Therapeutic Dashboard

Immunology Topics and Relevant Publications in the Past Year

Boston, MA, 11 June 2016 – Jonathan Bromberg, MD, PhD, University of Maryland School of Medicine, identified 11 innovative areas within immunology, as described below. This list also includes key papers by category (where applicable) in the past year that are worth a review by the transplant community:

1. *Big data*

   Gorenshteyn D, Zaslavsky E, Fribourg M, et al. Interactive big data resource to elucidate human immune pathways and diseases. Immunity. 2015;43(3):605-14.

   Godec J, Tan Y, Liberzon A, et al. Compendium of immune signatures identifies conserved and species-specific biology in response to inflammation. Immunity. 2016;44(1):194-206.

   Roederer M, Quaye L, Mangino M, et al. The genetic architecture of the human immune system: a bioresource for autoimmunity and disease pathogenesis. Cell. 2015;161(2):387-403.

2. *Microbiota*

   Vétizou M, Pitt JM, Daillère R, et al. Anticancer immunotherapy by CTLA-4 blockade relies on the gut microbiota. Science. 2015;350(6264):1079-84.

   Sivan A, Corrales L, Hubert N, et al. Commensal Bifidobacterium promotes antitumor immunity and facilitates anti-PD-L1 efficacy. Science. 2015;350(6264):1084-9.

   Morais da Fonseca D, Hand TW, Han S-J, et al. Microbiota-dependent sequelae of acute infection compromise tissue-specific immunity. Cell. 2015;163(2):354-66.

   Carr EJ, Dooley J, Garcia-Perez JE, et al. The cellular composition of the human immune system is shaped by age and cohabitation. Nat Immunol.

2016;17(4):461-8.

Koeth RA, Levison BS, Culley MK, et al. γ-Butyrobetaine is a proatherogenic intermediate in gut microbial metabolism of L-carnitine to TMAO. Cell Metab. 2014;20(5):799-812.

Wang Z, Roberts AB, Buffa JA, et al. Non-lethal inhibition of gut microbial trimethylamine production for the treatment of atherosclerosis. Cell. 2015;163(7):1585-95.

3. *T-cell metabolism*

Sawinski D, Maltzman JS. Do mice need an order of fries to be relevant for transplant studies? Am J Transplant. 2015;15(9):2283-4.

Bagley J, Yuan J, Chandrakar A, Iacomini J. Hyperlipidemia alters regulatory T cell function and promotes resistance to tolerance induction through costimulatory molecule blockade. Am J Transplant. 2015;15(9):2324-35.

Okoye I, Wang L, Pallmer K, et al. T cell metabolism. The protein LEM promotes $CD8^+$ T cell immunity through effects on mitochondrial respiration. Science. 2015;348(6238):995-1001.

4. *Immune system anatomy*

Louveau A, Smirnov I, Keyes TJ, et al. Structural and functional features of central nervous system lymphatic vessels. Nature. 2015;523(7560):337-41.

Steinert EM, Schenkel JM, Fraser KA, et al. Quantifying memory CD8 T cells reveals regionalization of immunosurveillance. Cell. 2015;161(4):737-49.

Calderon B, Carrero JA, Ferris ST, et al. The pancreas anatomy conditions the origin and properties of resident macrophages. J Exp Med. 2015;212(10):1497-512.

5. *Cell-Free DNA*

Snyder MW, Kircher M, Hill AJ, Daza RM, Shendure J. Cell-free DNA comprises an in vivo nucleosome footprint that informs its tissues-of-origin. Cell. 2016;164(1-2):57-68.

6. *B Cells*

   Rosser EC, Mauri C. Regulatory B cells: origin, phenotype, and function. Immunity. 2015;42(4):607-12.

   Chamberlain N, Massad C, Oe T, et al. Rituximab does not reset defective early B cell tolerance checkpoints. J Clin Invest. 2016;126(1):282-7.

   Abe T, Ishii D, Gorbacheva V, et al. Anti-huCD20 antibody therapy for antibody-mediated rejection of renal allografts in a mouse model. Am J Transplant. 2015;15(5):1192-204.

   Halliley JL, Tipton CM, Liesveld J, et al. Long-lived plasma cells are contained within the CD19(-)CD38(hi)CD138(+) subset in human bone marrow. Immunity. 2015;43(1):132-45.

   Roberts AW, Davids MS, Seymour JF. New agents to treat chronic lymphocytic leukemia. N Engl J Med. 2016;374(22):2186-7.

   Byrd JC, Harrington B, O'Brien S, et al. Acalabrutinib (ACP-196) in relapsed chronic lymphocytic leukemia. N Engl J Med. 2016;374(4):323-32.

7. *Nanoparticles*

   Clemente-Casares X, Blanco J, Ambalavanan P, et al. Expanding antigen-specific regulatory networks to treat autoimmunity. Nature. 2016;530(7591):434-40.

   Radovic-Moreno AF, Chernyak N, Mader CC, et al. Immunomodulatory spherical nucleic acids. Proc Natl Acad Sci U S A. 2015;112(13):3892-7.

8. *Discovery*

   Although no specific papers are reported here, keeping current with the drug pipeline and innovations in biotechnology remain a priority.

9. CRISPR

   Clustered regularly interspaced short palindromic repeats or “CRISPR” represents a new step forward in DNA editing.

10. *Inflammation and innate immunity*

Hotchkiss RS, Sherwood ER. Immunology. Getting sepsis therapy right. Science. 2015;347(6227):1201-2.

Weber GF, Chousterman BG, He S, et al. Interleukin-3 amplifies acute inflammation and is a potential therapeutic target in sepsis. Science. 2015;347(6227):1260-5.

Artis D, Spits H. The biology of innate lymphoid cells. Nature. 2015;517(7534):293-301.

Sonnenberg GF, Artis D. Innate lymphoid cells in the initiation, regulation and resolution of inflammation. Nat Med. 2015;21(7):698-708.

Guo H, Callaway JB, Ting JP. Inflammasomes: mechanism of action, role in disease, and therapeutics. Nat Med. 2015;21(7):677-87.

11. *Pathophysiology of T cells*

Ueno H, Banchereau J, Vinuesa CG. Pathophysiology of T follicular helper cells in humans and mice. Nat Immunol. 2015;16(2):142-52.

Gagliani N, Amezcua Vesely MC, Iseppon A, et al. Th17 cells transdifferentiate into regulatory T cells during resolution of inflammation. Nature. 2015;523(7559):221-5.

Henderson JG, Opejin A, Jones A, Gross C, Hawiger D. CD5 instructs extrathymic regulatory T cell development in response to self and tolerizing antigens. Immunity. 2015;42(3):471-83.

Paterson AM, Lovitch SB, Sage PT, et al. Deletion of CTLA-4 on regulatory T cells during adulthood leads to resistance to autoimmunity. J Exp Med. 2015;212(10):1603-21.