

Publications resulting from research using MS tissue of NBB-MS, 2016 – 2019.

Neuroimmunology research group (IMM) of the Netherlands Institute for Neuroscience (NIN).

Note: this overview only lists publications using tissue from NBB-MS. For all publications of the IMM group, please see [this](#) overview on the NIN website.

Hendrickx, D. A. E., van Eden, C. G., Schuurman, K. G., Hamann, J., & Huitinga, I. (2017). Staining of HLA-DR, Iba1 and CD68 in human microglia reveals partially overlapping expression depending on cellular morphology and pathology. *Journal of Neuroimmunology*, *309*, 12–22.

<https://doi.org/10.1016/j.jneuroim.2017.04.007>

Hendrickx, D. A. E., van Scheppingen, J., van der Poel, M., Bossers, K., Schuurman, K. G., van Eden, C. G., Hol, E. M., Hamann, J., & Huitinga, I. (2017). Gene Expression Profiling of Multiple Sclerosis Pathology Identifies Early Patterns of Demyelination Surrounding Chronic Active Lesions. *Frontiers in Immunology*, *8*. <https://doi.org/10.3389/fimmu.2017.01810>

Luchetti, S., Fransen, N. L., van Eden, C. G., Ramaglia, V., Mason, M., & Huitinga, I. (2018). Progressive multiple sclerosis patients show substantial lesion activity that correlates with clinical disease severity and sex: A retrospective autopsy cohort analysis. *Acta Neuropathologica*, *135*(4), 511–528. <https://doi.org/10.1007/s00401-018-1818-y>

Melief, J., Koper, J. W., Endert, E., Møller, H. J., Hamann, J., Uitdehaag, B. M., & Huitinga, I. (2016). Glucocorticoid receptor haplotypes conferring increased sensitivity (BclI and N363S) are associated with faster progression of multiple sclerosis. *Journal of Neuroimmunology*, *299*, 84–89.

<https://doi.org/10.1016/j.jneuroim.2016.08.019>

Melief, J., Orre, M., Bossers, K., van Eden, C. G., Schuurman, K. G., Mason, M. R. J., Verhaagen, J., Hamann, J., & Huitinga, I. (2019). Transcriptome analysis of normal-appearing white matter reveals cortisol- and disease-associated gene expression profiles in multiple sclerosis. *Acta Neuropathologica Communications*, *7*(1), 60. <https://doi.org/10.1186/s40478-019-0705-7>

Smolders, J., Heutinck, K. M., Fransen, N. L., Remmerswaal, E. B. M., Hombrink, P., ten Berge, I. J. M., van Lier, R. A. W., Huitinga, I., & Hamann, J. (2018). Tissue-resident memory T cells populate the human brain. *Nature Communications*, *9*(1), 4593. <https://doi.org/10.1038/s41467-018-07053-9>

van der Poel, M., Ulas, T., Mizze, M. R., Hsiao, C.-C., Miedema, S. S. M., Adelia, Schuurman, K. G., Helder, B., Tas, S. W., Schultze, J. L., Hamann, J., & Huitinga, I. (2019). Transcriptional profiling of human microglia reveals grey–white matter heterogeneity and multiple sclerosis-associated changes. *Nature Communications*, *10*(1), 1139. <https://doi.org/10.1038/s41467-019-08976-7>

Worldwide

Acquarelli, J., Brain Bank, T. N., Bianchini, M., & Marchiori, E. (2016). Discovering Potential Clinical Profiles of Multiple Sclerosis from Clinical and Pathological Free Text Data with Constrained Non-negative Matrix Factorization. *Applications of Evolutionary Computation*, 169–183. https://doi.org/10.1007/978-3-319-31204-0_12

Alonso, R., Fernández-Fernández, A. M., Pisa, D., & Carrasco, L. (2018). Multiple sclerosis and mixed microbial infections. Direct identification of fungi and bacteria in nervous tissue. *Neurobiology of Disease*, *117*, 42–61. <https://doi.org/10.1016/j.nbd.2018.05.022>

Barateiro, A., Afonso, V., Santos, G., Cerqueira, J. J., Brites, D., Horsen, J. van, & Fernandes, A. (2016). S100B as a Potential Biomarker and Therapeutic Target in Multiple Sclerosis. *Molecular Neurobiology*, *53*(6), 3976–3991. <https://doi.org/10.1007/s12035-015-9336-6>

Beaino, W., Janssen, B., Kooij, G., van der Pol, S. M. A., van Het Hof, B., van Horsen, J., Windhorst, A. D., & de Vries, H. E. (2017). Purinergic receptors P2Y12R and P2X7R: Potential targets for PET imaging of microglia phenotypes in multiple sclerosis. *Journal of Neuroinflammation*, *14*, 259. <https://doi.org/10.1186/s12974-017-1034-z>

