

Bibliografía

BIBLIOGRAFIA

- Abdel-Mageed A**, Agrawal KC. Antisense down-regulation of metallothionein induces growth arrest and apoptosis in human breast carcinoma cells. *Cancer Gene Ther* 1997; 4: 199-207
- Abel J**, de Ruiter N. Inhibition of hydroxyl-radical-generated DNA degradation by metallothionein. *Toxicol Lett* 1989; 47: 191-196
- Acarin L**, Carrasco J, Gonzalez B, Hidalgo J, Castellano B. Expression of growth inhibitory factor (metallothionein-III) mRNA and protein following excitotoxic immature brain injury. *J Neuropathol Exp Neurol*. 1999; 58: 389-397
- Acha-Orbea H**, Mitchell DJ, Timmermann L, Wraith DC, Tausch GS, Waldor MK, Zamvil SS, McDevitt HO, Steinman L. Limited heterogeneity of T cell receptors from lymphocytes mediating autoimmune encephalomyelitis allows specific immune intervention. *Cell* 1988; 54: 263-273
- Achiron A**, Gabbay U, Gilad R, Hassin-Baer S, Barak Y, Gornish M, Elizur A, Goldhammer Y, Sarova-Pinhas I. Intravenous immunoglobulin treatment in multiple sclerosis. Effect on relapses. *Neurology* 1998; 50: 398-402
- Akira S**, Nishio Y, Inoue M, Wang XJ, Wei S, Matsusaka T, Yoshida K, Sudo T, Naruto M, Kishimoto T. Molecular cloning of APRF, a novel IFN-stimulated gene factor 3 p91-related transcription factor involved in the gp130-mediated signaling pathway. *Cell* 1994; 77: 63-71
- Aktas O**, Wendling U, Zschenderlein R, Zipp F. Apoptosis in multiple sclerosis. Etiopathogenetic relevance and prospects for new therapeutic strategies. *Nervenarzt* 2000; 71: 767-773
- Alberch J**, Perez-Navarro E, Canals JM. Neuroprotection by neurotrophins and GDNF family members in the excitotoxic model of Huntington's disease. *Brain Res Bull* 2002; 57: 817-822
- Albert LJ**, Inman RD. Molecular mimicry and autoimmunity. *N Engl J Med* 1999; 341: 2068-2074
- Alcazar A**, Regidor I, Masjuan J, Salinas M, Alvarez-Cermeno JC. Induction of apoptosis by cerebrospinal fluid from patients with primary-progressive multiple sclerosis in cultured neurons. *Neurosci Lett* 1998; 255: 75-78
- Alegre ML**, Frauwirth KA, Thompson CB. T-cell regulation by CD28 and CTLA-4. *Nat Rev Immunol* 2001; 1: 220-228
- Aloisi F**. Immune function of microglia. *Glia* 2001; 36: 165-179
- Andrews GK**. Regulation of metallothionein gene expression by oxidative stress and metal ions. *Biochem Pharmacol* 2000; 59: 95-104
- Anezaki T**, Ishiguro H, Hozumi I, Inuzuka T, Hiraiwa M, Kobayashi H, Yuguchi T, Wanaka A, Uda Y, Miyatake T, Yamada K, Tohyama M, Tsuji S. Expression of growth inhibitory factor (GIF) in normal and injured rat brains. *Neurochem Int* 1995; 27: 89-94
- Arai KI**, Lee F, Miyajima A, Miyatake S, Arai N, Yokota T. Cytokines: coordinators of immune and inflammatory responses. *Annu Rev Biochem* 1990; 59: 783-836
- Arai Y**, Uchida Y, Takashima S. Developmental immunohistochemistry of growth inhibitory factor in normal brains and brains of patients with Down syndrome. *Pediatr Neurol* 1997; 17: 134-138

Arbizu-Urdiaín T, Martínez-Yelamos A. Axonal damage in multiple sclerosis. *Rev Neurol* 2000; 30: 1223-1227

Archelos JJ, Jung S, Rinner W, Lassmann H, Miyasaka M, Hartung HP. Role of the leukocyte-adhesion molecule L-selectin in experimental autoimmune encephalomyelitis. *J Neurol Sci* 1998; 159: 127-134

Archelos JJ, Previtali SC, Hartung HP. The role of integrins in immune-mediated diseases of the nervous system. *Trends Neurosci* 1999; 22: 30-38

Ard MD, Schachner M, Rapp JT, Faissner A. Growth and degeneration of axons on astrocyte surfaces: effects on extracellular matrix and on later axonal growth. *Glia* 1993; 9: 248-259

Arimilli S, Ferlin W, Solvason N, Deshpande S, Howard M, Mocci S. Chemokines in autoimmune diseases. *Immunol Rev* 2000; 177: 43-51

Arizono K, Kagawa S, Hamada H, Ariyoshi T. Nitric oxide mediated metallothionein induction by lipopolysaccharide. *Res Commun Mol Pathol Pharmacol* 1995; 90: 49-58

Arnold DL, Matthews PM, Francis G, Antel J. Proton magnetic resonance spectroscopy of human brain in vivo in the evaluation of multiple sclerosis: assessment of the load of disease. *Magn Reson Med* 1990; 14: 154-159

Arredondo LR, Deng C, Ratts RB, Lovett-Racke AE, Holtzman DM, Racke MK. Role of nerve growth factor in experimental autoimmune encephalomyelitis. *Eur J Immunol* 2001; 31: 625-633

Asakura K, Miller DJ, Pease LR, Rodriguez M. Targeting of IgM kappa antibodies to oligodendrocytes promotes CNS remyelination. *J Neurosci* 1998; 18: 7700-7708

Ascherio A, Munger KL, Lennette ET, Spiegelman D, Hernan MA, Olek MJ, Hankinson SE, Hunter DJ. Epstein-Barr virus antibodies and risk of multiple sclerosis: a prospective study. *JAMA* 2001; 286: 3083-3088

Aschner M. Astrocytic functions and physiological reactions to injury: the potential to induce and/or exacerbate neuronal dysfunction--a forum position paper. *Neurotoxicology* 1998; 19: 7-17; discussion 37-38

Aschner M. Astrocyte metallothioneins (MTs) and their neuroprotective role. *Ann N Y Acad Sci* 1997; 825: 334-347

Aschner M. The functional significance of brain metallothioneins. *FASEB J* 1996; 10: 1129-1136

Atkins GJ, McQuaid S, Morris-Downes MM, Galbraith SE, Amor S, Cosby SL, Sheahan BJ. Transient virus infection and multiple sclerosis. *Rev Med Virol* 2000; 10: 291-303

Babbe H, Roers A, Waismann A, Lassmann H, Goebels N, Hohlfeld R, Friese M, Schroder R, Deckert M, Schmidt S, Ravid R, Rajewsky K. Clonal expansions of CD8(+) T cells dominate the T cell infiltrate in active multiple sclerosis lesions as shown by micromanipulation and single cell polymerase chain reaction. *J Exp Med* 2000; 192: 393-404

Bagasra O, Michaels FH, Zheng YM, Bobroski LE, Spitsin SV, Fu ZF, Tawadros R, Koprowski H. Activation of the inducible form of nitric oxide synthase in the brains of patients with multiple sclerosis. *Proc Natl Acad Sci U S A* 1995; 92: 12041-12045

Baggiolini M. Chemokines and leukocyte traffic. *Nature* 1998; 392: 565-568

Banks WA, Ortiz L, Plotkin SR, Kastin AJ. Human interleukin (IL) 1 alpha, murine IL-1 alpha and murine IL-1 beta are transported from blood to brain in the mouse by a shared saturable mechanism. *J Pharmacol Exp Ther* 1991; 259: 988-996

Barkhof F, Bruck W, De Groot CJ, Bergers E, Hulshof S, Geurts J, Polman CH, van der Valk P. Remyelinated lesions in multiple sclerosis: magnetic resonance image appearance. *Arch Neurol* 2003; 60: 1073-1081

Barnett MH, Prineas JW. Relapsing and remitting multiple sclerosis: pathology of the newly forming lesion. *Ann Neurol* 2004; 55: 458-468

Bauer J, Ganter U, Abel J, Strauss S, Jonas U, Weiss R, Gebicke-Haerter P, Volk B, Berger M. Effects of interleukin-1 and interleukin-6 on metallothionein and amyloid precursor protein expression in human neuroblastoma cells. Evidence that interleukin-6 possibly acts via a receptor different from the 80-kDa interleukin-6 receptor. *J Neuroimmunol* 1993; 45: 163-173

Beck RW, Chandler DL, Cole SR, Simon JH, Jacobs LD, Kinkel RP, Selhorst JB, Rose JW, Cooper JA, Rice G, Murray TJ, Sandrock AW. Interferon beta-1a for early multiple sclerosis: CHAMPS trial subgroup analyses. *Ann Neurol* 2002; 51: 481-490

Beckman JS, Koppenol WH. Nitric oxide, superoxide, and peroxynitrite: the good, the bad, and ugly. *Am J Physiol* 1996a; 271: C1424-1437

Beckman JS. Oxidative damage and tyrosine nitration from peroxynitrite. *Chem Res Toxicol* 1996b; 9: 836-844

Bell JU, Lawman MJ, Lopez JM, DesJardin LE, Applewhite LA. Effects of type I interferon-inducing agents on hepatic metallothionein. *Experientia Suppl* 1987; 52: 581-586

Beloso E, Hernandez J, Giralt M, Kille P, Hidalgo J. Effect of stress on mouse and rat brain metallothionein I and III mRNA levels. *Neuroendocrinology* 1996; 64: 430-439

Benveniste EN. Role of macrophages/microglia in multiple sclerosis and experimental allergic encephalomyelitis. *J Mol Med* 1997; 75: 165-173

Berger T, Rubner P, Schautzer F, Egg R, Ulmer H, Mayringer I, Dilitz E, Deisenhammer F, Reindl M. Antimyelin antibodies as a predictor of clinically definite multiple sclerosis after a first demyelinating event. *N Engl J Med* 2003; 349: 139-145

Bettelli E, Das MP, Howard ED, Weiner HL, Sobel RA, Kuchroo VK. IL-10 is critical in the regulation of autoimmune encephalomyelitis as demonstrated by studies of IL-10- and IL-4-deficient and transgenic mice. *J Immunol* 1998; 161: 3299-32306

Beutler B, Cerami A. Tumor necrosis, cachexia, shock, and inflammation: a common mediator. *Annu Rev Biochem* 1988; 57: 505-518

Bever CT Jr, Rosenberg GA. Matrix metalloproteinases in multiple sclerosis: targets of therapy or markers of injury? *Neurology* 1999; 53: 1380-1381

Bielekova B, Richert N, Howard T, Blevins G, Markovic-Plese S, McCartin J, Frank JA, Wurfel J, Ohayon J, Waldmann TA, McFarland HF, Martin R. Humanized anti-CD25 (daclizumab) inhibits disease activity in multiple sclerosis patients failing to respond to interferon beta. *Proc Natl Acad Sci U S A* 2004; 101: 8705-8708

Binz PA, Kägi JHR. Metallothionein: molecular evolution and classification. In: *Metallothionein IV*. Klaassen, CD ed. Birkhäuser Verlag, Basel 1999: 7-13

Bitsch A, Schuchardt J, Bunkowski S, Kuhlmann T, Bruck W. Acute axonal injury in multiple sclerosis. Correlation with demyelination and inflammation. *Brain* 2000; 123: 1174-1183

Bjartmar C, Kidd G, Mork S, Rudick R, Trapp BD. Neurological disability correlates with spinal cord axonal loss and reduced N-acetyl aspartate in chronic multiple sclerosis patients. Ann Neurol 2000; 48: 893-901

