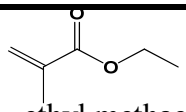
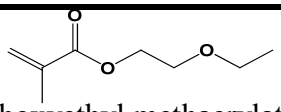
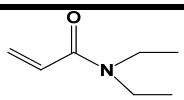
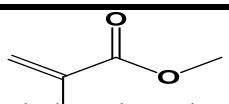
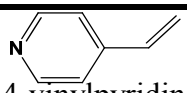
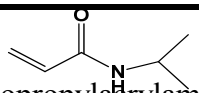
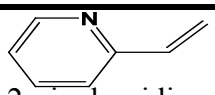
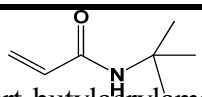
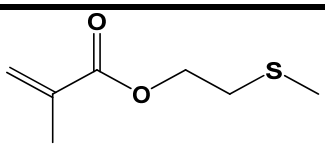
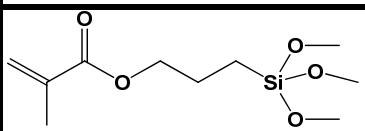
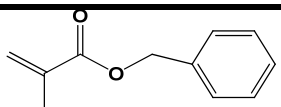
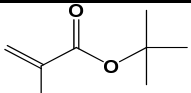
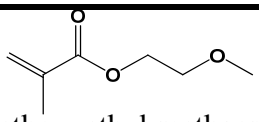
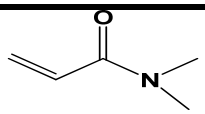
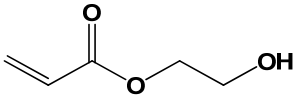
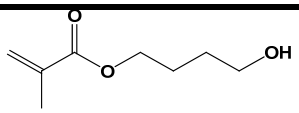
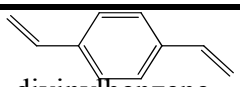
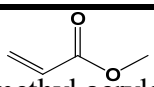
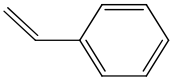
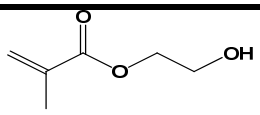
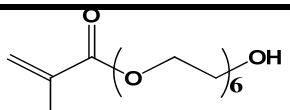
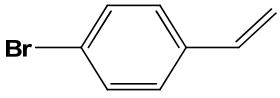
All chemicals were from Sigma-Aldrich. Styrene and divinylbenzene were purified with 10 % NaOH and distilled water, dried with $MgSO_4$ and filtered. 4-vinylpyridine and 2-vinylpyridine were purified by distillation *in vacuo* (11 bar). Other chemicals were used as received. Paraffin oil (CAS 8012-95-1) is a mineral oil for oil baths.

Analysis:

Low resolution image capture and analysis of the slides was carried out using a Bioanalyzer 4F/4S fluorescent scanner (Lavision BioTec) or at high resolution using a Nikon Eclipse 50i microscope with the software Pathfinder (IMSTAR S. A., France).

GPC-SEC analysis was carried out on a PLgel 5µm Mixed-C column (300 x 7.5 mm) from Polymer Laboratories on an Agilent 1100 HPLC. Data was analysed using the ChemStation software. Polymer analysis was run using 1-Methyl-2-pyrrolidone (NMP) as the eluent at a flow rate of 0.5 ml/min at 55 ºC. The polymer was detected using an RID detector. Polystyrenes (Polymer Laboratories) with a peak molecular weight range from 580 to 300,000 g/mol were used as standards.

Table S1 Monomers used for fabrication of the polymer arrays and grids.

No	Monomer[a]	No	Monomer[a]
1	 butyl methacrylate	13	 glycidyl methacrylate
2	 ethyl methacrylate	14	 ethoxyethyl methacrylate
3	 N,N-diethylacrylamide	15	 methyl methacrylate
4	 4-vinylpyridine	16	 N-isopropylacrylamide
5	 2-vinylpyridine	17	 N-tert-butylacrylamide
6	 2-(methylthio)ethyl methacrylate	18	 3-(trimethoxysilyl)propyl methacrylate
7	 benzyl methacrylate	19	 *tert* -Butyl methacrylate
8	 2-methoxyethyl methacrylate	20	 N,N-dimethylacrylamide
9	 2-hydroxyethyl acrylate	21	 4-hydroxybutyl acrylate
10	 divinylbenzene	22	 methyl acrylate
11	 styrene	23	 ethylene glycol methacrylate
12	 poly(ethylene glycol) monomethacrylate – Mn 360	24	 4-bromostyrene

Agarose coated glass slides:

Coating with agarose was achieved by manually dip-coating the slide into agarose Type I-B (1.0 % w/v in deionised waterat 65 °C) followed by removal of the coating on the bottom side by wiping with a clean piece of tissue. After drying for 24 h at room temperature (25 °C), the coated slides were ready for use.