Bogie, J. F., Boelen, E., Louagie, E., Delputte, P., Elewaut, D., van Horsen, J., Hendriks, J. J., & Hellings, N. (2018). CD169 is a marker for highly pathogenic phagocytes in multiple sclerosis. *Multiple Sclerosis Journal*, *24*(3), 290–300. <https://doi.org/10.1177/1352458517698759>

Bogie, J. F. J., Mailleux, J., Wouters, E., Jorissen, W., Grajchen, E., Vanmol, J., Wouters, K., Hellings, N., van Horsen, J., Vanmierlo, T., & Hendriks, J. J. A. (2017). Scavenger receptor collectin placenta 1 is a novel receptor involved in the uptake of myelin by phagocytes. *Scientific Reports*, *7*, 44794. <https://doi.org/10.1038/srep44794>

Bridel, C., Koel-Simmelink, M. J. A., Peferoen, L., Troletti, C. D., Durieux, S., Gorter, R., Nutma, E., Gami, P., Iacobaeus, E., Brundin, L., Kuhle, J., Vrenken, H., Killestein, J., Piersma, S. R., Pham, T. V., Vries, H. E. D., Amor, S., Jimenez, C. R., & Teunissen, C. E. (2018). Brain endothelial cell expression of SPARCL1

is specific to chronic multiple sclerosis lesions and is regulated by inflammatory mediators in vitro. *Neuropathology and Applied Neurobiology*, 44(4), 404–416. <https://doi.org/10.1111/nan.12412>

- Burm, S. M., Peferoen, L. A. N., Zuiderwijk-Sick, E. A., Haanstra, K. G., 't Hart, B. A., van der Valk, P., Amor, S., Bauer, J., & Bajramovic, J. J. (2016). Expression of IL-1 β in rhesus EAE and MS lesions is mainly induced in the CNS itself. *Journal of Neuroinflammation*, 13, 138. <https://doi.org/10.1186/s12974-016-0605-8>
- Chen, Y., Zhen, W., Guo, T., Zhao, Y., Liu, A., Rubio, J. P., Krull, D., Richardson, J. C., Lu, H., & Wang, R. (2017). Histamine Receptor 3 negatively regulates oligodendrocyte differentiation and remyelination. *PLOS ONE*, 12(12), e0189380. <https://doi.org/10.1371/journal.pone.0189380>
- Chrobok, N. L., Bol, J. G. J. M., Wilhelmus, M. M. M., Drukarch, B., & van Dam, A.-M. (2019). Tissue Transglutaminase Appears in Monocytes and Macrophages but Not in Lymphocytes in White Matter Multiple Sclerosis Lesions. *Journal of Neuropathology & Experimental Neurology*, 78(6), 492–500. <https://doi.org/10.1093/jnen/nlz030>
- de Jong, C. G. H. M., Stancic, M., Pinxterhuis, T. H., van Horsen, J., van Dam, A.-M., Gabius, H.-J., & Baron, W. (2018). Galectin-4, a Negative Regulator of Oligodendrocyte Differentiation, Is Persistently Present in Axons and Microglia/Macrophages in Multiple Sclerosis Lesions. *Journal of Neuropathology & Experimental Neurology*, 77(11), 1024–1038. <https://doi.org/10.1093/jnen/nly081>
- Fraussen, J., Claes, N., Van Wijmeersch, B., van Horsen, J., Stinissen, P., Hupperts, R., & Somers, V. (2016). B cells of multiple sclerosis patients induce autoreactive proinflammatory T cell responses. *Clinical Immunology*, 173, 124–132. <https://doi.org/10.1016/j.clim.2016.10.001>
- Gorter, R. P., Nutma, E., Jahrei, M.-C., Jonge, J. C. de, Quinlan, R. A., Valk, P. van der, Noort, J. M. van, Baron, W., & Amor, S. (2018). Heat shock proteins are differentially expressed in brain and spinal cord: Implications for multiple sclerosis. *Clinical & Experimental Immunology*, 194(2), 137–152. <https://doi.org/10.1111/cei.13186>
- Große-Veldmann, R., Becker, B., Amor, S., Valk, P. van der, Beyer, C., & Kipp, M. (2016). Lesion Expansion in Experimental Demyelination Animal Models and Multiple Sclerosis Lesions. *Molecular Neurobiology*, 53(7), 4905–4917. <https://doi.org/10.1007/s12035-015-9420-y>
- Harnisch, K., Teuber-Hanselmann, S., Macha, N., Mairinger, F., Fritsche, L., Soub, D., Meinl, E., & Junker, A. (2019). Myelination in Multiple Sclerosis Lesions Is Associated with Regulation of Bone Morphogenetic Protein 4 and Its Antagonist Noggin. *International Journal of Molecular Sciences*, 20(1), 154. <https://doi.org/10.3390/ijms20010154>

