

Supplement

The Use of a Barley-Based Well to Define Cationic Betaglucan to Study Mammalian Cell Toxicity Associated with Interactions with Biological Structures

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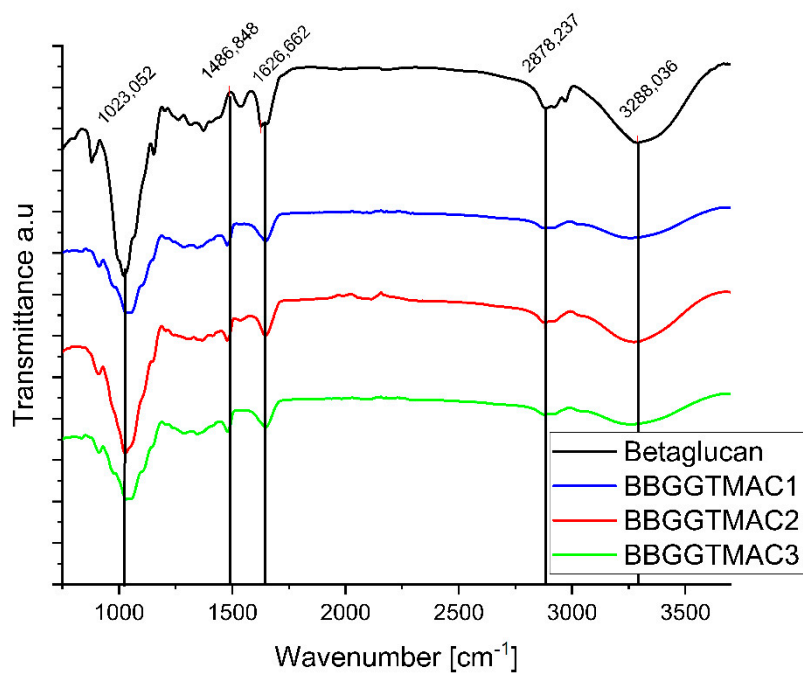
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Table S1. Combustion elemental analysis of obtained polymers.

Name	Elemental composition %		
	N	C	H
Betaglucan	1.77 ± 0.07	40.82 ± 0.58	6.19 ± 0.03
BBGGTMAC3	4.44 ± 0.02	45.15 ± 0.01	7.52 ± 0.04
BBGGTMAC2	3.59 ± 0.03	40.57 ± 0.02	7.55 ± 0.12
BBGGTMAC1	2.92 ± 0.04	41.41 ± 0.21	7.18 ± 0.06



Wavenumber [cm ⁻¹]	Functional groups
1023,052	-CO stretching
1486,848	-CH ₃ from cationic group
1626,662	-NH bending
2878,237	-CH stretching
3288,036	-OH stretching

Figure S1. IR spectra of the obtained polycations with marked peaks and functional groups

