Supporting Information

Ductile electroactive biodegradable hyperbranched polylactide copolymers enhancing myoblast differentiation

Meihua Xie [a], Ling Wang [a], Baolin Guo [a, *], Zhong Wang [b], Y. Eugene Chen [b], Peter X. Ma [a,c,d,e,f,*]

[a] *Center for Biomedical Engineering and Regenerative Medicine, Frontier Institute of Science and Technology, Xi'an Jiaotong University, Xi'an, 710049, China*

[b] *Department of Cardiac Surgery, Cardiovascular Center, The University of Michigan, Ann Arbor, MI 48109, USA*

[c] *Department of Biomedical Engineering, University of Michigan, Ann Arbor, MI 48109, USA*

[d] *Department of Biologic and Materials Sciences, University of Michigan, 1011, North University Ave., Room 2209, Ann Arbor, MI 48109, USA*

[e] *Macromolecular Science and Engineering Center, University of Michigan, Ann Arbor, MI 48109, USA*

[f] *Department of Materials Science and Engineering, University of Michigan, Ann Arbor, MI 48109, USA*

***** To whom correspondence should be addressed.

Peter X. Ma: mapx@umich.edu

Tel : +1 734-764-2209

Fax : +1 734-647-2805

Baolin Guo: baoling@mail.xjtu.edu.cn

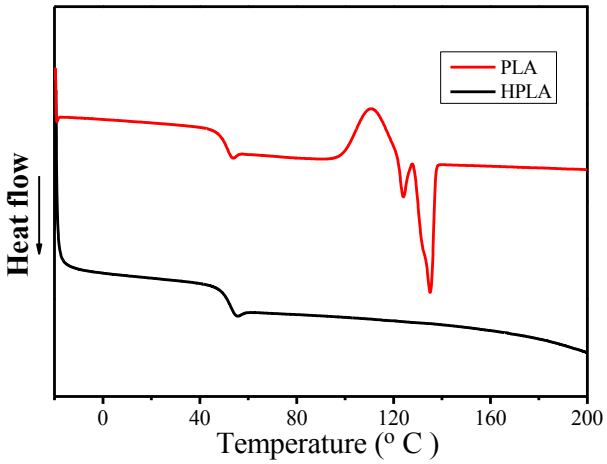

Figure S1. DSC curves of PLA and HPLA. Melting peak in PLA was not present in HPLA, indicating the amorphous state of HPLA copolymer.

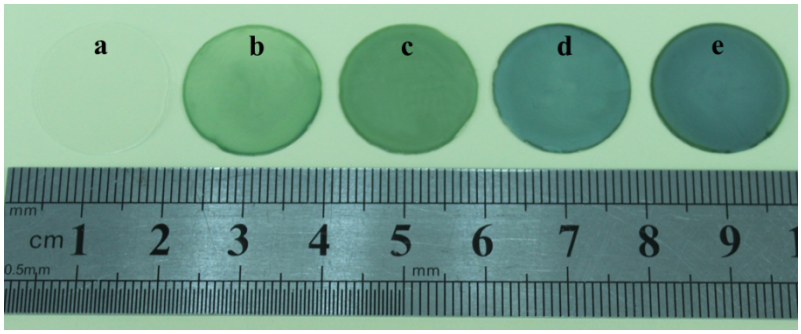

Figure S2. The images of (a) HPLA, (b) HPLAAT3, (c) HPLAAT6, (d) HPLAAT9 and (e) HPLAAT12.

HPLA was transparent without color, indicating the amorphous state of the polymer. The addition of AT (doped with CSA) caused the color of the HPLAAT films to turn emeraldine. The intensity of emeraldine color increased proportionally with the content of AT in the copolymers.

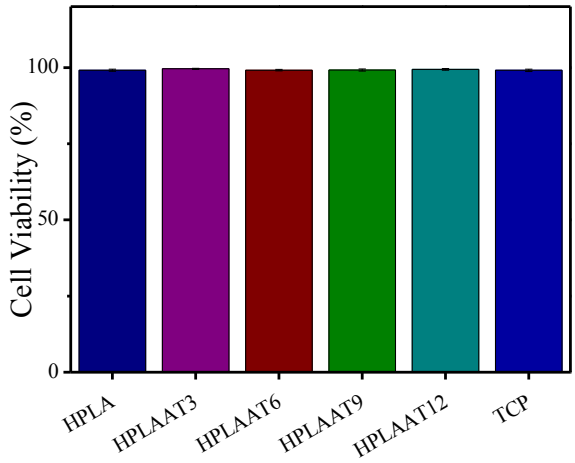

Figure S3. The cell viability results of C2C12 myoblast on HPLA, HPLAAT and TCP. Data are reported as Mean ± SD (n = 4). There was no significant difference between HPLAAT and TCP (P>0.05).