- Holtman Inge R., Bsibsi Malika, Gerritsen Wouter H., Boddeke Hendrikus W. G. M., Eggen Bart J. L., van der Valk Paul, Kipp Markus, van Noort Johannes M., & Amor Sandra. (2017). Identification of highly connected hub genes in the protective response program of human macrophages and microglia activated by alpha B-crystallin. *Glia*, 65(3), 460–473. <https://doi.org/10.1002/glia.23104>
- Horsen, J. van, Pol, S. van der, Nijland, P., Amor, S., & Perron, H. (2016). Human endogenous retrovirus W in brain lesions: Rationale for targeted therapy in multiple sclerosis. *Multiple Sclerosis and Related Disorders*, 8, 11–18. <https://doi.org/10.1016/j.msard.2016.04.006>
- Jonkman, L. E., Fleysher, L., Steenwijk, M. D., Koeleman, J. A., Snoo, T.-P. de, Barkhof, F., Inglese, M., & Geurts, J. J. (2016). Ultra-high field MTR and qR2* differentiates subpial cortical lesions from normal-appearing gray matter in multiple sclerosis. *Multiple Sclerosis Journal*, 22(10), 1306–1314. <https://doi.org/10.1177/1352458515620499>
- Kiljan, S., Meijer, K. A., Steenwijk, M. D., Pouwels, P. J. W., Schoonheim, M. M., Schenk, G. J., Geurts, J. J. G., & Douw, L. (2019). Structural network topology relates to tissue properties in multiple sclerosis. *Journal of Neurology*, 266(1), 212–222. <https://doi.org/10.1007/s00415-018-9130-2>
- Kiljan, S., Prins, M., Baselmans, B. M., Bol, J. G. J. M., Schenk, G. J., & van Dam, A.-M. (2019). Enhanced GABAergic Immunoreactivity in Hippocampal Neurons and Astroglia of Multiple Sclerosis Patients. *Journal of Neuropathology & Experimental Neurology*, 78(6), 480–491. <https://doi.org/10.1093/jnen/nlz028>
- Kilsdonk, I. D., Jonkman, L. E., Klaver, R., Veluw, V., J. S., Zwanenburg, J. J. M., Kuijter, J. P. A., Pouwels, P. J. W., Twisk, J. W. R., Wattjes, M. P., Luijten, P. R., Barkhof, F., & Geurts, J. J. G. (2016). Increased cortical grey matter lesion detection in multiple sclerosis with 7 T MRI: A post-mortem verification study. *Brain*, 139(5), 1472–1481. <https://doi.org/10.1093/brain/aww037>
- Langelaar, J. van, Rijvers, L., Janssen, M., Wierenga-Wolf, A. F., Melief, M.-J., Siepman, T. A., Vries, H. E. de, Unger, P.-P. A., Ham, S. M. van, Hintzen, R. Q., & Luijn, M. M. van. (2019). Induction of brain-infiltrating T-bet-expressing B cells in multiple sclerosis. *Annals of Neurology*, 86(2), 264–278. <https://doi.org/10.1002/ana.25508>
- Mailleux, J., Vanmierlo, T., Bogie, J. F., Wouters, E., Lütjohann, D., Hendriks, J. J., & van Horsen, J. (2018). Active liver X receptor signaling in phagocytes in multiple sclerosis lesions. *Multiple Sclerosis Journal*, 24(3), 279–289. <https://doi.org/10.1177/1352458517696595>
- Nierop, G. P. van, Luijn, M. M. van, Michels, S. S., Melief, M.-J., Janssen, M., Langerak, A. W., Ouwendijk, W. J. D., Hintzen, R. Q., & Verjans, G. M. G. M. (2017). Phenotypic and functional characterization of T

