

Aleksandra Deczkowska

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Education / Training

Current Position: Head of the Laboratory "Brain Immune Communication" (since 2021).

2023 - Habilitation (Université Paris-Saclay).

2021 - Post-doc in Immunogenomics (Weizmann Institut of Science).

2017 - Ph.D. in Neuroimmunology (Weizmann Institut of Science).

2013 - Master in Neuroimmunology (Weizmann Institut of Science).

2009 - Engineer of Biotechnology (Warsaw University of Life Sciences and Gent University).

Early Achievement Track record

During my PhD in the lab of Prof. Michal Schwartz, I conducted pioneering studies showing the unique properties of the choroid plexus as an active brain border and demonstrating that its activity shapes brain function in aging (Science 2014, Nature Communications 2017). To expand my toolbox and learn more about the immune system, I then pursued my post-doctoral studies in the field of immunogenomics, at the lab of Prof. Ido Amit, where I used and developed high-throughput single-cell genomic tools to identify the key immune regulators of chronic disease (Nature Medicine 2021). During my studies, I contributed reviews and opinion articles in leading journals (Nature Neuroscience 2018, Cell 2018; Cell 2020) discussing the importance of immune cells and signals in tissue maintenance and function. Overall I authored over 20 peer-reviewed articles cited 7300+ times (H-index=20). I have given invited talks at international meetings in the fields of immunology, neuroimmunology and genomics, and obtained excellence prizes and fellowships, including the Joël Ménard Prize for research on Alzheimer's disease in 2023.

I opened my lab for Brain-Immune Communication of Institut Pasteur in Paris in the departments of Immunology and Neuroscience in April 2021. Since the start, by integrating tools of single-cell genomics, immunology, and neuroscience, mouse models as well as analysis of human samples, we aim to identify key mechanisms of physiological body-brain communication via the choroid plexus in health and disease. Our vision is that in the future modulation of the choroid plexus, immune cells or peripheral signals may be deployed as a strategy to cure neurological disease.

Supervision of graduate students and post-docs:

2021-Ongoing supervision of post-docs, PhD and Master student.

2016-2021 Co-supervision of two PhD students: Raz Dvir (in biotech), and Shir Shlomi (continues her PhD studies under the supervision of Prof. Ido Amit) Department of Immunology, Weizmann Institute of Science, Israel

2014-2017 Co-supervision of three MSc students; Afroditi Tsitsou-Kampeli (continued to PhD), Raz Dvir (continued to PhD), Sefi Ben-Hamo (continued his career as a pharmacist); Department of Neurobiology, Weizmann Institute of Science, Israel

Participation to CSI and PhD thesis committees: Salimata Gassama (UCLA, USA), Ranabir Chakraborty (Pasteur), Eloise Dufourd (Infinity Toulouse), Junhua Xie (Gent, Belgium), Yago Pazos Baubeta (Pasteur).

Teaching:

12.2022 Lecturer in "Genes ad Genomes" M2 course, Institut Pasteur, France

12.2021, 2022, 2023 Lecturer in Advanced Immunology M2 course, Institut Pasteur, France

10.2021, 2022, 2023 Lecturer in "Cells of the brain" course, Master's program in Neuroscience, École Normale Supérieure, Paris, France

07.2021, 2022, 2023 Lecturer in "Single-cell gene expression and beyond" course for Institute Pasteur's students and staff, Institut Pasteur, France

12.2021 Lecturer in Advanced Immunology M2 course, University of Lyon, France

Participation in international conferences (last 3 years):

06.2024	Brain-body Physiology, Cold Spring Harbor, USA (selected for a flash talk and poster)
03.2024	Systems Neuroimmunology, Cold Spring Harbor, USA (Invited Speaker)
11.2023	European Choroid plexus Scientific Forum, Germany (Invited Speaker)
04.2023	3rd Neuroepigenetics & Neuroepitranscriptomics Conference, Mexico (Invited Speaker)
01.2023	GRC Neuroimmune Communication in Health and Disease, USA (Discussion Leader / Chair)
09.2022	Cell Symposia: The Neuro-Immune Axis, Lisbon, Portugal
03.2022	International SynAGE Conference on healthy aging (ISYNC), Germany (Invited speaker)
04.2021	Cold Spring Harbor conference on Brain Barriers, virtual
03.2021	Conte Center Symposium on Neuro-Immune Interactions, virtual
01.2021	Next Generation in Genomic Immunology, Gladstone-UCSF Institute of Genomic Immunology, UCSF, USA (invited speaker)

