

## Publications aligned with the SysCODE goals

April, 2008 – March, 2009

### *Project 2. Tooth Germ Design and Engineering*

1. Wang XP, O'Connell DJ, Lund JJ, Saadi I, Kuraguchi M, Turbe-Doan A, Cavallesco R, Kim HS, Park PJ, Harada H, Kucherlapati R, Maas RL. Apc inhibition of Wnt signaling regulates supernumerary tooth formation during embryogenesis and throughout adulthood. *Development*, 2009 Jun; 136(11): 1939-49 (Funded by SysCODE). PMID: [19429790](#).
2. Orford K, Kharchenko P, Lai W, Dao MC, Worhunsky DJ, Ferro A, Janzen V, Park PJ, Scadden Differential H3K4 methylation identifies developmentally poised hematopoietic genes. *DT. Dev Cell*. 2008 May;14(5):798-809. PMID: [18477461](#).
3. Kharchenko PV, Woo CJ, Tolstorukov MY, Kingston RE, Park PJ. Nucleosome positioning in human HOX gene clusters. *Genome Res*. 2008 Oct;18(10):1554-61. PMID: [18723689](#).
4. Park PJ. Epigenetics meets next-generation sequencing. *Epigenetics*. 2008 Nov;3(6):318-21. PMID: [19098449](#).
5. Kharchenko PV, Tolstorukov MY, Park PJ. Design and analysis of ChIP-seq experiments for DNA-binding proteins. *Nat Biotechnol*. 2008 Dec;26(12):1351-9. (Funded by SysCODE). PMID: [19029915](#).
6. Warner JB, Philippakis AA, Jaeger SA, He FS, Lin J, Bulyk ML. Systematic identification of mammalian regulatory motifs' target genes and functions. *Nat Methods*. 2008 Apr; 5(4):347-53. PMID: [18311145](#).
7. Berger MF, Badis G, Gehrke AR, Talukder S, Philippakis AA, Peña-Castillo L, Alleyne TM, Mnaimneh S, Botvinnik OB, Chan ET, Khalid F, Zhang W, Newburger D, Jaeger SA, Morris QD, Bulyk ML, Hughes TR. Variation in homeodomain DNA binding revealed by high-resolution analysis of sequence preferences. *Cell*. 2008 Jun 27;133(7):1266-76. PMID: [18585359](#).
8. Newburger DE, Bulyk ML. UniPROBE: an online database of protein binding microarray data on protein-DNA interactions. *Nucleic Acids Res*. 2008 Oct 8. PMID: [18842628](#).
9. Busser BW, Bulyk ML, Michelson AM. Toward a systems-level understanding of developmental regulatory networks. *Curr Opin Genet Dev*. 2008 Oct 8. PMID: [18848887](#).
10. Alleyne TM, Peña-Castillo L, Badis G, Talukder S, Berger MF, Gehrke AR, Philippakis AA, Bulyk ML, Morris QD, Hughes TR. Predicting the binding preference of transcription factors to individual DNA k-mers. *Bioinformatics*. 2009 Apr 15;25(8):1012-8. PMID: [19088121](#).
11. Berger MF, Bulyk ML. Universal protein-binding microarrays for the comprehensive characterization of the DNA-binding specificities of transcription factors. *Nat Protoc*. 2009;4(3):393-411. PMID: [19265799](#).

