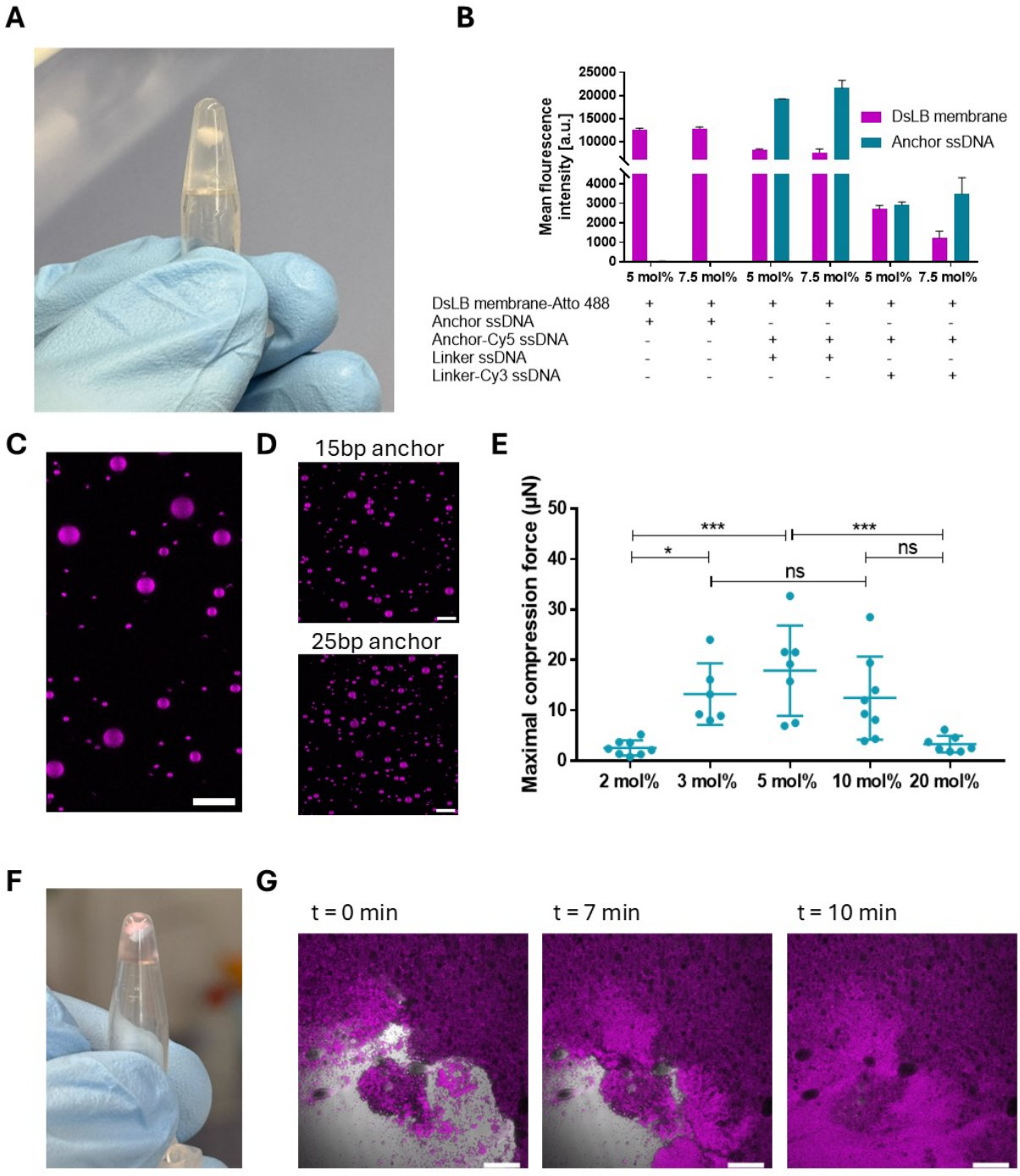

Figure S 1: Construct assessment and disassembly A) Side view of a fee flowing synthetic tissue produced in a 0.5 mL Eppendorf tube. **B)** Flow cytometry measurements showing the mean fluorescent intensity of the dsLB membrane (magenta) equipped with anchor 20bp ssDNA (cyan) and linker 20bp ssDNA at different ssDNA concentrations of 7 mol% and 7.5 mol% with and without fluorophores. Data is shown as mean +/- SD. **C)** Representative confocal microscopy maximal z-projection (dsLB membrane: magenta) of anchor 20bp ssDNA loaded dsLBs without the corresponding linker ssDNA. Scale bar is 20 µm. **D)** Representative confocal microscopy maximal z-projection (dsLB membrane: magenta) of anchor 15bp and 25bp ssDNA equipped dsLBs without the corresponding linker ssDNA. Scale bar is 20 µm. **E)** Maximal compression force measurement required to compress 10% of the construct height assembled with 20 bp ssDNA with the following ssDNA concentrations: 2 mol%, 3 mol%, 5 mol%, 10 mol% and 20 mol% using parallel mirco-compression. **F)** Side view of a free floating two-zone synthetic tissue formed in fully supplemented cell culture medium. **G)** Representative confocal timelapse images (overlayed bright field and membrane fluorescence channel) of constructs formed with anchor 20bp + linker 13bp mm 1a/ab before (t = 0) addition of the dis strand, 7 min and 10 min after addition of 200% dis strand. The images show continuous loss of construct integrity and dissolution into a flat layer of single dsLBs. Scale bars are 200 µm. Results are shown as ± SD of n <= 6 constructs. p values were calculated using two-tailed t test, ns = not significant.