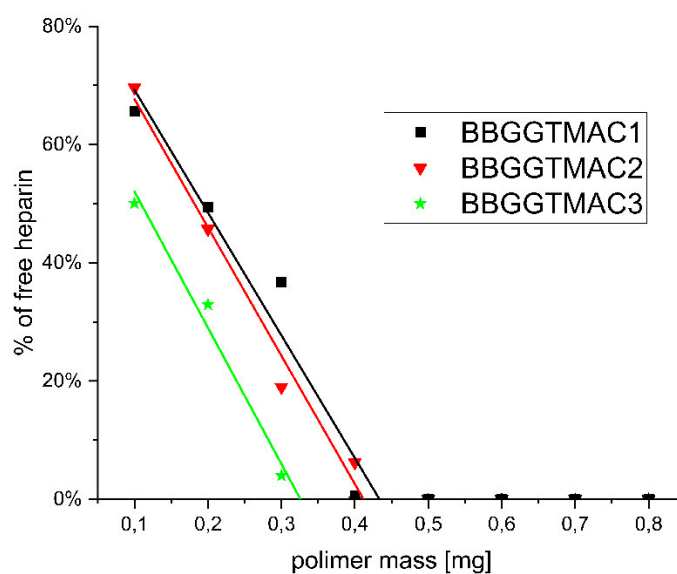


Figure S2. Dependence of unbound % heparin on polymer in solution

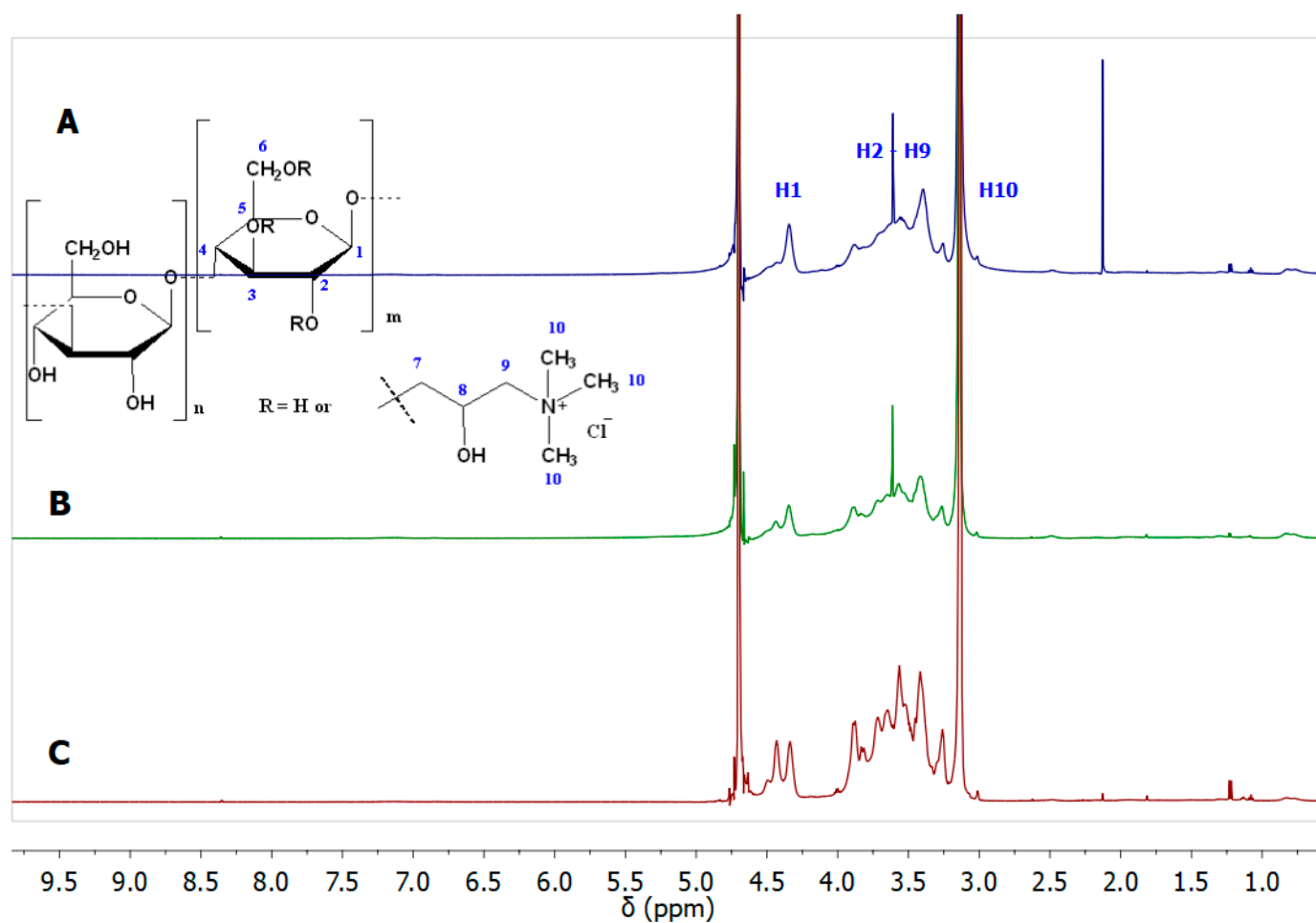


Figure S3. ¹H NMR spectrum of BBGGTMAC1, BBGGTMAC2 and BBGGTMAC3 in D₂O.