Protocols for mouse embryonic stem (mES) cell screening:

mES-Oct4 (the 8^{th} passage) were kindly provided by Josh Brickman (Institute for Stem Cell Research (ISCR), University of Edinburgh). The cells were seeded at $7x10^5$ cells per slide and then incubated in a Gibco incubator at 37 ºC with 5 % CO_2 with 7 ml medium per slide in a four-rectangular well plate (Nunc, Denmark). The medium was GMEM complemented with heat inactivated fetal calf serum 10 % v/v, penicillin (100 units/mL), streptomycin (100 mg/mL), L-glutamine (2.0 mM), Sodium pyruvate (2.0 mM), 2- mercaptoethanol (0.1 mM) and LIF (0.18 units/mL). Cells attached on the slides were stained with Hoescht 33245 for 15 min and then fixed with formaldehyde solution (4 % wt) in phosphorous buffer saline (PBS) pH 7.5 for another 15 min.

Table S2 GPC analysis of polymers synthesised on the glass slides using the inkjet printing approach (200 features/slide for each polymer) and under identical reaction conditions in glass vials.

Monomer	**Traditional synthesis Mn (x10^4)/MWD**	**Inkjet based spot synthesis Mn (x10^4)/MWD**
butyl methacrylate	3.42/1.2	2.68/1.1
ethyl methacrylate	9.28/2.3	8.63/2.3
N,N-diethylacrylamide	23.36/3.4	20.68/3.1
4-vinylpyridine	8.34/4.8	4.09/6.4
2-vinylpyridine	1.70/1.7	8.17/2.9
2-(methylthio)ethyl methacrylate	12.36/4.3	10.84/5.1
benzyl methacrylate	3.89/1.8	3.46/1.7
2-methoxyethyl methacrylate	9.14/4.01	7.38/3.7
2-hydroxyethyl methacrylate	48.42/9.8	11.04/4.2
styrene	8.90/1.8	6.88/1.5
poly(ethylene glycol) monomethacrylate -Mn 360	Not soluble	Not soluble
glycidyl methacrylate	4.25/1.8	3.53/1.76
ethoxyethyl methacrylate	3.95/1.4	4.37/2.7
methyl methacrylate	9.78/1.8	11.63/2.4
N-isopropylacrylamide	7.23/2.9	2.84/1.8
N-tert-butylacrylamide	9.98/2.5	8.59/2.1
3-(trimethoxysilyl)propyl methacrylate	6.02/3.5	7.54/3.1
tert-butyl methacrylate	11.30/1.6	6.47/1.7
N,N-dimethylacrylamide	22.86/3.4	19.81/4.3
4-hydroxybutyl acrylate	6.77/1.9	6.98/2.7
methyl acrylate	8.38/1.3	9.62/1.3
4-bromostyrene	Not soluble	Not soluble

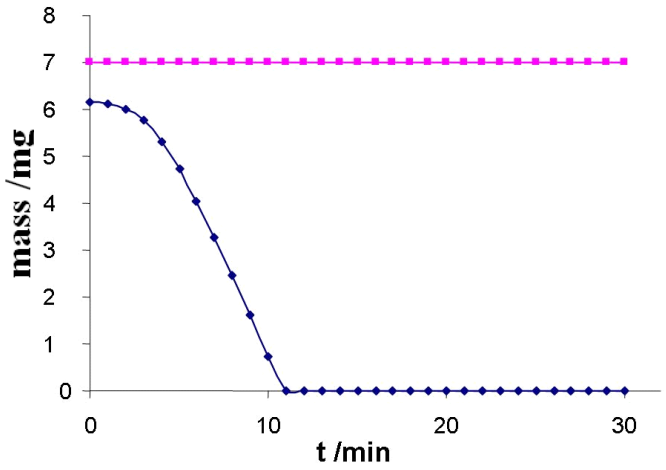
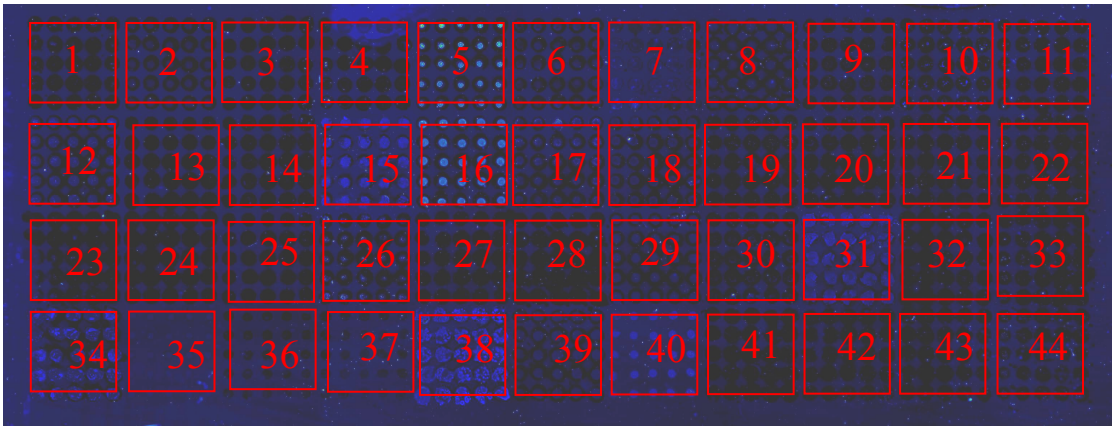