### ***Project 3. Pancreatic Islet Design and Engineering***

12. Zhou Q, Brown J, Kanarek A, Rajagopal J, Melton DA. In vivo reprogramming of adult pancreatic exocrine cells to beta-cells. *Nature*. 2008 Oct 2;455 (7213):627-32. PMID: [18754011](#).
13. Richard I Sherwood, Tzong-Yang A Chen and Douglas A Melton. Transcriptional dynamics of endodermal organ formation. *Dev. Dynamics*. 2008 Dec. 238 (1) 29-42. PMID: [19097184](#).
14. Chen S, Borowiak M, Fox JL, Maehr R, Osafune K, Davidow L, Lam K, Peng LF, Schreiber SL, Rubin LL, Melton D. A small molecule that directs differentiation of human ESCs into the pancreatic lineage. *Nat Chem Biol*. 2009 Apr;5(4):258-65. PMID: [19287398](#).
15. Borowiak M, Maehr R, Chen S, Chen AE, Tang W, Fox JL, Schreiber SL, Melton DA. Small molecules efficiently direct endodermal differentiation of mouse and human embryonic stem cells. *Cell Stem Cell*. 2009 Apr 3;4(4):348-58. PMID: [19341624](#).
16. Mathur D, Danford TW, Boyer LA, Young RA, Gifford DK, Jaenisch R. Analysis of the mouse embryonic stem cell regulatory networks obtained by ChIP-chip and ChIP-PET. *Genome Biol*. 2008;9(8):R126. PMID: [18700969](#).
17. Danford T, Rolfe A, Gifford D. GSE: a comprehensive database system for the representation, retrieval, and analysis of microarray data. *Pac Symp Biocomput*. 2008:539-50. PMID: [18229714](#).
18. Assmann A, Hinault C Kulkarni RN. Growth factor control of pancreatic islet regeneration and function. *Pediatr Diabetes*. 2009 Feb;10(1):14-32. PMID: [18828795](#).
19. Assmann A, Ueki K, Winnay JN, Kulkarni RN. (2009). Glucose effects on beta-cell growth and survival require activation of insulin receptors and insulin receptor substrate-2. *Mol Cell Biol*, doi:10.1128/MCB.01489-08. PMID: [19273608](#).
20. Kawamori D, Kurpad AJ, Hu J, Liew CW, Shih JL, Ford EL, Herrera PL, Polonsky KS, McGuinness OP, Kulkarni RN. Insulin signaling in alpha cells modulates glucagon secretion in vivo. *Cell Metab*. 2009 Apr; 9(4): 350-61. PMID: [19356716](#).

### ***Project 4. Heart Valve Design and Engineering***

21. Langworthy M, Zhou B, de Caestecker M, Moeckel G, Baldwin HS. NFATc1 identifies a population of proximal tubule cell progenitors. *J Am Soc Nephrol*. 2009 Feb;20(2):311-21. PMID: [19118153](#).
22. Townsend TA, Wrana JL, Davis GE, Barnett JV. Transforming growth factor-beta-stimulated endocardial cell transformation is dependent on Par6c regulation of RhoA. *J Biol Chem*. 2008 May 16;283(20):13834-41. PMID: [18343818](#).
23. Austin AF, Compton LA, Love JD, Brown CB, Barnett JV. Primary and immortalized mouse epicardial cells undergo differentiation in response to TGFbeta. *Dev Dyn*. 2008 Feb;237(2):366-76. PMID: [18213583](#).
24. Schoen FJ. Evolving concepts of cardiac valve dynamics: the continuum of development, functional structure, pathobiology, and tissue engineering. *Circulation*. 2008 Oct 28;118(18):1864-80. Review. PMID: [18955677](#).

25. Joyce EM, Liao J, Schoen FJ, Mayer JE Jr, Sacks MS. Functional collagen fiber architecture of the pulmonary heart valve cusp. *Ann Thorac Surg.* 2009 Apr;87(4):1240-9. PMID: [19324159](#).
26. Sacks MS, Schoen FJ, Mayer JE. Bioengineering Challenges for Heart Valve Tissue Engineering. *Annu Rev Biomed Eng.* 2009 May 4. PMID: [19413511](#).