Organization of international conferences:

2022 “Go with the flow! Choroid plexus mechanisms shape brain function in health and disease” within The Forum of Neuroscience FENS (the largest neuroscience meeting in Europe, usually attracts 7,000+ international delegates).

Dissemination of knowledge: Pint of Science 2023, Paris talks 2023
<https://www.youtube.com/watch?v=D9BjbByuNI>

Review for journals (Immunity, Brain, Cell Reports, Scientific Reports, Frontiers in Immunology, Frontiers in Neuroscience, FASEB, JoVE) **and funding agencies** (European Research Council, Wellcome Grants, National Science Agency in Poland, Agence Nationale de la Recherche, Fédération pour la Recherche sur le Cerveau, United States-Israel Binational Science Foundation).

Grants

2023-2028	ERC Starting Grant (European; €1.5M; individual grant)
2023-2027	Agence Nationale de la Recherche; PRC coordinator €376.000 (with Gérard Eberl)
2023-2024	Fédération de la recherche sur le Cerveau (France; €80.000; individual grant)
2022-2025	Alzheimer’s Association Research Grant (international; \$150.000; individual grant)
2021-2026	Ville de Paris EMERGENCE(S) (regional; €210.000; individual grant)

Institutional Activities

2024	Organization of NIGHT SCIENCE a workshop on scientific creativity (full-day event for Pastuerian scientists)
2023	Organization of CIML-Pasteur Immunology Retreat (3-day conference encouraging collaboration between the two institutions)
2021–now	Member of the Advisory Board for CB UTechS Cytometry and Biomarkers, a technological platform for high-end single cell and genomic analysis, Institut Pasteur, France
2022–now	Member of the Steering Committee of the Animalerie Centrale, Institut Pasteur.
2022-2023	Member of the selection committee of the PPU, Institut Imagine Ph.D. program.
2021– 2022	Member of the Faculty Selection Committee in the departments of Neuroscience and Immunology, Institut Pasteur, France
05.2021	Neuro-Immune Brainstorm (co-organized with Gerard Eberl) – Internal meeting (~70 participants) at Institut Pasteur, France (with international guest speaker joining virtually).

Membership of Scientific Societies

2022–now	Member, Research Network on Immunity, infection and dementia, France
2021–now	Member, Research Network GDR Microglia & Neuroinflammation, France
2021–now	Member, Research Network on Alzheimer’s disease research, understanding and therapy CReACTIF, Île-de-France, France
2014–2016	Member of International Society of Neuroimmunology

Patent application:

M Eisenbach-Schwartz, N Friedman, K Baruch, G Kunis, L Cahalon, N Rosenzweig, A Deczkowska. Individualized Immunomodulation Therapy for Neurodegenerative Disorders, CNS Injury and Age-Related Dementia, 2019, US Patent App. 16/145,641

All publications:

= corresponding author; * = co-first author, key publications relevant to current work highlighted in blue.

