Dr. Anna C. Aschenbrenner, PhD

Life and Medical Sciences (LIMES) Institute

Rheinische Friedrich-Wilhelms-University Bonn, Life and Medical Sciences (LIMES) Institute
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Research Expertise

Using systems immunology approaches, I am interested in understanding immune cells in health and disease, in particular by bringing single-cell omics technologies to large cohort studies in infectious diseases including COVID-19, sepsis, and HIV. We recently showed for COVID-19 how bulk blood transcriptomics can be used to determine molecular signatures of the disease and facilitate drug repurposing. Further, we have developed an approach for the analysis of multi-layered data from large human cohorts utilizing human variance as a surrogate to analyse functional traits and are applying this in the context of aging and immune system homeostasis.

Education / Training

University of Bonn, Germany, Molecular Biomedicine, PhD, 2014
University of Bonn, Germany, Molecular Biomedicine, Diploma, 2008

Appointments / Positions Held

2020 - present
Team leader Clinical Single Cell Omics, PRECISE Platform for Single Cell Genomics and Epigenomics, German Center for Neurodegenerative Diseases (DZNE) & University of Bonn, Germany

2019
Proxy for W3 professorship, Genomics and Immunoregulation, Life & Medical Sciences (LIMES) Institute, University of Bonn, Germany

2017 - present
Visiting Researcher, Department of Internal Medicine, Radboud University Medical Center, Nijmegen, The Netherlands

2016 - 2020
PostDoc, Genomics and Immunoregulation, LIMES Institute, University of Bonn, Germany

Honors / Awards

2014
PhD summa cum laude

2008
PhD stipend by the NRW International Graduate School 'LIMES Chemical Biology'

10 Most Relevant Publications for Dr. Anna Aschenbrenner

1. Schultze JL, **Aschenbrenner AC**. COVID-19 and the human innate immune system. Cell. 2021 Feb 16:S0092-8674(21)00218-x.
2. **Aschenbrenner AC***, Mouktaroudi M*, Krämer B*, Antonakos N*, Oestreich M*, Gkizeli K*, Nuesch-Germano M*, Saridaki M*, Bonaguro L*, Reusch N*, Baßler K*, Doulou S*, Knoll R*, Pecht T*, Kapellos TS*, Rovina N*, Kröger C*, Herbert M*, Holsten L*, Horne A*, Gemünd ID*, Agrawal S*, [...] Netea MG#, Schultze JL#, Kox M#, Breteler MMB#, Nattermann J#, Koutsoukou A#, Giamarellos-Bourboulis EJ#, Ulas T#,§, German COVID-19 Omics Initiative (DeCOI). Disease severity-specific neutrophil signatures in blood transcriptomes stratify COVID-19 patients. Genome Med. 2021 Jan 13;13(1):7.
3. Bernardes JP*, Mishra N*, Tran F, Bahmer T*, Best L+, Blase JI+, Bordoni D+, Franzenburg J+, Geisen U+, Josephs-Spaulding J+, Köhler P+, Künstner A+, Rosati E+, **Aschenbrenner AC**, Bacher P, Baran N, [...] Schultze JL#, Rosenstiel P#; HCA Lung Biological Network; Deutsche COVID-19 Omics Initiative (DeCOI). Longitudinal Multi-omics Analyses Identify Responses of Megakaryocytes, Erythroid Cells, and Plasmablasts as Hallmarks of Severe COVID-19. Immunity. 2020 Dec 15:53(6):1296-1314.e9.
4. Bonaguro L, Köhne M, Schmidleithner L, Schulte-Schrepping J, Warnat-Herresthal S, Kern P, Günther P, Horne A, ter Horst R, Jäger M, Rahmouni S, Georges M, Falk CS, Li Y, Mass E, Beyer M, Joosten LAB, Netea MG, Ulas T, Schultze JL, **Aschenbrenner AC§**. CRELD1 modulates homeostasis of the immune system in mouse and human. Nat Immunol. 2020 Dec;21(12):1517-1527
5. Schulte-Schrepping J*, Reusch N*, Paclik D*, Baßler K*, Schlickeiser S*, Zhang B*, Krämer B*, Krammer T*, Brumhard S*, Bonaguro L*, De Domenico E*, Wendisch D*, [...] Schultze JL#, **Aschenbrenner AC#**, Li Y#, Nattermann J#, Sawitzki B#, Saliba AE#, Sander LE#; Deutsche COVID-19 OMICS Initiative (DeCOI). Severe COVID-19 Is Marked by a Dysregulated Myeloid Cell Compartment. Cell. 2020 Aug 5:S0092-8674(20)30992-2
6. Baßler K, Schulte-Schrepping J, Warnat-Herresthal S, **Aschenbrenner AC**, Schultze JL. The Myeloid Cell Compartment – Cell by Cell. Annu Rev Immunol. 2019 Apr 26;37:269-293
7. Sander J*, Schmidt SV*, Cirovic B, McGovern N, Papantonopoulou O, Hardt AL, **Aschenbrenner AC**, Kreer C, Quast T, Xu AM, Schmidleithner LM, Theis H, Thi Huong LD, Sumatoh HRB, Lauterbach MAR, Schulte-Schrepping J, Günther P, Xue J, Baßler K, Ulas T, Klee K, Katzmarski N, Herresthal S, Krebs W, Martin B, Latz E, Händler K, Kraut M, Kolanus W, Beyer M, Falk CS, Wiegmann B, Burgdorf S, Melosh NA, Newell EW, Ginhoux F, Schlitzer A#, Schultze JL. Cellular Differentiation of Human Monocytes Is Regulated by Time-Dependent Interleukin-4 Signaling and the Transcriptional Regulator NCOR2. Immunity. 2017 Dec 19;47(6):1051-1066.e12
8. **Aschenbrenner AC*,§**, Bassler K*, Brondolin M, Bonaguro L, Carrera P, Klee K, Ulas T, Schultze JL, Hoch M. A cross-species approach to identify transcriptional regulators exemplified for Dnajc22 and Hnf4a. Sci Rep. 2017 Jun 22;7(1):4056
9. Becker T, Loch G, Beyer M, Zinke I, **Aschenbrenner AC**, Carrera P, Inhester T, Schultze JL, Hoch M. Foxo-dependent regulation of innate immune homeostasis. Nature. 2010 Jan 21; 463(7279); 369-73.
10. Jordan MS*, Smith JE*, Burns JC, Austin JE, Nichols KE, **Aschenbrenner AC**, Koretzky GA. Complementation in trans of altered thymocyte development in mice expressing mutant forms of the adaptor molecule SLP76. Immunity. 2008 Mar; 28(3): 359-69.