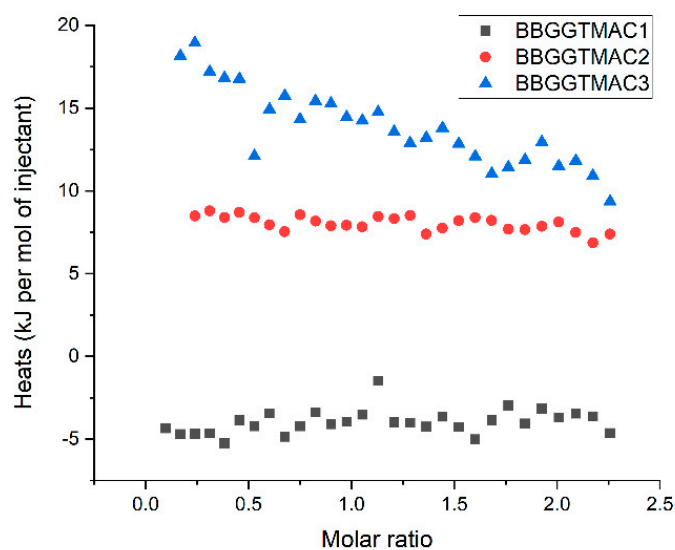


Figure S4. Calorimetric titrations of 200 μ M polycations solutions into 20 μ M BSA solution after subtraction of the dilution heats. Experiments were performed in PBS at 37°C.

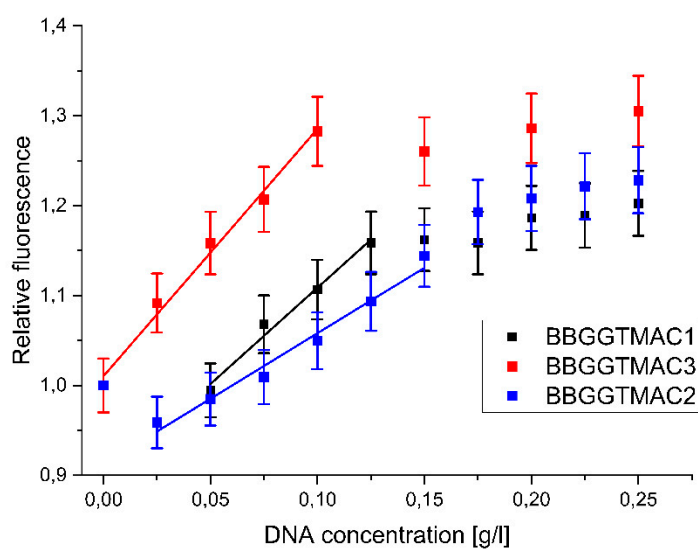


Figure S5. Change in fluorescence spectra of polycations with addition of DNA (polycation concentration 0,05 g/l).