#### ***Project 5. Mass Spectrometry of Proteins Involved in Organogenesis***

27. Jungueira M, Spirin V, Santana Balbuena T, Waridel P, Surendranath V, Kryukov G, Adzhubei I, Thomas H, Sunyaev S, Shevchenko A. Separating the wheat from the chaff: unbiased filtering of background tandem mass spectra improves protein identification. *J Proteome Res.* 2008 Aug; 2008; 7(8):3382-95. PMID: [18558732](#).
28. Jungueira M, Spirin V, Balbuena TS, Thomas H, Adzhubei I, Sunyaev S, Shevchenko A. Protein identification pipeline for the homology-driven proteomics. *J. Proteomics* 2008 Aug 21; 71(3): 346-56. PMID: [18639657](#).
29. Bakalarski CE, Elias JE, Villén J, Haas W, Gerber SA, Everley PA, Gygi SP. The impact of peptide abundance and dynamic range on stable-isotope-based quantitative proteomic analyses. *J Proteome Res.* 2008 Nov;7(11):4756-65. PMID: [18798661](#).

#### ***Project 6. Micromechanical Determinants of Organ Design and Engineering***

30. Ingber DE. From molecular cell engineering to biologically inspired engineering. *Cellular Molec. Bioeng.* 2008; 1 (1):51-57. ISSN: [1865-5025 \(Print\) 1865-5033 \(Online\)](#).
31. Wang N, Tytell J, and Ingber DE. Mechanotransduction at a distance: mechanically coupling the extracellular matrix with the nucleus. *Nat. Rev. Mol. Cell Biol.* 2009 Jan;10(1):75-82. PMID: [19197334](#).
32. Mammoto A, Connor K, Mammoto T, Aderman C, Mostoslavsky G, Smith LEH, Ingber DE. A mechanosensitive transcriptional mechanism that controls angiogenesis. *Nature* 2009; 457, 1103-1008. PMID: [19242469](#).
33. Stamenovic D and Ingber DE. Tensegrity-guided self assembly: from molecules to living cells. *Soft Matter* 2009 5:1137-1145, in press.
34. Ostuni E, Whitesides GM, Ingber DE, Chen CS. Using self-assembled monolayers to pattern ECM proteins and cells on substrates. *Methods Mol. Biol.* 2009 522: 1-12. PMID: [19247618](#).
35. Discher D, Dong C, Guilak F, Ingber DE, Janmey P, Kamm R. Schmid-Schönbein, GW, Fredberg JJ. Biomechanics: cell research and applications for the next decade. *Ann. Biomed. Eng.* 2009 May; 37(5):847-59. PMID: [19259817](#).
36. Ingber DE. In: Mofrad M, Kamm R, eds. Tensegrity as a mechanism for integrating cellular mechanisms of mechanotransduction. *Mechanotransduction*, London, England: Cambridge University Press, in press.
37. Ali OA, Huebsch N, Cao L, Dranoff G, Mooney DJ. Infection-mimicking materials to program dendritic cells in situ. *Nat Mater.* 2009 Feb;8(2):151-8. Epub 2009 Jan 11. PMID: [19136947](#).

38. Yung YC, Vandenburg H, Mooney DJ. Cellular strain assessment tool (CSAT): precision-controlled cyclic uniaxial tensile loading. *J Biomech.* 2009 Jan 19;42(2):178-82. PMID: [19121524](#).
39. Boontheekul T, Kong HJ, Hsiong SX, Huang YC, Mahadevan L, Vandenburg H, Mooney DJ. Quantifying the relation between bond number and myoblast proliferation. *Faraday Discuss.* 2008;139:53-70; discussion 105-28, 419-20. PMID: [19048990](#).
40. Park EJ, Kim ES, Weber HP, Wright RF, Mooney DJ. Improved bone healing by angiogenic factor-enriched platelet-rich plasma and its synergistic enhancement by bone morphogenetic protein-2. *Int J Oral Maxillofac Implants.* 2008 Sep-Oct;23(5):818-26. PMID: [19014150](#).
41. Silva EA, Kim ES, Kong HJ, Mooney DJ. Material-based deployment enhances efficacy of endothelial progenitor cells. *Proc Natl Acad Sci USA.* 2008 Sep 23;105(38):14347-52. PMID: [18794520](#).
42. Hsiong SX, Boontheekul T, Huebsch N, Mooney DJ. Cyclic Arginine-Glycine-Aspartate Peptides Enhance Three-Dimensional Stem Cell Osteogenic Differentiation. *Tissue Eng Part A.* 2008 Sep 10. PMID: [18783323](#).
43. Hsiong SX, Huebsch N, Fischbach C, Kong HJ, Mooney DJ. Integrin-adhesion ligand bond formation of preosteoblasts and stem cells in three-dimensional RGD presenting matrices. *Biomacromolecules.* 2008 Jul;9(7):1843-51. Epub 2008 Jun 10. PMID: [18540674](#).
44. Chan G, Mooney DJ. New materials for tissue engineering: towards greater control over the biological response. *Trends Biotechnol.* 2008 Jul;26(7):382-92. Review. PMID: [18501452](#).
45. Hsiong SX, Cooke PH, Kong HJ, Fishman ML, Ericsson M, Mooney DJ. AFM imaging of RGD presenting synthetic extracellular matrix using gold nanoparticles. *Macromol Biosci.* 2008 Jun 11;8(6):469-77. PMID: [18383570](#).