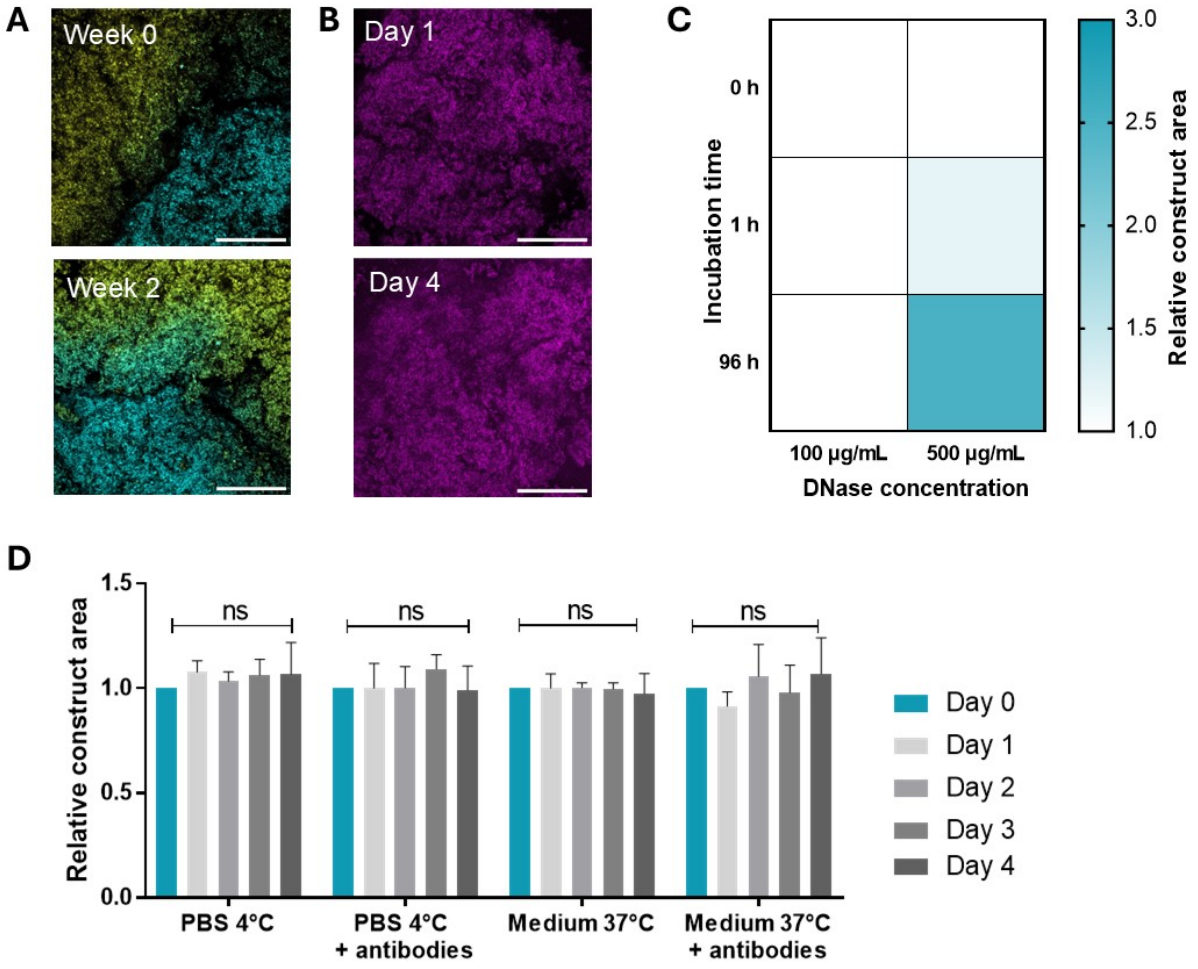

Figure S 2: Stability assessment of construct and synthetic tissues A) Representative confocal microscopy maximal z-projection of a two-zone synthetic tissue before and after two-week storage in PBS at 4 °C. Scale bars are 250 µm. **B)** Representative confocal microscopy maximal z-projection of a synthetic tissue before and after one and four days incubation in fully supplemented medium at 37 °C. Scale bars are 250 µm. **C)** Construct stability was evaluated under cell culture conditions with additional 100 µg/mL and 500 µg/mL DNase before addition of DNase (0 h), after 1 h and after 96 h after DNase addition. The structural stability of constructs was evaluated using the parameter of construct size measured by stereo microscopy and normalized to 0 h. **D)** Evaluation of time dependent construct and assembloid structural stability. Constructs and assembloids (+antibodies) are formed with anchor 20bp and linker 20bp 1a/1b and stored for 4 days in either PBS at 4°C or fully supplements cell culture medium a 37°C. The structural stability of constructs and assembloids was evaluated using the parameter of total construct size measured by stereo microscopy and normalized to day 0. Results are shown as ± SD of n = 3 constructs. p values were calculated using two-way ANOVA, ns = not significant.