Bjartmar C, Kinkel RP, Kidd G, Rudick RA, Trapp BD. Axonal loss in normal-appearing white matter in a patient with acute MS. Neurology 2001; 57: 1248-1252

Bjartmar C, Trapp BD. Axonal and neuronal degeneration in multiple sclerosis: mechanisms and functional consequences. Curr Opin Neurol 2001; 14: 271-278

Blaauwgeers HG, Sillevius Smitt PA, de Jong JM, Troost D. Localization of metallothionein in the mammalian central nervous system. Biol Signals 1994 ; 3: 181-187

Blasig IE, Mertsch K, Haseloff RF. Nitronyl nitroxides, a novel group of protective agents against oxidative stress in endothelial cells forming the blood-brain barrier. Neuropharmacology 2002; 43: 1006-1014

Blatteis CM. Neuromodulatory actions of cytokines. Yale J Biol Med 1990; 63: 133-146

Boehme SA, Lenardo MJ. Propriocidal apoptosis of mature T lymphocytes occurs at S phase of the cell cycle. Eur J Immunol 1993; 23: 1552-1560

Bolton C, Flower RJ. The effects of the anti-glucocorticoid RU 38486 on steroid-mediated suppression of experimental allergic encephalomyelitis (EAE) in the Lewis rat. Life Sci 1989; 45: 97-104

Booss J, Esiri MM, Tourtelotte WW, Mason DY. Immunohistological analysis of T lymphocyte subsets in the central nervous system in chronic progressive multiple sclerosis. J Neurol Sci 1983; 62: 219-232

Bracken WM, Klaassen CD. Induction of metallothionein by steroids in rat primary hepatocyte cultures. Toxicol Appl Pharmacol 1987; 87: 381-388

Braun W, Wagner G, Worgotter E, Vasak M, Kagi JH, Wuthrich K. Polypeptide fold in the two metal clusters of metallothionein-2 by nuclear magnetic resonance in solution. J Mol Biol 1986; 187: 125-129

Bretscher PA. A two-step, two-signal model for the primary activation of precursor helper T cells. Proc Natl Acad Sci U S A 1999; 96: 185-190

Brex PA, Ciccarelli O, O'Riordan JI, Sailer M, Thompson AJ, Miller DH. A longitudinal study of abnormalities on MRI and disability from multiple sclerosis. N Engl J Med 2002; 346: 158-164

Brocke S, Piercy C, Steinman L. Superantigens in demyelinating disease. Springer Semin Immunopathol 1996; 18: 51-56

Bruck W, Kuhlmann T, Stadelmann C. Remyelination in multiple sclerosis. J Neurol Sci 2003; 206: 181-185

Brunet JF, Denizot F, Luciani MF, Roux-Dosseto M, Suzan M, Mattei MG, Golstein P. A new member of the immunoglobulin superfamily--CTLA-4. Nature 1987; 328: 267-270

Bufill E, Blesa R, Galán I, Dean G. Prevalence of multiple sclerosis in the region of Osona, Catalonia, Northern Spain. J Neurol Neurosurg Psychiatry 1995; 58: 577-581

Butcher EC. Leukocyte-endothelial cell recognition: three (or more) steps to specificity and diversity. Cell 1991; 67: 1033-1036

Camhi SL, Lee P, Choi AM. The oxidative stress response. *New Horiz* 1995; 3: 170-182

Campbell IL, Abraham CR, Masliah E, Kemper P, Inglis JD, Oldstone MB, Mucke L. Neurologic disease induced in transgenic mice by cerebral overexpression of interleukin 6. *Proc Natl Acad Sci U S A* 1993; 90: 10061-10065

Carrasco J, Giralt M, Molinero A, Penkowa M, Moos T, Hidalgo J. Metallothionein (MT)-III: generation of polyclonal antibodies, comparison with MT-I+II in the freeze lesioned rat brain and in a bioassay with astrocytes, and analysis of Alzheimer's disease brains. *J Neurotrauma* 1999; 16: 1115-1129

Carrasco J, Giralt M, Penkowa M, Stalder AK, Campbell IL, Hidalgo J. Metallothioneins are upregulated in symptomatic mice with astrocyte-targeted expression of tumor necrosis factor-alpha. *Exp Neurol* 2000a; 163: 46-54

Carrasco J, Hernandez J, Bluethmann H, Hidalgo J. Interleukin-6 and tumor necrosis factor-alpha type 1 receptor deficient mice reveal a role of IL-6 and TNF-alpha on brain metallothionein-I and -III regulation. *Brain Res Mol Brain Res* 1998; 57: 221-234

Carrasco J, Penkowa M, Hadberg H, Molinero A, Hidalgo J. Enhanced seizures and hippocampal neurodegeneration following kainic acid-induced seizures in metallothionein-I + II-deficient mice. *Eur J Neurosci* 2000b; 12: 2311-2322

Cassarino DS, Bennett JP Jr. An evaluation of the role of mitochondria in neurodegenerative diseases: mitochondrial mutations and oxidative pathology, protective nuclear responses, and cell death in neurodegeneration. *Brain Res Brain Res Rev* 1999; 29: 1-25

Cautain B, Damoiseaux J, Bernard I, van Straaten H, van Breda Vriesman P, Boneu B, Druet P, Saoudi A. Essential role of TGF-beta in the natural resistance to experimental allergic encephalomyelitis in rats. *Eur J Immunol* 2001; 31: 1132-1140

Cermelli C, Jacobson S. Viruses and multiple sclerosis. *Viral Immunol* 2000; 13: 255-267

Chan PC, Shiu CK, Wong FW, Wong JK, Lam KL, Chan KM. Common carp metallothionein-1 gene: cDNA cloning, gene structure and expression studies. *Biochim Biophys Acta* 2004; 1676: 162-171

Chang A, Tourtellotte WW, Rudick R, Trapp BD. Premyelinating oligodendrocytes in chronic lesions of multiple sclerosis. *N Engl J Med* 2002; 346: 165-173

Charcot J. Comptes des séances et mémoires lus à la société de Biologie. 1868a

Charcot J. Histologie de la sclérose en plaque. *Gazette des Hôpitaux* 1868b; 41 : 554-566

Charcot J. Lectures on the diseases of the nervous system. The New Sydenham Society. London, United Kingdom 1877; 157-222

Chataway J, Mander A, Robertson N, Sawcer S, Deans J, Fraser M, Broadley S, Clayton D, Compston A. Multiple sclerosis in sibling pairs: an analysis of 250 families. *J Neurol Neurosurg Psychiatry* 2001; 71: 757-761

Chen RW, Ganther HE. Relative cadmium-binding capacity of metallothionein and other cytosolic fractions in various tissues of the rat. *Environ Physiol Biochem* 1975; 5: 378-388

Chen Y, Irie Y, Keung WM, Maret W. S-nitrosothiols react preferentially with zinc thiolate clusters of metallothionein III through transnitrosation. *Biochemistry* 2002; 41: 8360-8367

Choi DW, Koh JY. Zinc and brain injury. *Annu Rev Neurosci* 1998; 21: 347-375

Choudhuri S, McKim JM Jr, Klaassen CD. Differential expression of the metallothionein gene in liver and brain of mice and rats. *Toxicol Appl Pharmacol* 1993; 119: 1-10

Chubatsu LS, Meneghini R. Metallothionein protects DNA from oxidative damage. *Biochem J* 1993; 291: 193-198

Cohen RI, Marmur R, Norton WT, Mehler MF, Kessler JA. Nerve growth factor and neurotrophin-3 differentially regulate the proliferation and survival of developing rat brain oligodendrocytes. *J Neurosci*. 1996; 16: 6433-6442

Coles AJ, Wing M, Smith S, Coraddu F, Greer S, Taylor C, Weetman A, Hale G, Chatterjee VK, Waldmann H, Compston A. Pulsed monoclonal antibody treatment and autoimmune thyroid disease in multiple sclerosis. *Lancet* 1999a; 354: 1691-1695

Coles AJ, Wing MG, Molyneux P, Paolillo A, Davie CM, Hale G, Miller D, Waldmann H, Compston A. Monoclonal antibody treatment exposes three mechanisms underlying the clinical course of multiple sclerosis. *Ann Neurol* 1999b; 46: 296-304

Comabella M, Balashov K, Issazadeh S, Smith D, Weiner HL, Khouri SJ. Elevated interleukin-12 in progressive multiple sclerosis correlates with disease activity and is normalized by pulse cyclophosphamide therapy. *J Clin Invest* 1998; 102: 671-678

Comi C, Leone M, Bonissoi S, DeFranco S, Bottarel F, Mezzatesta C, Chiocchetti A, Perla F, Monaco F, Dianzani U. Defective T cell fas function in patients with multiple sclerosis. *Neurology* 2000a; 55: 921-927

Comi G, Colombo B, Martinelli V. Prognosis-modifying therapy in multiple sclerosis. *Neurol Sci* 2000b; 21: S893-899

Compere SJ, Palmiter RD. DNA methylation controls the inducibility of the mouse metallothionein-I gene lymphoid cells. *Cell* 1981; 25: 233-240

Confavreux C, Hutchinson M, Hours M, Cortinovis-Tourniaire P, Grimaud J, Moreau T. Multiple sclerosis and pregnancy : clinical issues. *Rev Neurol (Paris)* 1999 ; 155 : 186-191

Constantinescu CS, Hilliard B, Fujioka T, Bhopale MK, Calida D, Rostami AM. Pathogenesis of neuroimmunologic diseases. Experimental models. *Immunol Res* 1998; 17: 217-227

Cossins JA, Clements JM, Ford J, Miller KM, Pigott R, Vos W, Van der Valk P, De Groot CJ. Enhanced expression of MMP-7 and MMP-9 in demyelinating multiple sclerosis lesions. *Acta Neuropathol (Berl)* 1997; 94: 590-598

Cousins RJ, Leinart AS. Tissue-specific regulation of zinc metabolism and metallothionein genes by interleukin 1. *FASEB J* 1988; 2: 2884-2890

Cousins RJ. Absorption, transport, and hepatic metabolism of copper and zinc: special reference to metallothionein and ceruloplasmin. *Physiol Rev* 1985; 65: 238-309

Coyle P, Philcox JC, Rofe AM. Corticosterone enhances the zinc and interleukin-6-mediated induction of metallothionein in cultured rat hepatocytes. *J Nutr* 1993; 123: 1464-1470

Coyle PK, Hartung HP. Use of interferon beta in multiple sclerosis: rationale for early treatment and evidence for dose- and frequency-dependent effects on clinical response. *Mult Scler* 2002a; 8: 2-9

Coyle P, Philcox JC, Carey LC, Rofe AM. Metallothionein: the multipurpose protein. *Cell Mol Life Sci*. 2002b; 59: 627-647

Critchfield JM, Racke MK, Zuniga-Pflucker JC, Cannella B, Raine CS, Goverman J, Lenardo MJ. T cell deletion in high antigen dose therapy of autoimmune encephalomyelitis. *Science* 1994; 263: 1139-1143

Cross AH, Keeling RM, Goorha S, San M, Rodi C, Wyatt PS, Manning PT, Misko TP. Inducible nitric oxide synthase gene expression and enzyme activity correlate with disease activity in murine experimental autoimmune encephalomyelitis. *J Neuroimmunol* 1996; 71: 145-153

Cross AH, Manning PT, Keeling RM, Schmidt RE, Misko TP. Peroxynitrite formation within the central nervous system in active multiple sclerosis. *J Neuroimmunol* 1998; 88: 45-56

Cross AH, Misko TP, Lin RF, Hickey WF, Trotter JL, Tilton RG. Aminoguanidine, an inhibitor of inducible nitric oxide synthase, ameliorates experimental autoimmune encephalomyelitis in SJL mice. *J Clin Invest* 1994; 93: 2684-2690