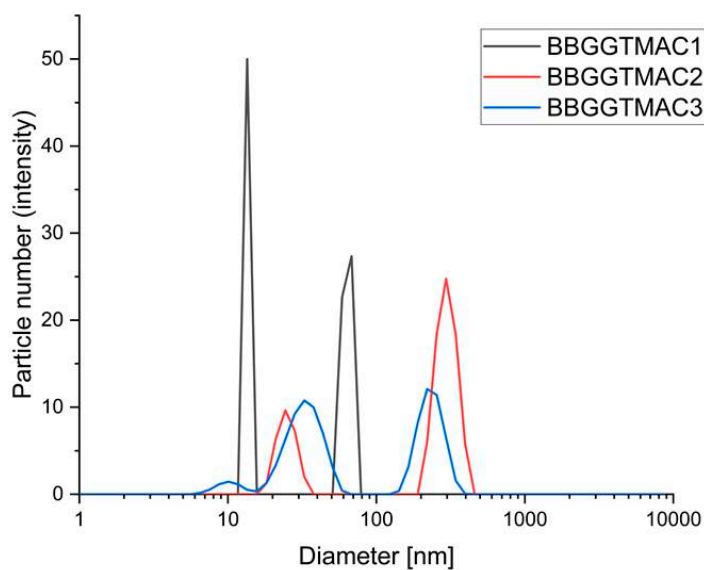


Figure S6. Particle size distribution of polycations.

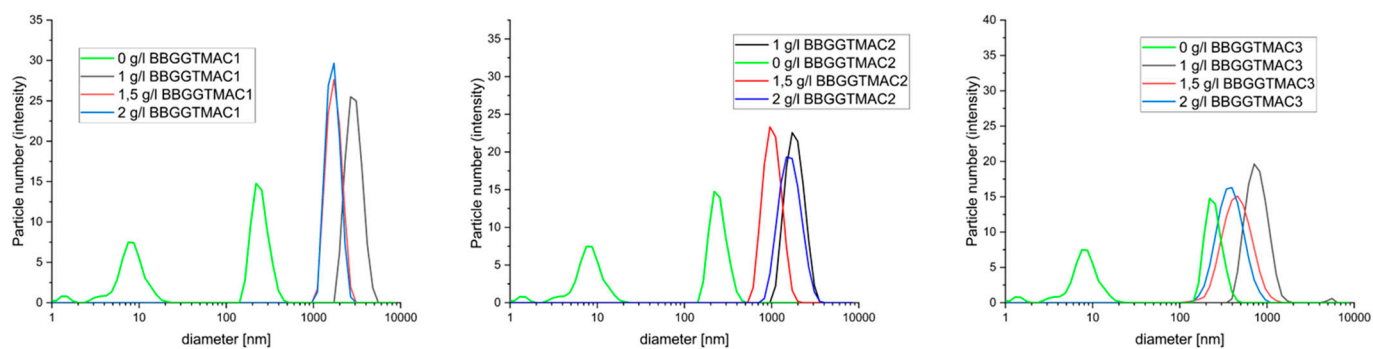


Figure S7. The diameters of the objects formed based on dynamic light scattering in result of the interaction of polymers with DNA, from left to right BBGGTMAC1, BBGGTMAC2, BBGGTMAC3

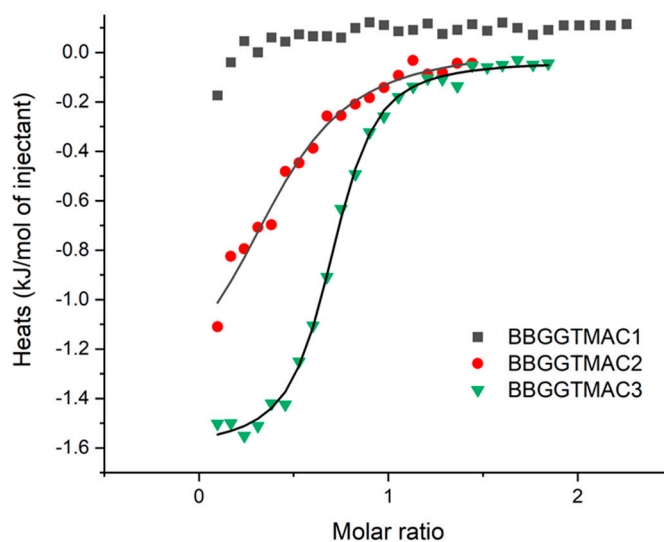


Figure S8. Example calorimetric titrations of 5 mM DNA solutions into 500 μ M polymers solution. Experiments were performed in PBS at 37°C. Solid lines represent the best fit of the single-site binding model to the data.