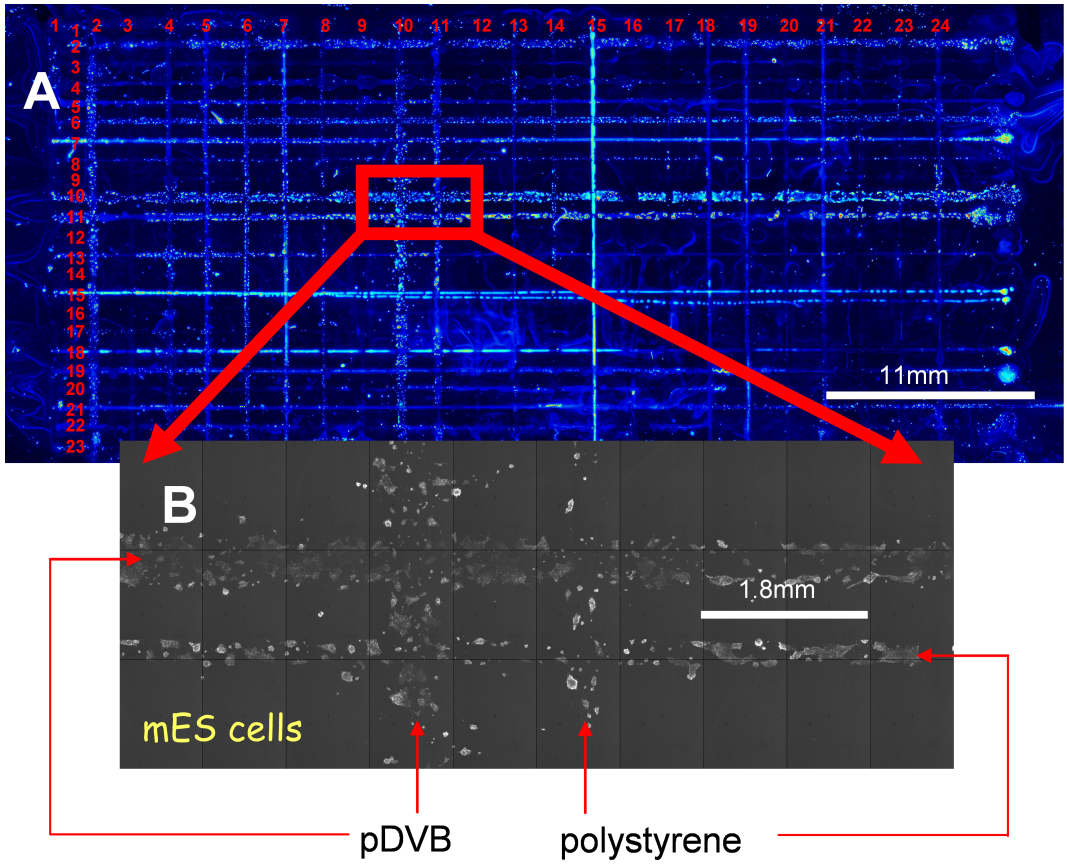
Figure S1 Evaporation of printed water drops. Water was printed onto two microscope glass slides (26x76 mm) respectively by inkjet printing (100 spots, 180 drops/spot). After printing the slides were weighted every minute for 4 h. (A) Pink line showing no water evaporation when the slide was covered with a layer of paraffin oil (Fisher Scientific) (0.3 mL of oil was spread onto the slide); (B) blue line shows the rapid evaporation of water from the slide when not protected by the oil layer.