Cserr HF, Knopf PM. Cervical lymphatics, the blood-brain barrier and the immunoreactivity of the brain: a new view. *Immunol Today* 1992; 13: 507-512

Cursiefen S, Flachenecker P, Toyka KV, Rieckmann P. Escalating immunotherapy with mitoxantrone in patients with very active relapsing-remitting or progressive multiple sclerosis. *Eur Neurol* 2000; 43: 186-187

Dahlman I, Jacobsson L, Glaser, Lorentzen JC, Andersson M, Luthman H, Olsson T. Genome-wide linkage analysis of chronic relapsing experimental autoimmune encephalomyelitis in the rat identifies a major susceptibility locus on chromosome 9. *J Immunol* 1999; 162: 2581-2588

Dal Canto MC, Lipton HL. Primary demyelination in Theiler's virus infection. An ultrastructural study. *Lab Invest* 1975; 33: 626-637

Dalton CM, Miszkiel KA, Barker GJ, MacManus DG, Pepple TI, Panzara M, Yang M, Hulme A, O'Connor P, Miller DH. Effect of natalizumab on conversion of gadolinium enhancing lesions to T1 hypointense lesions in relapsing multiple sclerosis. *J Neurol* 2004; 251: 407-413

Dalton TP, Li Q, Bittel D, Liang L, Andrews GK. Oxidative stress activates metal-responsive transcription factor-1 binding activity. Occupancy in vivo of metal response elements in the metallothionein-I gene promoter. *J Biol Chem* 1996; 271: 26233-26241

Dalton TP, Palmiter RD, Andrews GK. Transcriptional induction of the mouse metallothionein-I gene in hydrogen peroxide-treated Hepa cells involves a composite major late transcription factor/antioxidant response element and metal response promoter elements. *Nucleic Acids Res* 1994; 22: 5016-5023

Dalton TP, Pazdernik TL, Wagner J, Samson F, Andrews GK. Temporal spatial patterns of expression of metallothionein-I and -III and other stress related genes in rat brain after kainic acid-induced seizures. *Neurochem Int* 1995; 27: 59-71

Dantzer R. How do cytokines say hello to the brain? Neural versus humoral mediation. *Eur Cytokine Netw* 1994; 5: 271-273

Dawson VL, Dawson TM, Bartley DA, Uhl GR, Snyder SH. Mechanisms of nitric oxide-mediated neurotoxicity in primary brain cultures. *J Neurosci* 1993; 13: 2651-2661

Dawson VL, Dawson TM. Nitric oxide in neuronal degeneration. *Proc Soc Exp Biol Med* 1996; 211: 33-40

De SK, McMaster MT, Andrews GK. Endotoxin induction of murine metallothionein gene expression. *J Biol Chem* 1990; 265: 15267-15274

de Groot CJ, Ruuls SR, Theeuwes JW, Dijkstra CD, Van der Valk P. Immunocytochemical characterization of the expression of inducible and constitutive isoforms of nitric oxide synthase in demyelinating multiple sclerosis lesions. *J Neuropathol Exp Neurol* 1997; 56: 10-20

de Jong BA, Huizinga TW, Bollen EL, Uitdehaag BM, Bosma GP, van Buchem MA, Remarque EJ, Burgmans AC, Kalkers NF, Polman CH, Westendorp RG. Production of IL-1 β and IL-1Ra as risk factors for susceptibility and progression of relapse-onset multiple sclerosis. *J Neuroimmunol* 2002; 126: 172-179

de Simoni MG, Sironi M, De Luigi A, Manfridi A, Mantovani A, Ghezzi P. Intracerebroventricular injection of interleukin 1 induces high circulating levels of interleukin 6. *J Exp Med* 1990; 171: 1773-1778

de Stefano N, Matthews PM, Fu L, Narayanan S, Stanley J, Francis GS, Antel JP, Arnold DL. Axonal damage correlates with disability in patients with relapsing-remitting multiple sclerosis. Results of a longitudinal magnetic resonance spectroscopy study. *Brain* 1998; 121: 1469-1477

de Stefano N, Narayanan S, Francis GS, Arnaoutelis R, Tartaglia MC, Antel JP, Matthews PM, Arnold DL. Evidence of axonal damage in the early stages of multiple sclerosis and its relevance to disability. *Arch Neurol* 2001; 58: 65-70

Delerive P, De Bosscher K, Besnard S, Vanden Berghe W, Peters JM, Gonzalez FJ, Fruchart JC, Tedgui A, Haegeman G, Staels B. Peroxisome proliferator-activated receptor alpha negatively regulates the vascular inflammatory gene response by negative cross-talk with transcription factors NF-kappaB and AP-1. *J Biol Chem* 1999; 274: 32048-32054

Dinarello CA. Interleukin-1. In: The Cytokine Handbook. Thomson AW ed. Academic Press, London 1991

Ding M, Zhang M, Wong JL, Rogers NE, Ignarro LJ, Voskuhl RR. Antisense knockdown of inducible nitric oxide synthase inhibits induction of EAE in SJL mice. *J Immunol* 1998; 160: 2560-2564

Disilvestro RA, Cousins RJ. Glucocorticoid independent mediation of interleukin-1 induced changes in serum zinc and liver metallothionein levels. *Life Sci* 1984; 35: 2113-2118

Dore-Duffy P, Washington R, Dragovic L. Expression of endothelial cell activation antigens in microvessels from patients with multiple sclerosis. *Adv Exp Med Biol* 1993; 331: 243-248

Dowdell KC, Gienapp IE, Stuckman S, Wardrop RM, Whitacre CC. Neuroendocrine modulation of chronic relapsing experimental autoimmune encephalomyelitis: a critical role for the hypothalamic-pituitary-adrenal axis. *J Neuroimmunol* 1999; 100: 243-251

Dowling P, Shang G, Raval S, Menonna J, Cook S, Husar W. Involvement of the CD95 (APO-1/Fas) receptor/ligand system in multiple sclerosis brain. *J Exp Med* 1996; 184: 1513-1518

D'Souza SD, Bonetti B, Balasingam V, Cashman NR, Barker PA, Troutt AB, Raine CS, Antel JP. Multiple sclerosis: Fas signaling in oligodendrocyte cell death. *J Exp Med* 1996; 184: 2361-2370

Dubois-Dalcq M, Murray K. Why are growth factors important in oligodendrocyte physiology? *Pathol Biol (Paris)* 2000; 48: 80-86

Duda PW, Krieger JI, Schmied MC, Valentine C, Hafler DA. Human and murine CD4 T cell reactivity to a complex antigen: recognition of the synthetic random polypeptide glatiramer acetate. *J Immunol* 2000a; 165: 7300-7307

Duda PW, Schmied MC, Cook SL, Krieger JI, Hafler DA. Glatiramer acetate (Copaxone) induces degenerate, Th2-polarized immune responses in patients with multiple sclerosis. *J Clin Invest* 2000b; 105: 967-976

Durnam DM, Palmiter RD. Transcriptional regulation of the mouse metallothionein-I gene by heavy metals. *J Biol Chem* 1981; 256: 5712-5716

Ebadi M, Iversen PL, Hao R, Cerutis DR, Rojas P, Happe HK, Murrin LC, Pfeiffer RF. Expression and regulation of brain metallothionein. *Neurochem Int* 1995; 27: 1-22. Review

Ebers GC, Bulman DE, Sadovnick AD, Paty DW, Warren S, Hader W, Murray TJ, Seland TP, Duquette P, Grey T, et al. A population based study of multiple sclerosis in twins. *N Engl J Med* 1986; 315: 1638-1642

Ebers GC, Sadovnick AD, Risch NJ, Canadian Collaborative Study Group. A genetic basis for familial aggregation in multiple sclerosis. *Nature* 1995; 377: 350-351

Elices MJ. Natalizumab. Elan/Biogen. *Curr Opin Investig Drugs* 2003; 4: 1354-1362

Ellison JA, Barone FC, Feuerstein GZ. Matrix remodeling after stroke. De novo expression of matrix proteins and integrin receptors. *Ann N Y Acad Sci* 1999; 890: 204-222

Eng LF, Ghirnikar RS, Lee YL. Inflammation in EAE: role of chemokine/cytokine expression by resident and infiltrating cells. *Neurochem Res* 1996; 21: 511-525

Engelhardt B, Wolburg-Buchholz K, Wolburg H. Involvement of the choroid plexus in central nervous system inflammation. *Microsc Res Tech* 2001; 52: 112-129

Epplen C, Jackel S, Santos EJ, D'Souza M, Poehlau D, Dotzauer B, Sindern E, Haups M, Rude KP, Weber F, Stover J, Poser S, Gehler W, Malin JP, Przuntek H, Epplen JT. Genetic predisposition to multiple sclerosis as revealed by immunoprinting. *Ann Neurol* 1997; 41: 341-352

Erickson JC, Hollopeter G, Thomas SA, Froelick GJ, Palmiter RD. Disruption of the metallothionein-III gene in mice: analysis of brain zinc, behavior, and neuron vulnerability to metals, aging, and seizures. *J Neurosci* 1997; 17: 1271-1281

Erickson JC, Masters BA, Kelly EJ, Brinster RL, Palmiter RD. Expression of human metallothionein-III in transgenic mice. *Neurochem Int* 1995; 27: 35-41

Erickson JC, Sewell AK, Jensen LT, Winge DR, Palmiter RD. Enhanced neurotrophic activity in Alzheimer's disease cortex is not associated with down-regulation of metallothionein-III (GIF). *Brain Res* 1994; 649: 297-304

Espejo C, Brieva L, Ruggiero G, Rio J, Montalban X, Martinez-Caceres EM. IFN-beta treatment modulates the CD28/CTLA-4-mediated pathway for IL-2 production in patients with relapsing-remitting multiple sclerosis. *Mult Scler* 2004; 10: 630-635

Espejo C, Penkowa M, Demestre M, Montalban X, Martinez-Caceres EM. Time-course expression of CNS inflammatory, neurodegenerative, tissue repair markers and metallothioneins during experimental autoimmune encephalomyelitis. *Neuroscience* 2005;132; 1135-1149

Etzel KR, Cousins RJ. Hormonal regulation of liver metallothionein zinc: independent and synergistic action of glucagon and glucocorticoids. Proc Soc Exp Biol Med 1981; 167: 233-236

Etzel KR, Shapiro SG, Cousins RJ. Regulation of liver metallothionein and plasma zinc by the glucocorticoid dexamethasone. Biochem Biophys Res Commun 1979; 89: 1120-1126

Evangelou N, Jackson M, Beeson D, Palace J. Association of the APOE epsilon4 allele with disease activity in multiple sclerosis. J Neurol Neurosurg Psychiatry 1999; 67: 203-205

Evangelou N, Konz D, Esiri MM, Smith S, Palace J, Matthews PM. Size-selective neuronal changes in the anterior optic pathways suggest a differential susceptibility to injury in multiple sclerosis. Brain 2001; 124: 1813-1820

Failla ML, Cousins RJ. Zinc accumulation and metabolism in primary cultures of adult rat liver cells. Regulation by glucocorticoids. Biochim Biophys Acta 1978; 543: 293-304

Farber JM. A collection of mRNA species that are inducible in the RAW 264.7 mouse macrophage cell line by gamma interferon and other agents. Mol Cell Biol 1992; 12: 1535-1545

Favreau LV, Pickett CB. Transcriptional regulation of the rat NAD(P)H:quinone reductase gene. Characterization of a DNA-protein interaction at the antioxidant responsive element and induction by 12-O-tetradecanoylphorbol 13-acetate. J Biol Chem 1993; 268: 19875-19881