Table S2. Thermodynamic parameters obtained when analyzing calorimetric data of the interaction of polycations with DNA based on a single class of binding sites model.

Name	stoichiometry	K_{app} [$\times 10^3 \text{ M}^{-1}$]	ΔH_{app} [kJ/mol]	ΔS_{app} [J/mol/K]
BBGGTMAC2	0.46 ± 0.05	14 ± 6	-1.5 ± 0.3	18 ± 1
BBGGTMAC3	0.66 ± 0.05	97 ± 13	-2.0 ± 0.1	21 ± 0.3

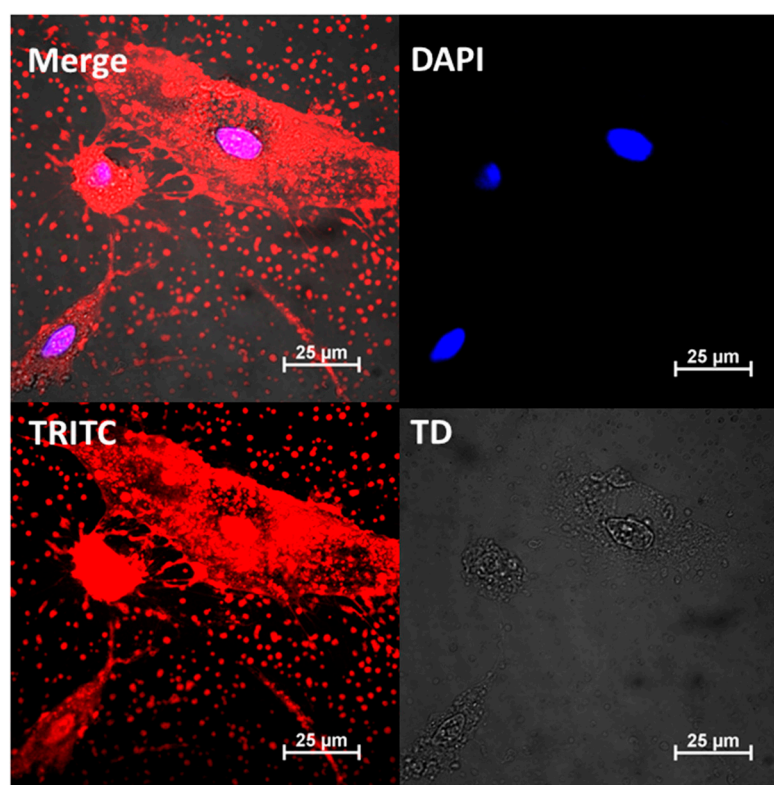


Figure S9. Confocal images of BBGGTMAC3.