1. Not so aDAMant after all: Plasticity of phagocytic microglia. **Deczkowska A#**. Immunity. 2024 Jun 11;57(6):1189-1191. doi: 10.1016/j.immuni.2024.05.013. PMID: 38865964
2. **Microbial and immune factors regulate brain maintenance and aging**. Travier L, Singh R, Sáenz Fernández D, **Deczkowska A.#** Curr Opin Neurobiol. 2022 Oct;76:102607. doi: 10.1016/j.conb.2022.102607. Epub 2022 Jul 29. PMID: 35914431
3. The interaction of CD4+ helper T cells with dendritic cells shapes the tumor microenvironment and immune checkpoint blockade response. Cohen M, Giladi A, Barboy O, Hamon P, Li B, Zada M, Gurevich-Shapiro A, Beccaria CG, David E, Maier BB, Buckup M, Kamer I, **Deczkowska A**, Le Berichel J, Bar J, Iannacone M, Tanay A, Merad M, Amit I. Nat Cancer. 2022 Mar;3(3):303-317. doi: 10.1038/s43018-022-00338-5. Epub 2022 Mar 3. PMID: 35241835
4. Isolation and Characterization of the Immune Cells from Micro-dissected Mouse Choroid Plexuses. Dominguez-Belloso A, Schmutz S, Novault S, Travier L, **Deczkowska A#**. J Vis Exp. 2022 Feb 3;(180). doi: 10.3791/63487. PMID: 35188133
5. **XCR1+ type 1 conventional dendritic cells drive liver pathology in non-alcoholic steatohepatitis**. **Deczkowska A*#**, David E, Ramadori P, Pfister D, Safran M, Li B, Giladi A, Jaitin DA, Barboy O, Cohen M, Yofe I, Gur C, Shlomi-Loubaton S, Henri S, Suhail Y, Qiu M, Kam S, Hermon H, Lahat E, Ben Yakov G, Cohen-Ezra O, Davidov Y, Likhter M, Goitein D, Roth S, Weber A, Malissen B, Weiner A, Ben-Ari Z, Heikenwälder M, Elinav E, Amit I. Nat Med. 2021 Jun;27(6):1043-1054. doi: 10.1038/s41591-021-01344-3. Epub 2021 May 20. PMID: 34017133

To gain insight into the immune contribution to a common liver condition, NASH, I used unbiased approach of scRNA-seq in mouse and human liver immune cells and observed disease-associated expansion of type 1 dendritic cells (cDC1). Using genetic and pharmacological models, novel genomic approaches (e.g. PIC-seq) and functional readouts of liver physiology and pathology I showed that cDC1 exacerbate the disease via promoting CD8+ T cells.

6. NASH limits anti-tumour surveillance in immunotherapy-treated HCC. Pfister D, Núñez NG, Pinyol R, Govaere O, Pinter M, Szydłowska M, Gupta R, Qiu M, **Deczkowska A**, (...) Heikenwalder M, Nature. 2021 Apr;592(7854):450-456. doi: 10.1038/s41586-021-03362-0. Epub 2021 Mar 24. PMID: 33762733
7. **Meningeal lymphoid structures are activated under acute and chronic spinal cord pathologies**. Cohen M, Giladi A, Raposo C, Zada M, Li B, Ruckh J, **Deczkowska A**, Mohar B, Shechter R, Lichtenstein RG, Amit I, Schwartz M. Life Sci Alliance. 2020 Dec 4;4(1):e202000907. doi: 10.26508/lsa.202000907. Print 2021 Jan. PMID: 33277355
8. **The Physiology, Pathology, and Potential Therapeutic Applications of the TREM2 Signaling Pathway**. **Deczkowska A*#**, Weiner A, Amit I. Cell. 2020 Jun 11;181(6):1207-1217. doi: 10.1016/j.cell.2020.05.003. PMID: 32531244

A review, summarizing our knowledge on the contribution of TREM2, a surface receptor expressed solely on immune cells, to neurodegenerative and metabolic disease as well as cancer, highlighting the contribution of immune cells and signals to tissue physiology and disease

9. Host-Viral Infection Maps Reveal Signatures of Severe COVID-19 Patients. Bost P, Giladi A, Liu Y, Bendjelal Y, Xu G, David E, Blecher-Gonen R, Cohen M, Medaglia C, Li H, **Deczkowska A**, Zhang S, Schwikowski B, Zhang Z, Amit I. Cell. 2020 Jun 25;181(7):1475-1488.e12. doi: 10.1016/j.cell.2020.05.006. Epub 2020 May 8. PMID: 32479746