1	styrene */tert*-butyl methacrylate co-polymer	23	poly *tert*-butyl methacrylate
2	poly 2-vinylpyridine	24	poly ethoxyethyl methacrylate
3	poly 3-(trimethoxysilyl)propyl methacrylate	25	poly N-*tert*-butylacrylamide
4	poly N-isopropylacrylamide	26	polystyrene

5	poly 4-bromostyrene	27	2-vinylpyridine/4-bromostyrene co-polymer
6	ethyl methacrylate/ ethylene glycol methacrylate co-polymer	28	poly 4-hydroxybutyl acrylate
7	poly 4-vinylpyridine	29	poly methyl methacrylate
8	4-bromostyrene/ styrene co-polymer	30	ethyl methacrylate/2-hydroxyethyl acrylate co-polymer
9	N-isopropylacrylamide/ *tert*-butyl methacrylate co-polymer	31	polydivinylbenzene
10	polybenzyl methacrylate	32	glycidyl methacrylate/ butyl methacrylate co-polymer
11	2-(methylthio)ethyl methacrylate /styrene co-polymer	33	polyglycidyl methacrylate
12	benzyl methacrylate / styrene co-polymer	34	polyethyl methacrylate
13	2-vinylpyridine/4-vinylpyridineco-polymer	35	glycidyl methacrylate /N-*tert*-Butylacrylamide co-polymer
14	polybutyl methacrylate	36	polymethyl acrylate
15	poly 2-(methylthio)ethyl methacrylate	37	styrene/2-hydroxyethyl acrylate co-polymer
16	methyl acrylate/4-vinylpyridine co-polymer	38	benzyl methacrylate /divinylbenzene co-polymer
17	poly 2-hydroxyethyl acrylate	39	methyl acrylate/ N,N-dimethylacrylamide co-polymer
18	2-methoxyethyl methacrylate/2-hydroxyethyl acrylate copolymer	40	poly(ethylene glycol) monomethacrylate – Mn 360
19	ethylene glycol methacrylate/2-hydroxyethyl acrylate co-polymer	41	polyethylene glycol methacrylate
20	poly 2-methoxyethyl methacrylate	42	styrene /4-hydroxybutyl acrylate co-polymer
21	4-vinylpyridine/ 4-bromostyrene co-polymer	43	N,N-diethylacrylamide / N,N-dimethylacrylamide co-polymer
22	poly N,N-dimethylacrylamide	44	poly N,N-diethylacrylamide

Figure S2 Localization of polymers on the microarray (Fig. 1A). Each polymer was printed as a 5×5 matrix of identical spots. The monomers used are listed in the table. Two monomers mean that the polymer spots were co-polymers generated by printing 25 drops of each monomer at the same position and then polymerised *in situ*.



C

1	polybutyl methacrylate	13	polyglycidyl methacrylate
2	polyethyl methacrylate	14	polyethoxyethyl methacrylate
3	poly N,N-diethylacrylamide	15	polymethyl methacrylate
4	poly 4-vinylpyridine	16	poly N-Isopropylacrylamide
5	poly 2-vinylpyridine	17	poly N-*tert*-butylacrylamide
6	poly 2-(methylthio)ethyl methacrylate	18	poly 3-(trimethoxysilyl)propyl methacrylate
7	polybenzyl methacrylate	19	poly *tert*-butyl methacrylate
8	poly 2-methoxyethyl methacrylate	20	poly N,N-dimethylacrylamide
9	poly 2-hydroxyethyl acrylate	21	poly 4-hydroxybutyl acrylate
10	polydivinylbenzene	22	polymethyl acrylate
11	polystyrene	23	polyethylene glycol methacrylate
12	poly(ethylene glycol) monomethacrylate – Mn 360	24	poly 4-bromostyrene

Figure S3 mES adhesion on girds prepared via high throughput *in situ* polymerization. (A) mES cells proliferating on a polymers spot printed on the polymer micorarray (after fixing with formaldehyde (4 % w/w) and stained with Hoescht 33245 (nuclei stain). The image (scale bar 10 mm) was taken with a BioAnalyzer 4F/4S scanner (LaVision Bio Tech); (B) An enlarged image of mES cells growing on the polymer grids. pDVB is polydivinylbenzene; (C) The polymer lines on the grids are marked with numbers which were listed in the table.