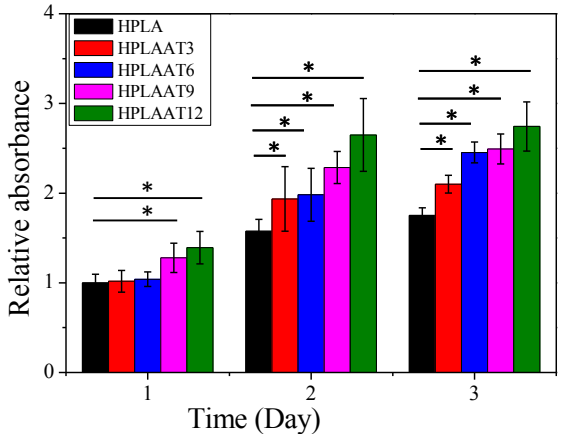

Figure S4. Characterization of C2C12 cell proliferation on HPLA, HPLAAT3, HPLAAT6, HPLAAT9 and HPLAAT12 films with CCK-8 method. The data are presented as Mean ± SD (n = 4). * means P<0.05.

The cell proliferation on these films was investigated by applying CCK-8 method for three days. Briefly, C2C12 cells were seeded on films at a density of 6000 cells/cm^2. At each point of detection, the cells were incubated in medium containing 10% (v/v) CCK-8 dye (Dojindo, Japan) at 37 °C in 5% CO_2 for 1 h, then 100 μL medium from

each example was examined at 450 nm in a SpectraMax microplate reader (Molecular Devices). Medium containing 10% (v/v) CCK-8 dye served as blank.

The cells cultured on HPLAAT9 and HPLAAT12 films showed higher cell number than that on HPLA film after cultivation for only one day. During the next two days of culturing, the cells on all these HPLAAT films had significantly higher cell number than that on HPLA film (P<0.05), which indicated higher proliferation rates on the HPLAAT substrates. Moreover, the films with higher AT contents exhibited higher cell proliferation rates. Those results were generally in agreement with the cell proliferation results obtained with Alamar blue method.

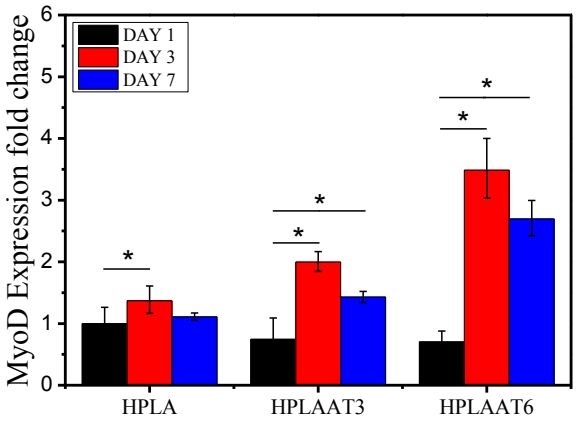

Figure S5. The gene expression of MyoD on HPLA, HPLAAT3 and HPLAAT6 at day 1, day 3 and day 7 of differentiation. Data are reported as Mean ± SD (n=4).

*P<0.05 when compared with the same sample at the day 1.

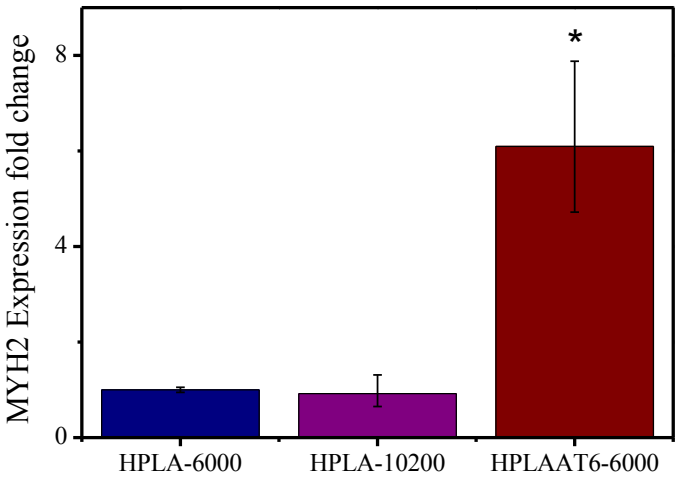

Figure S6. Relative MYH2 gene expression with different cell seeding densities on HPLA and HPLAAT6 after 7 days of differentiation. HPLA-6000: HPLA with cell density of 6000 cells/cm^2, HPLA-10200: HPLA with cell density of 10200 cells/cm^2, HPLAAT6-6000: HPLAAT6 with cell density of 6000 cells/cm^2. Data are presented as Mean ± SD (n = 4). *P<0.05 when compared with HPLA with cell density of 6000 cells/cm^2.