Ferguson B, Matyszak MK, Esiri MM, Perry VH. Axonal damage in acute multiple sclerosis lesions. Brain 1997; 120: 393-399

Fernandez O, Luque G, San Román C, Bravo M, Dean G. The prevalence of multiple sclerosis in the Sanitary District of Velez-Málaga, Southern Spain. Neurology 1994; 44: 425-429

Filippini G, Munari L, Incorvaia B, Ebers GC, Polman C, D'Amico R, Rice GP. Interferons in relapsing remitting multiple sclerosis: a systematic review. Lancet 2003; 361: 545-552

Floyd RA. Antioxidants, oxidative stress, and degenerative neurological disorders. Proc Soc Exp Biol Med 1999; 222: 236-245

Floyd RA. Neuroinflammatory processes are important in neurodegenerative diseases: an hypothesis to explain the increased formation of reactive oxygen and nitrogen species as major factors involved in neurodegenerative disease development. Free Radic Biol Med 1999; 26: 1346-1355

Ford AL, Foulcher E, Lemckert FA, Sedgwick JD. Microglia induce CD4 T lymphocyte final effector function and death. J Exp Med 1996; 184: 1737-1745

Franklin RJ. Why does remyelination fail in multiple sclerosis? Nat Rev Neurosci 2002; 3: 705-714

Fridkis-Hareli M, Teitelbaum D, Gurevich E, Pecht I, Brautbar C, Kwon OJ, Brenner T, Arnon R, Sela M. Direct binding of myelin basic protein and synthetic copolymer 1 to class II major histocompatibility complex molecules on living antigen-presenting cells--specificity and promiscuity. Proc Natl Acad Sci USA 1994; 91: 4872-4876

Fujinami RS, Oldstone MB. Amino acid homology between the encephalitogenic site of myelin basic protein and virus: mechanism for autoimmunity. Science 1985; 230: 1043-1045

Furey WF, Robbins AH, Clancy LL, Winge DR, Wang BC, Stout CD. Crystal structure of Cd,Zn metallothionein. *Science* 1986; 231: 704-710

Furlan R, Pluchino S, Martino G. The therapeutic use of gene therapy in inflammatory demyelinating diseases of the central nervous system. *Curr Opin Neurol* 2003; 16: 385-392

Gardinier MV, Amiguet P, Linington C, Matthieu JM. Myelin/oligodendrocyte glycoprotein is a unique member of the immunoglobulin superfamily. *J Neurosci Res* 1992; 33: 177-187

Gasull T, Giralt M, Hernandez J, Martinez P, Bremner I, Hidalgo J. Regulation of metallothionein concentrations in rat brain: effect of glucocorticoids, zinc, copper, and endotoxin. *Am J Physiol* 1994; 266: E760-767

Genain CP, Cannella B, Hauser SL, Raine CS. Identification of autoantibodies associated with myelin damage in multiple sclerosis. *Nat Med* 1999; 5: 170-175

Genain CP, Nguyen MH, Letvin NL, Pearl R, Davis RL, Adelman M, Lees MB, Linington C, Hauser SL. Antibody facilitation of multiple sclerosis-like lesions in a nonhuman primate. *J Clin Invest* 1995; 96: 2966-2974

Genc K, Dona DL, Reder AT. Increased CD80(+) B cells in active multiple sclerosis and reversal by interferon beta-1b therapy. *J Clin Invest* 1997; 99: 2664-2671

Giovannoni G, Lai M, Thorpe J, Kidd D, Chamoun V, Thompson AJ, Miller DH, Feldmann M, Thompson EJ. Longitudinal study of soluble adhesion molecules in multiple sclerosis: correlation with gadolinium enhanced magnetic resonance imaging. *Neurology* 1997; 48: 1557-1565

Giralt M, Carrasco J, Penkowa M, Morcillo MA, Santamaria J, Campbell IL, Hidalgo J. Astrocyte-targeted expression of interleukin-3 and interferon-alpha causes region-specific changes in metallothionein expression in the brain. *Exp Neurol* 2001; 168: 334-346

Giralt M, Gasull T, Hernandez J, Garcia A, Hidalgo J. Effect of stress, adrenalectomy and changes in glutathione metabolism on rat kidney metallothionein content: comparison with liver metallothionein. *Biometals* 1993; 6: 171-178

Giralt M, Penkowa M, Hernandez J, Molinero A, Carrasco J, Lago N, Camats J, Campbell IL, Hidalgo J. Metallothionein-1+2 deficiency increases brain pathology in transgenic mice with astrocyte-targeted expression of interleukin 6. *Neurobiol Dis* 2002a; 9: 319-338

Giralt M, Penkowa M, Lago N, Molinero A, Hidalgo J. Metallothionein-1+2 protect the CNS after a focal brain injury. *Exp Neurol* 2002b; 173: 114-128

Goddard DR, Berry M, Butt AM. In vivo actions of fibroblast growth factor-2 and insulin-like growth factor-I on oligodendrocyte development and myelination in the central nervous system. *J Neurosci Res* 1999; 57: 74-85

Goebels N, Hofstetter H, Schmidt S, Brunner C, Wekerle H, Hohlfeld R. Repertoire dynamics of autoreactive T cells in multiple sclerosis patients and healthy subjects: epitope spreading versus clonal persistence. *Brain* 2000; 123: 508-518

Gold R, Schmied M, Tontsch U, Hartung HP, Wekerle H, Toyka KV, Lassmann H. Antigen presentation by astrocytes primes rat T lymphocytes for apoptotic cell death. A model for T-cell apoptosis in vivo. *Brain* 1996; 119: 651-659

Gong YH, Elliott JL. Metallothionein expression is altered in a transgenic murine model of familial amyotrophic lateral sclerosis. *Exp Neurol*. 2000; 162: 27-36

Gordon EJ, Myers KJ, Dougherty JP, Rosen H, Ron Y. Both anti-CD11a (LFA-1) and anti-CD11b (MAC-1) therapy delay the onset and diminish the severity of experimental autoimmune encephalomyelitis. *J Neuroimmunol* 1995; 62: 153-160

Gran B, Hemmer B, Vergelli M, McFarland HF, Martin R. Molecular mimicry and multiple sclerosis: degenerate T-cell recognition and the induction of autoimmunity. *Ann Neurol* 1999; 45: 559-67

Gran B, Tranquill LR, Chen M, Bielekova B, Zhou W, Dhib-Jalbut S, Martin R. Mechanisms of immunomodulation by glatiramer acetate. *Neurology* 2000; 55: 1704-1714

Günes C, Heuchel R, Georgiev O, Muller KH, Lichtlen P, Bluthmann H, Marino S, Aguzzi A, Schaffner W. Embryonic lethality and liver degeneration in mice lacking the metal-responsive transcriptional activator MTF-1. *EMBO J* 1998; 17: 2846-2854

Hager LJ, Palmeter RD. Transcriptional regulation of mouse liver metallothionein-I gene by glucocorticoids. *Nature* 1981; 291: 340-342

Haines JL, Ter-Minassian M, Bazyk A, Gusella JF, Kim DJ, Terwedow H, Pericak-Vance MA, Rimmier JB, Haynes CS, Roses AD, Lee A, Shaner B, Menold M, Seboun E, Fitoussi RP, Gartioux C, Reyes C, Ribierre F, Gyapay G, Weissenbach J, Hauser SL, Goodkin DE, Lincoln R, Usuku K, Oksenberg JR, et al. A complete genomic screen for multiple sclerosis underscores a role for the major histocompatibility complex. The Multiple Sclerosis Genetics Group. *Nat Genet* 1996; 13: 469-471

Hall AC, Young BW, Bremner I. Intestinal metallothionein and the mutual antagonism between copper and zinc in the rat. *J Inorg Biochem* 1979; 11: 57-66

Halliwell B. Role of free radicals in the neurodegenerative diseases: therapeutic implications for antioxidant treatment. *Drugs Aging* 2001; 18: 685-716

Hao R, Cerutis DR, Blaxall HS, Rodriguez-Sierra JF, Pfeiffer RF, Ebadi M. Distribution of zinc metallothionein I mRNA in rat brain using in situ hybridization. *Neurochem Res* 1994; 19: 761-767

Hartung HP, Reiners K, Archelos JJ, Michels M, Seeldrayers P, Heidenreich F, Pflughaupt KW, Toyka KV. Circulating adhesion molecules and tumor necrosis factor receptor in multiple sclerosis: correlation with magnetic resonance imaging. *Ann Neurol* 1995; 38: 186-193

Heilmaier HE, Drasch GA, Kretschmer E, Summer KH. Metallothionein, cadmium, copper and zinc levels of human and rat tissues. *Toxicol Lett* 1987; 38: 205-211

Heilmaier HE, Summer KH. Metallothionein content and zinc status in various tissues of rats treated with iodoacetic acid and zinc. *Arch Toxicol* 1985; 56: 247-251

Heinrich PC, Castell JV, Andus T. Interleukin-6 and the acute phase response. *Biochem J* 1990; 265: 621-636

Hemmer B, Cepok S, Nessler S, Sommer N. Pathogenesis of multiple sclerosis: an update on immunology. *Curr Opin Neurol* 2002; 15: 227-231

Heneka MT, Sharp A, Murphy P, Lyons JA, Dumitrescu L, Feinstein DL. The heat shock response reduces myelin oligodendrocyte glycoprotein-induced experimental autoimmune encephalomyelitis in mice. *J Neurochem* 2001; 77: 568-579

Hernandez J, Giralt M, Beloso E, Rebollo DV, Romero B, Hidalgo J. Interactions between metallothionein inducers in rat liver and primary cultures of rat hepatocytes. *Chem Biol Interact* 1996; 100: 27-40

Hernandez J, Hidalgo J. Endotoxin and intracerebroventricular injection of IL-1 and IL-6 induce rat brain metallothionein-I and -II. *Neurochem Int* 1998; 32: 369-373

Hernandez J, Molinero A, Campbell IL, Hidalgo J. Transgenic expression of interleukin 6 in the central nervous system regulates brain metallothionein-I and -III expression in mice. *Brain Res Mol Brain Res* 1997; 48: 125-131

Heuchel R, Radtke F, Georgiev O, Stark G, Aguet M, Schaffner W. The transcription factor MTF-1 is essential for basal and heavy metal-induced metallothionein gene expression. *EMBO J* 1994; 13: 2870-2875

Hickey WF. Basic principles of immunological surveillance of the normal central nervous system. *Glia* 2001; 36: 118-124

Hickey WF. Migration of hematogenous cells through the blood-brain barrier and the initiation of CNS inflammation. *Brain Pathol* 1991b; 1: 97-105

Hickey WF, Hsu BL, Kimura H. T-lymphocyte entry into the central nervous system. *J Neurosci Res* 1991a; 28: 254-260

Hidalgo J, Aschner M, Zatta P, Vasak M. Roles of the metallothionein family of proteins in the central nervous system. *Brain Res Bull* 2001; 55: 133-145

Hidalgo J, Belloso E, Hernandez J, Gasull T, Molinero A. Role of Glucocorticoids on Rat Brain Metallothionein-I and -III Response to Stress. *Stress* 1997a; 1: 231-240

Hidalgo J, Castellano B, Campbell IL. Regulation of brain metallothioneins. *Curr Top Neurochem* 1997b; 1: 1-26

Hidalgo J, Carrasco J, Hernandez J, Giralt M, Molinero A, Gonzalez B, Bluethmann H, Campbell IL. Liver and brain metallothionein regulation in transgenic mice overexpressing IL-6 and mice carrying a null mutation in the IL-6 gene. In: *Metallothionein IV*. Klaasen CD ed. Birkhäuser Verlag, Basel 1998; 363-370