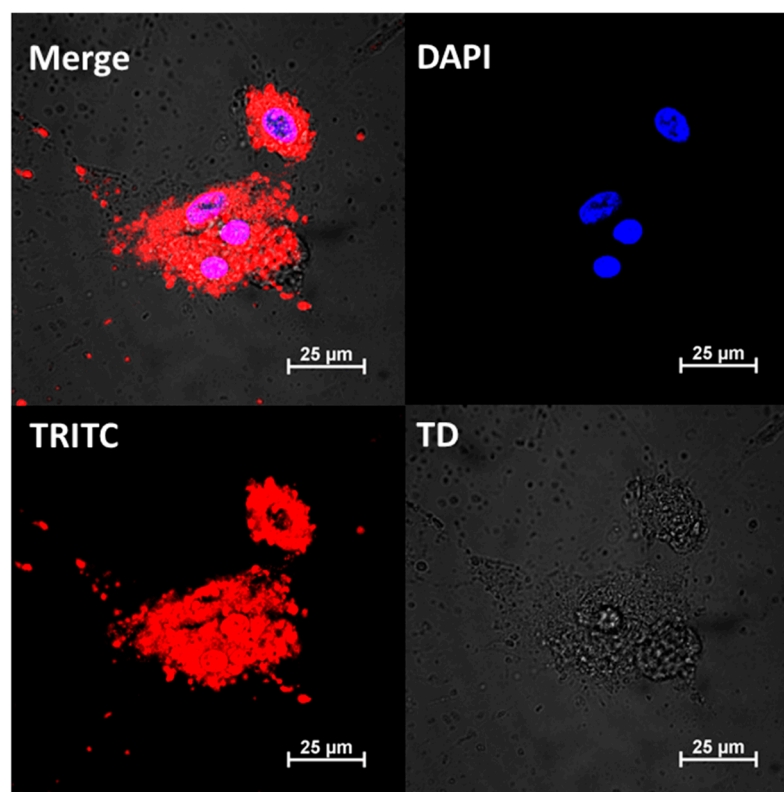


Figure S10. Confocal images of BBGGTMAC3 (lower concentration 50µg/ml).

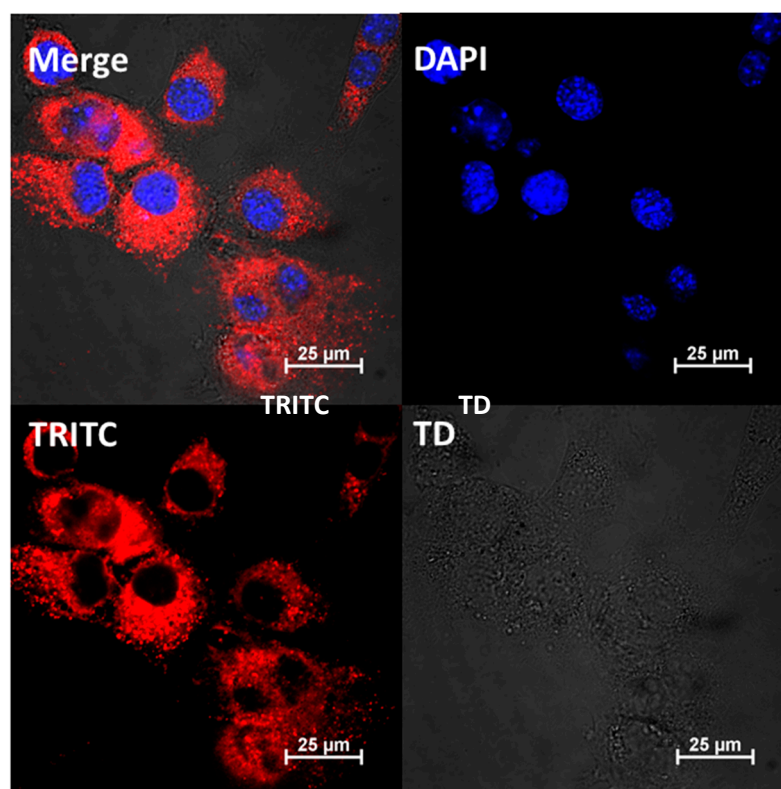


Figure S11. Confocal images of BBGGTMAC1.