10. Lipid-Associated Macrophages Control Metabolic Homeostasis in a Trem2-Dependent Manner. Jaitin DA, Adlung L, Thaïss CA, Weiner A, Li B, Descamps H, Lundgren P, Bleriot C, Liu Z, **Deczkowska A**, Keren-Shaul H, David E, Zmora N, Eldar SM, Lubezky N, Shibolet O, Hill DA, Lazar MA, Colonna M, Ginhoux F, Shapiro H, Elinav E, Amit I. *Cell*. 2019 Jul 25;178(3):686-698.e14. doi: 10.1016/j.cell.2019.05.054. Epub 2019 Jun 27. PMID: 31257031
11. Corticosteroid signaling at the brain-immune interface impedes coping with severe psychological stress. Kertser A, Baruch K, **Deczkowska A**, Weiner A, Croese T, Kenigsbuch M, Cooper I, Tsoory M, Ben-Hamo S, Amit I, Schwartz M. *Sci Adv*. 2019 May 29;5(5):eaav4111. doi: 10.1126/sciadv.aav4111. eCollection 2019 May. PMID: 31149632
12. Targeting neuro-immune communication in neurodegeneration: Challenges and opportunities. **Deczkowska A***, Schwartz M. *J Exp Med*. 2018 Nov 5;215(11):2702-2704. doi: 10.1084/jem.20181737. Epub 2018 Oct 9. PMID: 30301785
13. Microglial immune checkpoint mechanisms. **Deczkowska A***, Amit I, Schwartz M. *Nat Neurosci*. 2018 Aug;21(8):1137. doi: 10.1038/s41593-018-0186-1. PMID: 29942040
14. **Disease-Associated Microglia: A Universal Immune Sensor of Neurodegeneration.** **Deczkowska A***, Keren-Shaul H, Weiner A, Colonna M, Schwartz M, Amit I. *Cell*. 2018 May 17;173(5):1073-1081. doi: 10.1016/j.cell.2018.05.003. PMID: 29775591

A perspective article, which incorporated the recently discovered disease-associated microglia into the existing body of knowledge about brain aging and neurodegeneration.

15. **Mef2C restrains microglial inflammatory response and is lost in brain ageing in an IFN-I-dependent manner.** **Deczkowska A***, Matcovitch-Natan O, Tsitsou-Kampeli A, Ben-Hamo S, Dvir-Szternfeld R, Spinrad A, Singer O, David E, Winter DR, Smith LK, Kertser A, Baruch K, Rosenzweig N, Terem A, Prinz M, Villeda S, Citri A, Amit I, Schwartz M. *Nat Commun*. 2017 Sep 28;8(1):717. doi: 10.1038/s41467-017-00769-0. PMID: 28959042

In aging, IFN-I produced at the choroid plexus induces in microglia a harmful phenotype which then precipitates brain function decline. One of the key factors conferring resilience to IFN-I-associated microglial activity is Mef2C, recently discovered to play a similar role in the context of Alzheimer's disease (<https://www.nature.com/articles/s41593-023-01315-6>).

16. NIX-ing mitochondria: from development to pathology. **Deczkowska A***, Schwartz M. *EMBO J*. 2017 Jun 14;36(12):1650-1652. doi: 10.15252/embj.201797110. Epub 2017 May 22. PMID: 28533231
17. Neurological Disease as a Failure of Brain-Immune Crosstalk: The Multiple Faces of Neuroinflammation. Schwartz M, **Deczkowska A**. *Trends Immunol*. 2016 Oct;37(10):668-679. doi: 10.1016/j.it.2016.08.001. Epub 2016 Sep 6. PMID: 27616557
18. Microglia development follows a stepwise program to regulate brain homeostasis. Matcovitch-Natan O, Winter DR, Giladi A, Vargas Aguilar S, Spinrad A, Sarrazin S, Ben-Yehuda H, David E, Zelada González F, Perrin P, Keren-Shaul H, Gury M, Lara-Astaiso D, Thaïss CA, Cohen M, Bahar Halpern K, Baruch K, **Deczkowska A**, Lorenzo-Vivas E, Itzkovitz S, Elinav E, Sieweke MH, Schwartz M, Amit I. *Science*. 2016 Aug 19;353(6301):aad8670. doi: 10.1126/science.aad8670. Epub 2016 Jun 23. PMID: 27338705
19. Making Ends Meet: Myeloid Cells Catalyze Blood Vessel Repair in the Brain. **Deczkowska A***, Schwartz M. *Immunity*. 2016 May 17;44(5):1081-3. doi: 10.1016/j.immuni.2016.04.024. PMID: 27192572
20. Type I/II Interferon Balance in the Regulation of Brain Physiology and Pathology. **Deczkowska A***, Baruch K, Schwartz M. *Trends Immunol*. 2016 Mar;37(3):181-192. doi: 10.1016/j.it.2016.01.006. Epub 2016 Feb 11. PMID: 26877243
21. PD-1 immune checkpoint blockade reduces pathology and improves memory in mouse models of Alzheimer's disease. Baruch K, **Deczkowska A**, Rosenzweig N, Tsitsou-Kampeli A, Sharif AM,