Hidalgo J, Garcia A, Oliva AM, Giralt M, Gasull T, Gonzalez B, Milnerowicz H, Wood A, Bremner I. Effect of zinc, copper and glucocorticoids on metallothionein levels of cultured neurons and astrocytes from rat brain. *Chem Biol Interact* 1994; 93: 197-219

Hidalgo J, Garvey JS, Armario A. On the metallothionein, glutathione and cysteine relationship in rat liver. *J Pharmacol Exp Ther* 1990; 255: 554-564

Hidalgo J, Penkowa M, Giralt M, Carrasco J, Molinero A. Metallothionein expression and oxidative stress in the brain. *Methods Enzymol* 2002; 348: 238-249

Hill KE, Zollinger LV, Watt HE, Carlson NG, Rose JW. Inducible nitric oxide synthase in chronic active multiple sclerosis plaques: distribution, cellular expression and association with myelin damage. *J Neuroimmunol* 2004; 151: 171-179

Hisahara S, Yuan J, Momoi T, Okano H, Miura M. Caspase-11 mediates oligodendrocyte cell death and pathogenesis of autoimmune-mediated demyelination. *J Exp Med* 2001; 193: 111-122

Hockertz MK, Paty DW, Beall SS. Susceptibility to relapsing-progressive multiple sclerosis is associated with inheritance of genes linked to the variable region of the TcR beta locus: use of affected family-based controls. *Am J Hum Genet* 1998; 62: 373-385

Hoffman LM, Karpus WJ. Chemokine regulation of CNS T-cell infiltration in experimental autoimmune encephalomyelitis. *Res Immunol* 1998; 149: 790-794; discussion 846-847, 855-60

Hohlfeld R, Kerschensteiner M, Stadelmann C, Lassmann H, Wekerle H. The neuroprotective effect of inflammation: implications for the therapy of multiple sclerosis. *J Neuroimmunol* 2000; 107: 161-166

Hohlfeld R. Biotechnological agents for the immunotherapy of multiple sclerosis. Principles, problems and perspectives. *Brain* 1997; 120: 865-916. Review

Holz A, Bielekova B, Martin R, Oldstone MB. Myelin-associated oligodendrocytic basic protein: identification of an encephalitogenic epitope and association with multiple sclerosis. *J Immunol* 2000; 164: 1103-1109

Hooper DC, Ohnishi ST, Kean R, Numagami Y, Dietzschold B, Koprowski H. Local nitric oxide production in viral and autoimmune diseases of the central nervous system. *Proc Natl Acad Sci U S A* 1995; 92: 5312-5316

Hooper DC, Scott GS, Zborek A, Mikheeva T, Kean RB, Koprowski H, Spitsin SV. Uric acid, a peroxynitrite scavenger, inhibits CNS inflammation, blood-CNS barrier permeability changes, and tissue damage in a mouse model of multiple sclerosis. *FASEB J* 2000; 14: 691-698

Hooper DC, Spitsin S, Kean RB, Champion JM, Dickson GM, Chaudhry I, Koprowski H. Uric acid, a natural scavenger of peroxynitrite, in experimental allergic encephalomyelitis and multiple sclerosis. *Proc Natl Acad Sci U S A* 1998; 95: 675-680

Hori S, Nomura T, Sakaguchi S. Control of regulatory T cell development by the transcription factor Foxp3. *Science* 2003; 299: 1057-1061

Hozumi I, Inuzuka T, Hiraiwa M, Uchida Y, Anezaki T, Ishiguro H, Kobayashi H, Uda Y, Miyatake T, Tsuji S. Changes of growth inhibitory factor after stab wounds in rat brain. *Brain Res* 1995; 688: 143-148

Hozumi I, Inuzuka T, Ishiguro H, Hiraiwa M, Uchida Y, Tsuji S. Immunoreactivity of growth inhibitory factor in normal rat brain and after stab wounds—an immunocytochemical study using confocal laser scan microscope. *Brain Res* 1996; 741: 197-204

Hozumi I, Inuzuka T, Tsuji S. Brain injury and growth inhibitory factor (GIF): a minireview. *Neurochem Res* 1998; 23: 319-328

Huang D, Han Y, Rani MR, Glabinski A, Trebst C, Sorensen T, Tani M, Wang J, Chien P, O'Bryan S, Bielecki B, Zhou ZL, Majumder S, Ransohoff RM. Chemokines and chemokine receptors in inflammation of the nervous system: manifold roles and exquisite regulation. *Immunol Rev* 2000; 177: 52-67

Huang YM, Hussien Y, Jin YP, Soderstrom M, Link H. Multiple sclerosis: deficient in vitro responses of blood mononuclear cells to IFN-beta. *Acta Neurol Scand* 2001; 104: 249-56

Huitinga I, Damoiseaux JG, Dopp EA, Dijkstra CD. Treatment with anti-CR3 antibodies ED7 and ED8 suppresses experimental allergic encephalomyelitis in Lewis rats. *Eur J Immunol* 1993; 23:709-715

Huitinga I, De Groot CJ, Van der Valk P, Kamphorst W, Tilders FJ, Swaab DF. Hypothalamic lesions in multiple sclerosis. *J Neuropathol Exp Neurol* 2001; 60: 1208-1218

Imbra RJ, Karin M. Metallothionein gene expression is regulated by serum factors and activators of protein kinase C. *Mol Cell Biol* 1987; 7: 1358-1363

Interferon Beta-1b Study Group. Interferon Beta-1b in the treatment of multiple sclerosis β final outcome of the randomised control trial. *Neurology* 1995; 45: 1277-1285

Inuzuka T, Hozumi I, Tamura A, Hiraiwa M, Tsuji S. Patterns of growth inhibitory factor (GIF) and glial fibrillary acidic protein relative level changes differ following left middle cerebral artery occlusion in rats. *Brain Res* 1996; 709: 151-153

Itoh M, Ebadi M, Swanson S. The presence of zinc-binding proteins in brain. *J Neurochem* 1983; 41: 823-829

Itoh N, Okamoto H, Ohta M, Hori T, Min KS, Onosaka S, Nakanishi H, Okabe M, Muto N, Tanaka K. n-hexane-induced synthesis of hepatic metallothionein is mediated by IL-6 in mouse. *Toxicol Appl Pharmacol* 1994; 124: 257-261
J Clin Invest 1998; 102: 671-678

Jacobs LD, Beck RW, Simon JH, Kinkel RP, Brownscheidle CM, Murray TJ, Simonian NA, Slasor PJ, Sandrock AW. Intramuscular interferon beta-1a therapy initiated during a first demyelinating event in multiple sclerosis. CHAMPS Study Group. *N Engl J Med* 2000; 343: 898-904

Jaiswal AK. Antioxidant response element. *Biochem Pharmacol* 1994; 48: 439-444

Jasani B, Schmid KW. Significance of metallothionein overexpression in human tumours. *Histopathology* 1997; 31: 211-214

Jeffery ND, Blakemore WF. Locomotor deficits induced by experimental spinal cord demyelination are abolished by spontaneous remyelination. *Brain* 1997; 120: 27-37

Johnson HM, Torres BA, Soos JM. Superantigens: structure and relevance to human disease. *Proc Soc Exp Biol Med* 1996; 212: 99-109

Johnson KP, Brooks BR, Cohen JA, Ford CC, Goldstein J, Lisak RP, Myers LW, Panitch HS, Rose JW, Schiffer RB. Copolymer 1 reduces relapse rate and improves disability in relapsing-remitting multiple sclerosis: results of a phase III multicenter, double-blind placebo-controlled trial. The Copolymer 1 Multiple Sclerosis Study Group. *Neurology* 1995; 45: 1268-1276

Kabat EA, Wolf A, Bezer AE. The rapid production of acute disseminated encephalomyelitis in rhesus monkeys by injection of heterologous and homologous brain tissue with adjuvants. *J Exp Med* 1947; 85: 117-130

Kägi JH, Kojima Y. Chemistry and biochemistry of metallothionein. *Experientia Suppl* 1987; 52: 25-61

Kalkers NF, Bergers E, Castelijns JA, van Walderveen MA, Bot JC, Ader HJ, Polman CH, Barkhof F. Optimizing the association between disability and biological markers in MS. *Neurology* 2001; 57: 1253-1258

Kamata H, Manabe T, Kakuta J, Oka S, Hirata H. Multiple redox regulation of the cellular signaling system linked to AP-1 and NF κ B: effects of N-acetylcysteine and H₂O₂ on the receptor tyrosine kinases, the MAP kinase cascade, and IkappaB kinases. *Ann N Y Acad Sci* 2002; 973: 419-422

Kantarci OH, Hebrink DD, Achenbach SJ, Atkinson EJ, Waliszewska A, Buckle G, McMurray CT, de Andrade M, Hafler DA, Weinshenker BG. CTLA4 is associated with susceptibility to multiple sclerosis. *J Neuroimmunol* 2003; 134: 133-141

Kanwar JR, Harrison JE, Wang D, Leung E, Mueller W, Wagner N, Krissansen GW. Beta7 integrins contribute to demyelinating disease of the central nervous system. *J Neuroimmunol* 2000a; 103: 146-152

Kanwar JR, Kanwar RK, Wang D, Krissansen GW. Prevention of a chronic progressive form of experimental autoimmune encephalomyelitis by an antibody against mucosal addressin cell adhesion molecule-1, given early in the course of disease progression. *Immunol Cell Biol* 2000b; 78: 641-645

Kappos L, Heun R, Mertens HG. A 10-year matched-pairs study comparing azathioprine and no immunosuppression in multiple sclerosis. *Eur Arch Psychiatry Clin Neurosci* 1990; 240: 34-38

Kappos L, Patzold U, Dommasch D, Poser S, Haas J, Krauseneck P, Malin JP, Fierz W, Graffenreid BU, Gugerli US. Cyclosporine versus azathioprine in the long-term treatment of multiple sclerosis--results of the German multicenter study. *Ann Neurol* 1988; 23: 56-63

Karin M, Haslinger A, Holtgreve H, Cathala G, Slater E, Baxter JD. Activation of a heterologous promoter in response to dexamethasone and cadmium by metallothionein gene 5'-flanking DNA. *Cell* 1984a; 36: 371-379

Karin M, Haslinger A, Holtgreve H, Richards RI, Krauter P, Westphal HM, Beato M. Characterization of DNA sequences through which cadmium and glucocorticoid hormones induce human metallothionein-IIA gene. *Nature* 1984b; 308: 513-519

Karin M, Herschman HR. Dexamethasone stimulation of metallothionein synthesis in HeLa cell cultures. *Science* 1979; 204: 176-177

Karin M, Herschman HR. Glucocorticoid hormone receptor mediated induction of metallothionein synthesis in HeLa cells. *J Cell Physiol* 1980; 103:35-40

Kawashima T, Doh-ura K, Torisu M, Uchida Y, Furuta A, Iwaki T. Differential expression of metallothioneins in human prion diseases. *Dement Geriatr Cogn Disord* 2000; 11: 251-262

Kaye JF, Kerlero de Rosbo N, Mendel I, Flechter S, Hoffman M, Yust I, Ben-Nun A. The central nervous system-specific myelin oligodendrocytic basic protein (MOBP) is encephalitogenic and a potential target antigen in multiple sclerosis (MS). *J Neuroimmunol* 2000; 102: 189-198

Keirstead HS, Blakemore WF. The role of oligodendrocytes and oligodendrocyte progenitors in CNS remyelination. *Adv Exp Med Biol* 1999; 468: 183-197. Review

Kelly EJ, Palmiter RD. A murine model of Menkes disease reveals a physiological function of metallothionein. *Nat Genet* 1996; 13: 219-222