***Project 7. Microengineered Environments for Epi/Mes Interactions***

46. Manbachi A, Shrivastava S, Cioffi M, Chung BG, Moretti M, Demirci U, Yliperttula M, Khademhosseini A. Microcirculation within grooved substrates regulates cell positioning and cell docking inside microfluidic channels. *Lab Chip.* 2008 May;8(5):747-54 (Funded by SysCODE). PMID: [18432345](#).
47. Du Y, Lo E, Ali S, Khademhosseini A. Directed assembly of cell-laden microgels for fabrication of 3D tissue constructs. *Proc Natl Acad Sci USA.* 2008 Jul 15;105(28):9522-7 (Funded by SysCODE). PMID: [18599452](#).
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51. Y. Du, J. Shim, M. Vidula, E. Lo, B.G. Chung, M.J. Hancock, J. Borenstein, D. Crokek, A. Khademhosseini. Rapid generation of spatially and temporally controllable long range concentration gradients in a microfluidic device. *Lab on a Chip* 9(6): 761-767 (2009). PMID: [19255657](#).
52. J. Nichol, A. Khademhosseini. Modular tissue engineering: Engineering biological tissues from the bottom up. *Soft Matter*, in press.
53. S.A. Hacking, A. Khademhosseini. Applications of microscale technologies for regenerative dentistry. *Journal of Dental Research*. PMID: [19493883](#).
54. A. Khademhosseini, J. Vacanti, R. Langer. Tissue Engineering: Next Generation Tissue Constructs and Challenges to Clinical Practice. *Scientific American*, in press.

#### ***Project 10. DSAGE Technology Development***

55. Ahmad, F, Banerjee SK, Lage ML, Huang XN, Smith SH, Saba S, Rager J, Conner DA, Janczewski AM, Tobita K, Tinney JP, Moskowitz IP, Perez-Atayde AR, Keller BB, Mathier MA, Shroff SG, Seidman CE, Seidman JG. The role of Cardiac Troponin T quantity and function in cardiac development and dilated cardiomyopathy. *PLoS ONE* 2008;3(7):e2642. PMID: [18612386](#).
56. King JC, Moskowitz IP, Burgon PG, Ahmad F, Stone JR, Seidman JG, Lees JA. E2F3 plays an essential role in cardiac development and function. *Cell Cycle*. 2008;7(23):3775-80. PMID: [19029823](#).
57. Herman DS, Hovingh GK, Iartchouk O, Rehm H, Kucherlapati R, Kastelein JJP, Seidman CE, Seidman JG. Hybridization-enriched Targeted Resequencing Detects Nucleotide and Copy Number Variations. *Nat Methods*. 2009; in press.
58. Fox AA, Collard CD, Sherman SK, Seidman CE, Seidman JG, Liu KY, Muehlschlegel JD, Perry TE, Aranki SF, Lange C, Herman DS, Meitinger T, Lichtner P, Body SC. Natriuretic peptide system gene variants are associated with ventricular dysfunction after coronary artery bypass grafting. *Anesthesiology*. 2009;110(4):738-47. PMID: [19326473](#).