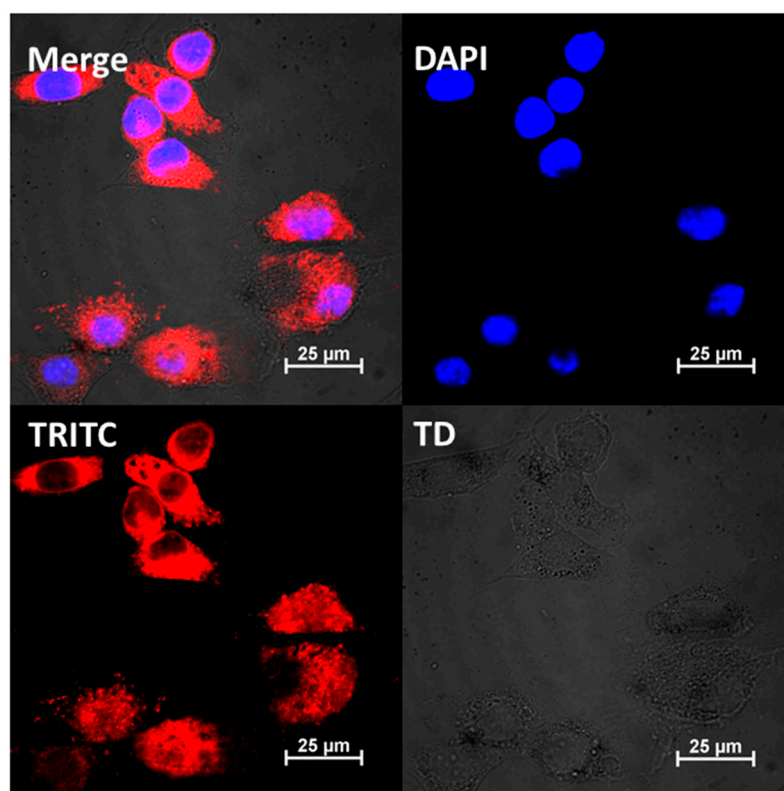


Figure S12. Confocal images of BBGGTMAC2

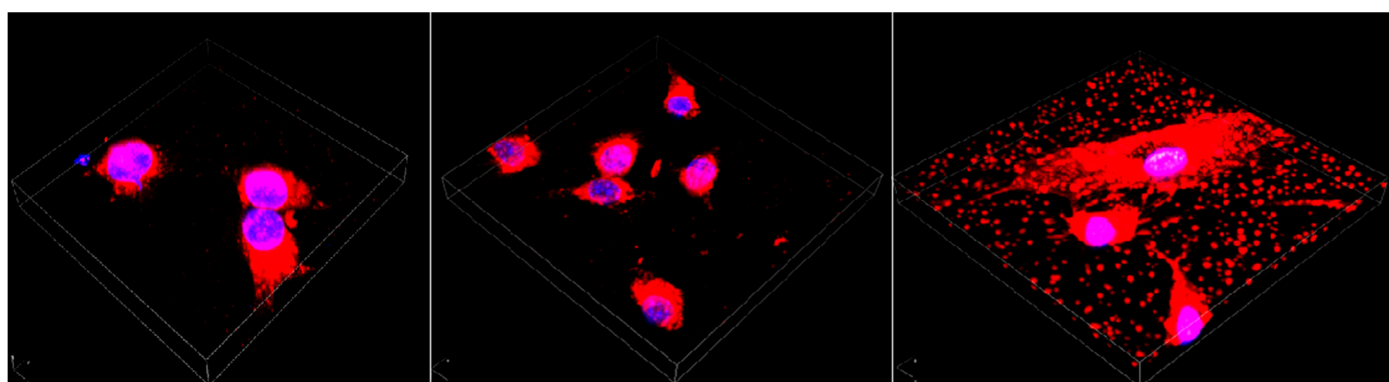


Figure S13. 3D Confocal images of left to right: BBGGTMAC1, BBGGTMAC2, BBGGTMAC3.

Table S3. Depolymerization process analysis.

Name	Time passed after the addition of betaglucanase [min]	Flow time [s]
Water	-	92
BBGGTMAC2	-	141
BBGGTMAC2 + 5 mg betaglucanase	0	134
	15	130
	45	130
BBGGTMAC2 + 25 mg betaglucanase	0	125
	15	124
	30	123
	45	123