Kelly EJ, Sandgren EP, Brinster RL, Palmiter RD. A pair of adjacent glucocorticoid response elements regulate expression of two mouse metallothionein genes. *Proc Natl Acad Sci U S A* 1997; 94: 10045-10050

Kennedy MK, Torrance DS, Picha KS, Mohler KM. Analysis of cytokine mRNA expression in the central nervous system of mice with experimental autoimmune encephalomyelitis reveals that IL-10 mRNA expression correlates with recovery. *J Immunol.* 1992 Oct 1;149(7):2496-505

Kent SJ, Karlik SJ, Cannon C, Hines DK, Yednock TA, Fritz LC, Horner HC. A monoclonal antibody to alpha 4 integrin suppresses and reverses active experimental allergic encephalomyelitis. *J Neuroimmunol* 1995; 58: 1-10

Kerlero de Rosbo N, Bernard CC, Simmons RD, Carnegie PR. Concomitant detection of changes in myelin basic protein and permeability of blood-spinal cord barrier in acute experimental autoimmune encephalomyelitis by electroimmunoblotting. *J Neuroimmunol* 1985; 9: 349-361

Kevil CG, Okayama N, Alexander JS. H(2)O(2)-mediated permeability II: importance of tyrosine phosphatase and kinase activity. Am J Physiol Cell Physiol 2001; 281: C1940-1947

Khoury SJ, Hancock WW, Weiner HL. Oral tolerance to myelin basic protein and natural recovery from experimental autoimmune encephalomyelitis are associated with downregulation of inflammatory cytokines and differential upregulation of transforming growth factor beta, interleukin 4, and prostaglandin E expression in the brain. J Exp Med 1992; 176: 1355-1364

Kieseier BC, Seifert T, Giovannoni G, Hartung HP. Matrix metalloproteinases in inflammatory demyelination: targets for treatment. Neurology 1999; 53: 20-25

Kikuchi Y, Irie M, Kasahara T, Sawada J, Terao T. Induction of metallothionein in a human astrocytoma cell line by interleukin-1 and heavy metals. FEBS Lett. 1993; 317: 22-26

Kim D, Kim EH, Kim C, Sun W, Kim HJ, Uhm CS, Park SH, Kim H. Differential regulation of metallothionein-I, II, and III mRNA expression in the rat brain following kainic acid treatment. Neuroreport 2003; 14: 679-682

Kishimoto T. The biology of interleukin-6. Blood 1989; 74: 1-10

Klaassen CD, Liu J. Induction of metallothionein in primary rat hepatocyte cultures. Methods Enzymol 1991; 205: 567-574

Kobayashi H, Uchida Y, Ihara Y, Nakajima K, Kohsaka S, Miyatake T, Tsuji S. Molecular cloning of rat growth inhibitory factor cDNA and the expression in the central nervous system. Brain Res Mol Brain Res 1993; 19: 188-194

Kojima K, Berger T, Lassmann H, Hinze-Selch D, Zhang Y, Gehrmann J, Reske K, Wekerle H, Linington C. Experimental autoimmune panencephalitis and uveoretinitis transferred to the Lewis rat by T lymphocytes specific for the S100 beta molecule, a calcium binding protein of astroglia. J Exp Med 1994; 180: 817-829

Kojima S, Shimada A, Morita T, Yamano Y, Umemura T. Localization of metallothioneins-I & -II and -III in the brain of aged dog. J Vet Med Sci 1999; 61: 343-349

Kondo Y, Rusnak JM, Hoyt DG, Settineri CE, Pitt BR, Lazo JS. Enhanced apoptosis in metallothionein null cells. Mol Pharmacol 1997; 52: 195-201

Kornek B, Storch MK, Weissert R, Wallstroem E, Stefferl A, Olsson T, Linington C, Schmidbauer M, Lassmann H. Multiple sclerosis and chronic autoimmune encephalomyelitis: a comparative quantitative study of axonal injury in active, inactive, and remyelinated lesions. Am J Pathol 2000; 157: 267-276

Koropatnick J, Zalups RK. Effect of non-toxic mercury, zinc or cadmium pretreatment on the capacity of human monocytes to undergo lipopolysaccharide-induced activation. Br J Pharmacol 1997; 120: 797-806

Kotsonis FN, Klaassen CD. Increase in hepatic metallothionein in rats treated with alkylating agents. Toxicol Appl Pharmacol 1979; 51: 19-27

Kramer KK, Liu J, Choudhuri S, Klaassen CD. Induction of metallothionein mRNA and protein in murine astrocyte cultures. Toxicol Appl Pharmacol 1996a; 136: 94-100

Kramer KK, Zoelle JT, Klaassen CD. Induction of metallothionein mRNA and protein in primary murine neuron cultures. Toxicol Appl Pharmacol. 1996b; 141: 1-7

Kuhlmann T, Lingfeld G, Bitsch A, Schuchardt J, Bruck W. Acute axonal damage in multiple sclerosis is most extensive in early disease stages and decreases over time. *Brain* 2002; 125: 2202-2212

Kumar V. Determinant spreading during experimental autoimmune encephalomyelitis: is it potentiating, protecting or participating in the disease? *Immunol Rev* 1998; 164: 73-80

Kurtzke JF. Epidemiology of multiple sclerosis. In: *Handbook of clinical neurology, revised series. Demyelinating diseases*. Vinken PJ, Bruyn GW, Klawans HL, eds. Elsevier, Amsterdam 1995: 259-287

Lafaille JJ, Keere FV, Hsu AL, Baron JL, Haas W, Raine CS, Tonegawa S. Myelin basic protein-specific T helper 2 (Th2) cells cause experimental autoimmune encephalomyelitis in immunodeficient hosts rather than protect them from the disease. *J Exp Med* 1997; 186: 307-312

Lassmann H. The pathology of multiple sclerosis and its evolution. *Philos Trans R Soc Lond B Biol Sci* 1999; 354: 1635-1640

Lassmann H, Bruck W, Lucchinetti C, Rodriguez M. Remyelination in multiple sclerosis. *Mult Scler* 1997; 3: 133-136

Lassmann H, Bruck W, Lucchinetti C. Heterogeneity of multiple sclerosis pathogenesis: implications for diagnosis and therapy. *Trends Mol Med* 2001; 7: 115-121

Lassmann H, Kitz K, Wisniewski HM. Structural variability of demyelinating lesions in different models of subacute and chronic experimental allergic encephalomyelitis. *Acta Neuropathol (Berl)* 1980; 51: 191-201

Lassmann H, Wisniewski HM. Chronic relapsing experimental allergic encephalomyelitis: clinicopathological comparison with multiple sclerosis. *Arch Neurol* 1979; 36: 490-497

Lazo JS, Kondo Y, Dellapiazza D, Michalska AE, Choo KH, Pitt BR. Enhanced sensibility to oxidative stress in cultured embryonic cells from transgenic mice deficient in metallothionein I and II genes. *J Biol Chem* 1995; 270: 5506-5510

Lazo JS, Kuo SM, Woo ES, Pitt BR. The protein thiol metallothionein as an antioxidant and protectant against antineoplastic drugs. *Chem Biol Interact* 1998; 111-112: 255-262

Lazo JS, Pitt BR. Metallothioneins and cell death by anticancer drugs. *Annu Rev Pharmacol Toxicol* 1995; 35: 635-653

Le J, Vilcek J. Tumor necrosis factor and interleukin 1: cytokines with multiple overlapping biological activities. *Lab Invest* 1987; 56: 234-248

Lee DK, Carrasco J, Hidalgo J, Andrews GK. Identification of a signal transducer and activator of transcription (STAT) binding site in the mouse metallothionein-I promoter involved in interleukin-6-induced gene expression. *Biochem J* 1999a; 337: 59-65

Lee JY, Kim JH, Palmiter RD, Koh JY. Zinc released from metallothionein-III may contribute to hippocampal CA1 and thalamic neuronal death following acute brain injury. *Exp Neurol* 2003; 184: 337-347

Lee MA, Palace J, Stabler G, Ford J, Gearing A, Miller K. Serum gelatinase B, TIMP-1 and TIMP-2 levels in multiple sclerosis. A longitudinal clinical and MRI study. *Brain* 1999b; 122: 191-197

Lehman-McKeeman LD, Andrews GK, Klaassen CD. Induction of hepatic metallothioneins determined at isoprotein and messenger RNA levels in glucocorticoid-treated rats. *Biochem J* 1988; 249: 429-433

Leibbrandt ME, Koropatnick J. Activation of human monocytes with lipopolysaccharide induces metallothionein expression and is diminished by zinc. *Toxicol Appl Pharmacol* 1994; 124: 72-81

Lenz DC, Wolf NA, Swantborg RH. Strain variation in autoimmunity: attempted tolerization of DA rats results in the induction of experimental autoimmune encephalomyelitis. *J Immunol* 1999; 163: 1763-1768

Levin LI, Munger KL, Rubertone MV, Peck CA, Lennette ET, Spiegelman D, Ascherio A. Multiple sclerosis and Epstein-Barr virus. *JAMA* 2003; 289: 1533-1536

Levings MK, Bacchetta R, Schulz U, Roncarolo MG. The role of IL-10 and TGF-beta in the differentiation and effector function of T regulatory cells. *Int Arch Allergy Immunol* 2002; 129: 263-276

Lewin GR, Barde YA. Physiology of the neurotrophins. *Annu Rev Neurosci* 1996; 19: 289-317

Liang L, Fu K, Lee DK, Sobieski RJ, Dalton T, Andrews GK. Activation of the complete mouse metallothionein gene locus in the maternal deciduum. *Mol Reprod Dev* 1996; 43: 25-37

Liblau RS, Fontaine B. Recent advances in immunology in multiple sclerosis. *Curr Opin Neurol* 1998; 11: 293-298

Ligers A, Xu C, Saarinen S, Hillert J, Olerup O. The CTLA-4 gene is associated with multiple sclerosis. *J Neuroimmunol* 1999; 97: 182-190

Lin RF, Lin TS, Tilton RG, Cross AH. Nitric oxide localized to spinal cords of mice with experimental allergic encephalomyelitis: an electron paramagnetic resonance study. *J Exp Med* 1993; 178: 643-648

Lindert RB, Haase CG, Brehm U, Linington C, Wekerle H, Hohlfeld R. Multiple sclerosis: B- and T-cell responses to the extracellular domain of the myelin oligodendrocyte glycoprotein. *Brain* 1999; 122: 2089-2100

Linington C, Lassmann H. Antibody responses in chronic relapsing experimental allergic encephalomyelitis: correlation of serum demyelinating activity with antibody titre to the myelin/oligodendrocyte glycoprotein (MOG). *J Neuroimmunol* 1987; 17: 61-69

Liu J, Liu YP, Sendelbach LE, Klassen CD. Endotoxin induction of hepatic metallothionein is mediated through cytokines. *Toxicol Appl Pharmacol* 1991; 109: 235-240

Liu X, Mashour GA, Webster HF, Kurtz A. Basic FGF and FGF receptor 1 are expressed in microglia during experimental autoimmune encephalomyelitis: temporally distinct expression of midkine and pleiotrophin. *Glia* 1998; 24: 390-397

Lock C, Hermans G, Pedotti R, Brendolan A, Schadt E, Garren H, Langer-Gould A, Strober S, Cannella B, Allard J, Klonowski P, Austin A, Lad N, Kaminski N, Galli SJ, Oksenberg JR, Raine CS, Heller R, Steinman L. Gene-microarray analysis of multiple sclerosis lesions yields new targets validated in autoimmune encephalomyelitis. *Nat Med* 2002; 8: 500-508

LoPachin RM, Lehning EJ. Mechanism of calcium entry during axon injury and degeneration. *Toxicol Appl Pharmacol* 1997; 143: 233-244