Matcovitch-Natan O, Kertser A, David E, Amit I, Schwartz M. Nat Med. 2016 Feb;22(2):135-7. doi: 10.1038/nm.4022. Epub 2016 Jan 18. PMID: 26779813

22. Breaking immune tolerance by targeting Foxp3(+) regulatory T cells mitigates Alzheimer's disease pathology. Baruch K, Rosenzweig N, Kertser A, **Deczkowska A**, Sharif AM, Spinrad A, Tsitsou-Kampeli A, Sarel A, Cahalon L, Schwartz M. Nat Commun. 2015 Aug 18;6:7967. doi: 10.1038/ncomms8967. PMID: 26284939
23. TNF-like weak inducer of apoptosis promotes blood brain barrier disruption and increases neuronal cell death in MRL/lpr mice. Wen J, Doerner J, Weidenheim K, Xia Y, Stock A, Michaelson JS, Baruch K, **Deczkowska A**, Gulinello M, Schwartz M, Burkly LC, Putterman C. J Autoimmun. 2015 Jun;60:40-50. doi: 10.1016/j.jaut.2015.03.005. Epub 2015 Apr 22. PMID: 25911200
24. **Ageing-induced type I interferon response at the choroid plexus negatively affects brain function.** Baruch K, **Deczkowska A***, David E, Castellano JM, Miller O, Kertser A, Berkutzki T, Barnett-Itzhaki Z, Bezalel D, Wyss-Coray T, Amit I, Schwartz M. Science. 2014 Oct 3;346(6205):89-93. doi: 10.1126/science.1252945. Epub 2014 Aug 21. PMID: 25147279

In this work we demonstrated the impact of aging CP on brain function during aging. Using RNA-seq and other approaches, we found that in aging mice and in elderly humans the CP produces Interferon beta. Follow-up experiments showed that blocking this signaling in old mice reversed aging-associated learning and memory deficits. It was one of the first publications showcasing CP as a source of signals which shape brain function and was later confirmed by other groups.

25. CD4(+) T Cell-Receptor Repertoire Diversity is Compromised in the Spleen but Not in the Bone Marrow of Aged Mice Due to Private and Sporadic Clonal Expansions. Shifrut E, Baruch K, Gal H, Ndifon W, **Deczkowska A**, Schwartz M, Friedman N. Front Immunol. 2013 Nov 19;4:379. doi: 10.3389/fimmu.2013.00379. eCollection 2013. PMID: 24312094
26. CNS-specific immunity at the choroid plexus shifts toward destructive Th2 inflammation in brain aging. Baruch K, Ron-Harel N, Gal H, **Deczkowska A**, Shifrut E, Ndifon W, Mirlas-Neisberg N, Cardon M, Vaknin I, Cahalon L, Berkutzki T, Mattson MP, Gomez-Pinilla F, Friedman N, Schwartz M. Proc Natl Acad Sci U S A. 2013 Feb 5;110(6):2264-9. doi: 10.1073/pnas.1211270110. Epub 2013 Jan 18. PMID: 23335631

Out-of-the lab:

*Philosophy and psychology; since 2022, regularly preparing meetings for Café Philo Paris (30 min presentation + 2h discussion) covering various topics in science and ethics such as Honor, Absurd, Moral Luck, Moral Foundations, Disgust, and Capitalism.

*Aerial acrobatics (hoop)

*Painting (watercolour, acrylic) and other arts.