- cells in white matter lesions of multiple sclerosis patients. *Acta Neuropathologica*, *134*(3), 383–401. <https://doi.org/10.1007/s00401-017-1744-4>
- Nutma, E., Stephenson, J. A., Gorter, R. P., de Bruin, J., Boucherie, D. M., Donat, C. K., Breur, M., van der Valk, P., Matthews, P. M., Owen, D. R., & Amor, S. (2019). A quantitative neuropathological assessment of translocator protein expression in multiple sclerosis. *Brain*, *142*(11), 3440–3455. <https://doi.org/10.1093/brain/awz287>
- Pinheiro, M. A. L., Kroon, J., Hoogenboezem, M., Geerts, D., Hof, B. van het, Pol, S. M. A. van der, Buul, J. D. van, & Vries, H. E. de. (2016). Acid Sphingomyelinase–Derived Ceramide Regulates ICAM-1 Function during T Cell Transmigration across Brain Endothelial Cells. *The Journal of Immunology*, *196*(1), 72–79. <https://doi.org/10.4049/jimmunol.1500702>
- Pollok, K., Mothes, R., Ulbricht, C., Liebheit, A., Gerken, J. D., Uhlmann, S., Paul, F., Niesner, R., Radbruch, H., & Hauser, A. E. (2017). The chronically inflamed central nervous system provides niches for long-lived plasma cells. *Acta Neuropathologica Communications*, *5*, 88. <https://doi.org/10.1186/s40478-017-0487-8>
- Popescu Veronica, Klaver Roel, Versteeg Adriaan, Voorn Pieter, Twisk Jos W.R., Barkhof Frederik, Geurts Jeroen J.G., & Vrenken Hugo. (2016). Postmortem validation of MRI cortical volume measurements in MS. *Human Brain Mapping*, *37*(6), 2223–2233. <https://doi.org/10.1002/hbm.23168>
- Preziosa, P., Kiljan, S., Steenwijk, M. D., Meani, A., van de Berg, W. D. J., Schenk, G. J., Rocca, M. A., Filippi, M., Geurts, J. J. G., & Jonkman, L. E. (2019). Axonal degeneration as substrate of fractional anisotropy abnormalities in multiple sclerosis cortex. *Brain*, *142*(7), 1921–1937. <https://doi.org/10.1093/brain/awz143>
- Shakhbazou, A., Schenk, G. J., Hay, C., Kawasoe, J., Klaver, R., Yong, V. W., Geurts, J. J. G., & Minnen, J. van. (2016). Demyelination induces transport of ribosome-containing vesicles from glia to axons: Evidence from animal models and MS patient brains. *Molecular Biology Reports*, *43*(6), 495–507. <https://doi.org/10.1007/s11033-016-3990-2>
- Strijbis, E. M. M., Kooi, E.-J., van der Valk, P., & Geurts, J. J. G. (2017). Cortical Remyelination Is Heterogeneous in Multiple Sclerosis. *Journal of Neuropathology & Experimental Neurology*, *76*(5), 390–401. <https://doi.org/10.1093/jnen/nlx023>
- Sun, D., Yu, Z., Fang, X., Liu, M., Pu, Y., Shao, Q., Wang, D., Zhao, X., Huang, A., Xiang, Z., Zhao, C., Franklin, R. J., Cao, L., & He, C. (2017). LncRNA GAS5 inhibits microglial M2 polarization and exacerbates demyelination. *EMBO Reports*, *18*(10), 1801–1816. <https://doi.org/10.15252/embr.201643668>

- Trépanier, M.-O., Hildebrand, K. D., Nyamoya, S. D., Amor, S., Bazinet, R. P., & Kipp, M. (2018). Phosphatidylcholine 36:1 concentration decreases along with demyelination in the cuprizone animal model and in post-mortem multiple sclerosis brain tissue. *Journal of Neurochemistry*, *145*(6), 504–515. <https://doi.org/10.1111/jnc.14335>
- Ummenthum Kimberley, Peferoen Laura A. N., Finardi Annamaria, Baker David, Pryce Gareth, Mantovani Alberto, Bsibsi Malika, Bottazzi Barbara, Peferoen-Baert Regina, van der Valk Paul, Garlanda Cecilia, Kipp Markus, Furlan Roberto, van Noort Johannes M., & Amor Sandra. (2015). Pentraxin-3 is upregulated in the central nervous system during MS and EAE, but does not modulate experimental neurological disease. *European Journal of Immunology*, *46*(3), 701–711. <https://doi.org/10.1002/eji.201545950>
- van Langelaar, J., van der Vuurst de Vries, R. M., Janssen, M., Wierenga-Wolf, A. F., Spilt, I. M., Siepmann, T. A., Dankers, W., Verjans, G. M. G. M., de Vries, H. E., Lubberts, E., Hintzen, R. Q., & van Luijn, M. M. (2018). T helper 17.1 cells associate with multiple sclerosis disease activity: Perspectives for early intervention. *Brain*, *141*(5), 1334–1349. <https://doi.org/10.1093/brain/awy069>
- Wang, P., Gorter, R. P., Jonge, J. C. de, Nazmuddin, M., Zhao, C., Amor, S., Hoekstra, D., & Baron, W. (2018). MMP7 cleaves remyelination-impairing fibronectin aggregates and its expression is reduced in chronic multiple sclerosis lesions. *Glia*, *66*(8), 1625–1643. <https://doi.org/10.1002/glia.23328>
- Wetzels, S., Vanmierlo, T., Scheijen, J. L. J. M., van Horssen, J., Amor, S., Somers, V., Schalkwijk, C. G., Hendriks, J. J. A., & Wouters, K. (2019). Methylglyoxal-Derived Advanced Glycation Endproducts Accumulate in Multiple Sclerosis Lesions. *Frontiers in Immunology*, *10*. <https://doi.org/10.3389/fimmu.2019.00855>