Lotan M, Schwartz M. Cross talk between the immune system and the nervous system in response to injury: implications for regeneration. *FASEB J* 1994; 8: 1026-1033

Lublin FD, Reingold SC. Defining the clinical course of multiple sclerosis: results of an international survey. National Multiple Sclerosis Society (USA) Advisory Committee on Clinical Trials of New Agents in Multiple Sclerosis. *Neurology* 1996; 46: 907-911

Lucchinetti C, Bruck W, Parisi J, Scheithauer B, Rodriguez M, Lassmann H. Heterogeneity of multiple sclerosis lesions: implications for the pathogenesis of demyelination. *Ann Neurol* 2000; 47: 707-717

Lucchinetti CF, Bruck W, Rodriguez M, Lassmann H. Distinct patterns of multiple sclerosis pathology indicates heterogeneity on pathogenesis. *Brain Pathol* 1996; 6: 259-274

Luheshi G, Gay J, Rothwell N. Circulating IL-6 is transported into the brain via a saturable transport mechanism in the rat. *Br J Pharmacol* 1994; 111: 146-150

Luheshi G, Rothwell N. Cytokines and fever. *Int Arch Allergy Immunol* 1996; 109: 301-307

Luster AD. Chemokines--chemotactic cytokines that mediate inflammation. *N Engl J Med* 1998; 338: 436-445

Luttkichen C, Wegenka UM, Yuan J, Buschmann J, Schindler C, Ziemiecki A, Harpur AG, Wilks AF, Yasukawa K, Taga T, et al. Association of transcription factor APRF and protein kinase Jak1 with the interleukin-6 signal transducer gp130. *Science* 1994; 263: 89-92

Maatta JA, Kaldman MS, Sakoda S, Salmi AA, Hinkkanen AE. Encephalitogenicity of myelin-associated oligodendrocytic basic protein and 2',3'-cyclic nucleotide 3'-phosphodiesterase for BALB/c and SJL mice. *Immunology* 1998; 95: 383-388

MacPhee IA, Antoni FA, Mason DW. Spontaneous recovery of rats from experimental allergic encephalomyelitis is dependent on regulation of the immune system by endogenous adrenal corticosteroids. *J Exp Med* 1989; 169: 431-445

Maeda A, Sobel RA. Matrix metalloproteinases in the normal human central nervous system, microglial nodules, and multiple sclerosis lesions. *J Neuropathol Exp Neurol* 1996; 55: 300-309

Martin R, Jaraquemada D, Flerlage M, Richert J, Whitaker J, Long EO, McFarlin DE, McFarland HF. Fine specificity and HLA restriction of myelin basic protein-specific cytotoxic T cell lines from multiple sclerosis patients and healthy individuals. *J Immunol* 1990; 145: 540-548

Martino G, Adorini L, Rieckmann P, Hillert J, Kallmann B, Comi G, Filippi M. Inflammation in multiple sclerosis: the good, the bad, and the complex. *Lancet Neurol* 2002; 1: 499-509

Mason D, MacPhee I, Antoni F. The role of the neuroendocrine system in determining genetic susceptibility to experimental allergic encephalomyelitis in the rat. *Immunology* 1990; 70: 1-5

Mason D. Genetic variation in the stress response: susceptibility to experimental allergic encephalomyelitis and implications for human inflammatory disease. *Immunol Today* 1991; 12: 57-60

Masterman T, Ligers A, Zhang Z, Hellgren D, Salter H, Anvret M, Hillert J. CTLA4 dimorphisms and the multiple sclerosis phenotype. *J Neuroimmunol* 2002; 131: 208-212

Masters BA, Kelly EJ, Quaife CJ, Brinster RL, Palmiter RD. Targeted disruption of metallothionein I and II genes increases sensitivity to cadmium. Proc Natl Acad Sci USA 1994a; 91: 584-588

Masters BA, Quaife CJ, Erickson JC, Kelly EJ, Froelick GJ, Zambrowicz BP, Brinster RL, Palmiter RD. Metallothionein III is expressed in neurons that sequester zinc in synaptic vesicles. J Neurosci 1994b; 14: 5844-5857

Mates JM. Effects of antioxidant enzymes in the molecular control of reactive oxygen species toxicology. Toxicology 2000; 153: 83-104. Review. Erratum in: Toxicology 2001; 163: 219

Matthews PM, De Stefano N, Narayanan S, Francis GS, Wolinsky JS, Antel JP, Arnold DL. Putting magnetic resonance spectroscopy studies in context: axonal damage and disability in multiple sclerosis. Semin Neurol 1998; 18: 327-336

Mauch E, Kornhuber HH, Krapf H, Fetzer U, Laufen H. Treatment of multiple sclerosis with mitoxantrone. Eur Arch Psychiatry Clin Neurosci 1992; 242: 96-102

Mauch E, Kornhuber HH, Pfrommer U, Hahnel A, Laufen H, Krapf H. Effective treatment of chronically progressive multiple sclerosis with low-dose cyclophosphamide with minor side-effects. Eur Arch Psychiatry Neurol Sci 1989; 238: 115-117

Mazzanti B, Vergelli M, Riccio P, Martin R, McFarland HF, Liuzzi GM, Amaducci L, Massacesi L. T-cell response to myelin basic protein and lipid-bound myelin basic protein in patients with multiple sclerosis and healthy donors. J Neuroimmunol. 1998; 82: 96-100

McKinnon RD, Matsui T, Dubois-Dalcq M, Aaronson SA. FGF modulates the PDGF-driven pathway of oligodendrocyte development. Neuron 1990; 5: 603-614

McMorris FA, Mozell RL, Carson MJ, Shinar Y, Meyer RD, Marchetti N. Regulation of oligodendrocyte development and central nervous system myelination by insulin-like growth factors. Ann NY Acad Sci 1993; 692: 321-334. Review

Mead RJ, Singhrao SK, Neal JW, Lassmann H, Morgan BP. The membrane attack complex of complement causes severe demyelination associated with acute axonal injury. J Immunol 2002; 168: 458-465

Mena E, Rohowsky-Kochan C. Expression of costimulatory molecules on peripheral blood mononuclear cells in multiple sclerosis. Acta Neurol Scand 1999; 100: 92-96

Menard MP, McCormick CC, Cousins RJ. Regulation of intestinal metallothionein biosynthesis in rats by dietary zinc. J Nutr 1981; 111: 1353-1361

Mendel I, Katz A, Kozak N, Ben-Nun A, Revel M. Interleukin-6 functions in autoimmune encephalomyelitis: a study in gene-targeted mice. Eur J Immunol 1998; 28: 1727-1737

Mendel I, Kerlero de Rosbo N, Ben-Nun A. A myelin oligodendrocyte glycoprotein peptide induces typical chronic experimental autoimmune encephalomyelitis in H-2b mice: fine specificity and T cell receptor V beta expression of encephalitogenic T cells. Eur J Immunol 1995; 25: 1951-1959

Merrill JE. Proinflammatory and antiinflammatory cytokines in multiple sclerosis and central nervous system acquired immunodeficiency syndrome. J Immunother 1992; 12: 167-170

Merrill JE, Benveniste EN. Cytokines in inflammatory brain lesions: helpful and harmful. Trends Neurosci 1996; 19: 331-338

Miljkovic Dj, Drulovic J, Trajkovic V, Mesaros S, Dujmovic I, Maksimovic D, Samardzic T, Stojasavljevic N, Levic Z, Mostarica Stojkovic M. Nitric oxide metabolites and interleukin-6 in cerebrospinal fluid from multiple sclerosis patients. *Eur J Neurol* 2002; 9: 413-418

Miller A, Shapiro S, Gershtein R, Kinarty A, Rawashdeh H, Honigman S, Lahat N. Treatment of multiple sclerosis with copolymer-1 (Copaxone): implicating mechanisms of Th1 to Th2/Th3 immune-deviation. *J Neuroimmunol* 1998; 92: 113-121

Miller DH, Khan OA, Sheremata WA, Blumhardt LD, Rice GP, Libonati MA, Willmer-Hulme AJ, Dalton CM, Miszkiel KA, O'Connor PW; International Natalizumab Multiple Sclerosis Trial Group. A controlled trial of natalizumab for relapsing multiple sclerosis. *N Engl J Med*. 2003; 348: 15-23

Miller DJ, Sanborn KS, Katzmeh JA, Rodriguez M. Monoclonal autoantibodies promote central nervous system repair in an animal model of multiple sclerosis. *J Neurosci* 1994; 14: 6230-6238

Miller DM, Weinstock-Guttman B, Bethoux F, Lee JC, Beck G, Block V, Durelli L, LaMantia L, Barnes D, Sellebjerg F, Rudick RA. A meta-analysis of methylprednisolone in recovery from multiple sclerosis exacerbations. *Mult Scler*. 2000; 6: 267-273

Minami M, Inoue M, Wei S, Takeda K, Matsumoto M, Kishimoto T, Akira S. STAT3 activation is a critical step in gp130-mediated terminal differentiation and growth arrest of a myeloid cell line. *Proc Natl Acad Sci U S A*. 1996; 93: 3963-3966

Mokhtarian F, McFarlin DE, Raine CS. Adoptive transfer of myelin basic-protein-sensitized T-cell produces chronic relapsing demyelinating disease in mice. *Nature* 1984; 309: 356-358

Molinero A, Carrasco J, Hernandez J, Hidalgo J. Effect of nitric oxide synthesis inhibition on mouse liver and brain metallothionein expression. *Neurochem Int* 1998; 33: 559-566

Monteyne P, Bureau JF, Brahic M. Viruses and multiple sclerosis. *Curr Opin Neurol* 1998; 11: 287-291

Montoliu C, Monfort P, Carrasco J, Palacios O, Capdevila M, Hidalgo J, Felipo V. Metallothionein-III prevents glutamate and nitric oxide neurotoxicity in primary cultures of cerebellar neurons. *J Neurochem*; 75: 266-273

Morale C, Brouwer J, Testa N, Tirolo C, Barden N, Dijkstra CD, Amor S, Marchetti B. Stress, glucocorticoids and the susceptibility to develop autoimmune disorders of the central nervous system. *Neurol Sci* 2001; 22: 159-162

Morris S, Huang PC. Transient response of amplified metallothionein genes in CHO cells to induction by alpha interferon. *Mol Cell Biol* 1987; 7: 600-605

Morris-Downes MM, McCormack K, Baker D, Sivaprasad D, Natkunarajah J, Amor S. Encephalitogenic and immunogenic potential of myelin-associated glycoprotein (MAG), oligodendrocyte-specific glycoprotein (OSP) and 2',3'-cyclic nucleotide 3'-phosphodiesterase (CNPase) in ABH and SJL mice. *J Neuroimmunol* 2002; 122:20-33

Mumford CJ, Wood NW, Kellar-Wood HF, Thorpe J, Miller D, Compston DAS. The British Isles survey of multiple sclerosis in twins. *Neurology* 1994; 44: 11-15

Munger KL, Peeling RW, Hernan MA, Chasan-Taber L, Olek MJ, Hankinson SE, Hunter D, Ascherio A. Infection with Chlamydia pneumoniae and risk of multiple sclerosis. *Epidemiology* 2003; 14: 141-147

Munger KL, Zhang SM, O'Reilly E, Hernan MA, Olek MJ, Willett WC, Ascherio A. Vitamin D intake and incidence of multiple sclerosis. *Neurology* 2004; 62: 60-65

Murphy A, Long A, Volkov Y, Kelleher D. Cross-linking of LFA-1 induces secretion of macrophage inflammatory protein (MIP)-1alpha and MIP-1beta with consequent directed migration of activated lymphocytes. *Eur J Immunol* 2000; 30: 3006-3011

Murray PD, McGavern DB, Sathornsumetee S, Rodriguez M. Spontaneous remyelination following extensive demyelination is associated with improved neurological function in a viral model of multiple sclerosis. *Brain* 2001; 124: 1403-1416

Myhr KM, Raknes G, Nyland H, Vedeler C. Immunoglobulin G Fc-receptor (Fc γ R) IIA and IIIB polymorphisms related to disability in MS. *Neurology* 1999; 52: 1771-1776

Nagata S, Golstein P. The Fas death factor. *Science* 1995; 267: 1449-1456

Nebes VL, DeFranco D, Morris SM Jr. Cyclic AMP induces metallothionein gene expression in rat hepatocytes but not in rat kidney. *Biochem J* 1988; 255: 741-743

Neuhaus O, Strasser-Fuchs S, Fazekas F, Kieseier BC, Niederwieser G, Hartung HP, Archelos JJ. Statins as immunomodulators: comparison with interferon-beta 1b in MS. *Neurology* 2002; 59: 990-997

Neumann H, Medana IM, Bauer J, Lassmann H. Cytotoxic T lymphocytes in autoimmune and degenerative CNS diseases. *Trends Neurosci* 2002; 25: 313-319

Neumann H, Schmidt H, Cavalie A, Jenne D, Wekerle H. Major histocompatibility complex (MHC) class I gene expression in single neurons of the central nervous system: differential regulation by interferon (IFN)-gamma and tumor necrosis factor (TNF)-alpha. *J Exp Med* 1997; 185: 305-316

Neumann H, Wekerle H. Neuronal control of the immune response in the central nervous system: linking brain immunity to neurodegeneration. *J Neuropathol Exp Neurol* 1998; 57: 1-9

Norris JG, Tang LP, Sparacio SM, Benveniste EN. Signal transduction pathways mediating astrocyte IL-6 induction by IL-1 beta and tumor necrosis factor-alpha. *J Immunol* 1994; 152: 841-850

Okuda Y, Sakoda S, Bernard CC, Fujimura H, Saeki Y, Kishimoto T, Yanagihara T. IL-6-deficient mice are resistant to the induction of experimental autoimmune encephalomyelitis provoked by myelin oligodendrocyte glycoprotein. *Int Immunol* 1998; 10: 703-708

Okuda Y, Sakoda S, Fujimura H, Saeki Y, Kishimoto T, Yanagihara T. IL-6 plays a crucial role in the induction phase of myelin oligodendrocyte glucoprotein 35-55 induced experimental autoimmune encephalomyelitis. *J Neuroimmunol* 1999; 101: 188-196

Olsson T. Cytokine-producing cells in experimental autoimmune encephalomyelitis and multiple sclerosis. *Neurology* 1995; 45: S11-5

Owens T, Wekerle H, Antel J. Genetic models for CNS inflammation. *Nat Med* 2001; 7: 161-166

Palmiter RD. Molecular biology of metallothionein gene expression. *Experientia Suppl* 1987; 52: 63-80

Palmiter RD, Findley SD, Whitmore TE, Durnam DM. MT-III, a brain-specific member of the metallothionein gene family. *Proc Natl Acad Sci USA* 1992; 89: 6333-6337

Paterson PY. Experimental autoimmune (allergic) encephalomyelitis: Induction, pathogenesis, and suppression. In: *Testbook of immunopathology*. Miescher PA, Muller-Eberhard HJ, eds. Gruene and Stratton, New York 1976; 1: 179

Paterson PY. Transfer of experimental allergic encephalomyelitis in rats by means of lymph node cells. *J Exp Med* 1960; 111: 119-129

Pender MP, Nguyen KB, McCombe PA, Kerr JF. Apoptosis in the nervous system in experimental allergic encephalomyelitis. *J Neurol Sci* 1991; 104: 81-87

Pender MP. Demyelination and neurological signs in experimental allergic encephalomyelitis. *J Neuroimmunol* 1987; 15: 11-24

Pender MP. Experimental autoimmune encephalomyelitis. In: *Autoimmune neurological disease*, Pender MP, McCombe PA, eds. Cambridge University Press, New York 1995: 26-88

Pender MP. Genetically determined failure of activation-induced apoptosis of autoreactive T cells as a cause of multiple sclerosis. *Lancet* 1998; 351: 978-981

Penkowa M, Carrasco J, Giralt M, Molinero A, Hernandez J, Campbell IL, Hidalgo J. Altered central nervous system cytokine-growth factor expression profiles and angiogenesis in metallothionein-I+II deficient mice. *J Cereb Blood Flow Metab* 2000; 20: 1174-1189

Penkowa M, Carrasco J, Giralt M, Moos T, Hidalgo J. CNS wound healing is severely depressed in metallothionein I- and II-deficient mice. *J Neurosci* 1999a; 19: 2535-2545

Penkowa M, Giralt M, Moos T, Thomsen PS, Hernandez J, Hidalgo J. Impaired inflammatory response to glial cell death in genetically metallothionein-I- and -II-deficient mice. *Exp Neurol* 1999b; 156: 149-164

Penkowa M, Hidalgo J. Metallothionein I+II expression and their role in experimental autoimmune encephalomyelitis. *Glia* 2000; 32: 247-263

Penkowa M, Hidalgo J. Metallothionein treatment reduces proinflammatory cytokines IL-6 and TNF-alpha and apoptotic cell death during experimental autoimmune encephalomyelitis (EAE). *Exp Neurol* 2001; 170: 1-14

Pestka S, Langer JA, Zoon KC, Samuel CE. Interferons and their actions. *Annu Rev Biochem* 1987; 56: 727-777

Petering DH, Fowler BA. Roles of metallothionein and related proteins in metal metabolism and toxicity: problems and perspectives. *Environ Health Perspect* 1986; 65: 217-224

Peterson JW, Bo L, Mork S, Chang A, Trapp BD. Transected neurites, apoptotic neurons, and reduced inflammation in cortical multiple sclerosis lesions. *Ann Neurol* 2001; 50: 389-400

Pettinelli CB, McFarlin DE. Adoptive transfer of experimental allergic encephalomyelitis in SJL/J mice after in vitro activation of lymph node cells by myelin basic protein: Requirement of Lyt 1⁺, 2⁻T lymphocytes. *J Immunol* 1981; 127: 1420-1423

Plata-Salaman CR. Immunoregulators in the nervous system. *Neurosci Biobehav Rev* 1991; 15: 185-215

Pluchino S, Quattrini A, Brambilla E, Gritti A, Salani G, Dina G, Galli R, Del Carro U, Amadio S, Bergami A, Furlan R, Comi G, Vescovi AL, Martino G. Injection of adult neurospheres induces recovery in a chronic model of multiple sclerosis. *Nature* 2003; 422: 688-694

Polman CH, Dijkstra CD, Sminia T, Koetsier JC. Immunohistological analysis of macrophages in the central nervous system of Lewis rats with experimental allergic encephalomyelitis. *J Neuroimmunol* 1986; 11: 215-222

Polman CH, Matthaei I, De Groot CJA, Koetsier JC, Sminia T, Dijkstra CD. Low-dose cyclosporine A induces relapsing remitting experimental allergic encephalomyelitis in Lewis rat. *J Neuroimmunol* 1988; 17: 209-216

Pozza M, Bettelli C, Aloe L, Giardino L, Calza L. Further evidence for a role of nitric oxide in experimental allergic encephalomyelitis: aminoguanidine treatment modifies its clinical evolution. *Brain Res* 2000; 855: 39-46

PRIMS (Prevention of relapses and disability by interferon beta-1a for relapsing multiple sclerosis) study group. PRIMS-4: Long-term efficacy of interferon- β -1a in relapsing MS. *Neurology* 2001; 56: 1628-1636

Prineas JW, Barnard RO, Revesz T, Kwon EE, Sharer L, Cho ES. Multiple sclerosis. Pathology of recurrent lesions. *Brain* 1993; 116: 681-693

Probert L, Eugster HP, Akassoglou K, Bauer J, Frei K, Lassmann H, Fontana A. TNFR1 signalling is critical for the development of demyelination and the limitation of T-cell responses during immune-mediated CNS disease. *Brain* 2000; 123: 2005-2019

Quaife CJ, Findley SD, Erickson JC, Froelick GJ, Kelly EJ, Zambrowicz BP, Palmiter RD. Induction of a new metallothionein isoform (MT-IV) occurs during differentiation of stratified squamous epithelia. *Biochemistry* 1994; 33: 7250-7259

Racke MK, Dhib-Jalbut S, Cannella B, Albert PS, Raine CS, McFarlin DE. Prevention and treatment of chronic relapsing experimental allergic encephalomyelitis by transforming growth factor-beta 1. *J Immunol* 1991; 146: 3012-3017

Radi R, Beckman JS, Bush KM, Freeman BA. Peroxynitrite-induced membrane lipid peroxidation: the cytotoxic potential of superoxide and nitric oxide. *Arch Biochem Biophys* 1991; 288: 481-487

Radtke F, Heuchel R, Georgiev O, Hergersberg M, Gariglio M, Dembic Z, Schaffner W. Cloned transcription factor MTF-1 activates the mouse metallothionein I promoter. *EMBO J* 1993; 12: 1355-1362

Raff MC, Lillien LE, Richardson WD, Burne JF, Noble MD. Platelet-derived growth factor from astrocytes drives the clock that times oligodendrocyte development in culture. *Nature* 1988; 333: 562-565

Raine CS, Cannella B, Hauser SL, Genain CP. Demyelination in primate autoimmune encephalomyelitis and acute multiple sclerosis lesions: a case for antigen-specific antibody mediation. *Ann Neurol* 1999; 46: 144-160

Raine CS, Cross AH. Axonal dystrophy as a consequence of long-term demyelination. *Lab Invest* 1989; 60: 714-725

Raine CS, Mokhtarian F, McFarlin DE. Adoptively transferred chronic relapsing experimental autoimmune encephalomyelitis in the mouse. *Neuropathologic analysis*. *Lab Invest* 1984; 51: 534-546

Raine CS. Experimental allergic encephalomyelitis and experimental allergic neuritis. In: *Handbook of clinical neurology. Demyelinating diseases*. Vinken PJ, Bruyn GW, Klawans HL, eds. Elsevier Science. Amsterdam, 1985; 3: 429

Raine CS. Multiple sclerosis and chronic relapsing EAE: comparative ultrastructural neuropathology. In: *Multiple sclerosis; pathology, diagnosis and management*. Hallpike JF, Adams CWM, Tourtelotte WW eds. Chapman and Hall, London 1983: 413

Raine CS. The Dale E. McFarlin Memorial Lecture: the immunology of the multiple sclerosis lesion. Ann Neurol 1994; 36: S61-72

Rajan AJ, Klein JD, Brosnan CF. The effect of gammadelta T cell depletion on cytokine gene expression in experimental allergic encephalomyelitis. J Immunol 1998; 160: 5955-5962

Ransohoff RM. Mechanisms of inflammation in MS tissue: adhesion molecules and chemokines. J Neuroimmunol 1999; 98: 57-68

Rasmussen HB, Perron H, Clausen J. Do endogenous retroviruses have etiological implications in inflammatory and degenerative nervous system diseases? Acta Neurol Scand 1993; 88: 190-198

Reindl M, Linington C, Brehm U, Egg R, Dilitz E, Deisenhammer F, Poewe W, Berger T. Antibodies against the myelin oligodendrocyte glycoprotein and the myelin basic protein in multiple sclerosis and other neurological diseases: a comparative study. Brain 1999; 122: 2047-2056

Richards MP, Cousins RJ. Isolation of an intestinal metallothionein induced by parenteral zinc. Biochem Biophys Res Commun 1977; 75: 286-294

Richards RI, Heguy A, Karin M. Structural and functional analysis of the human metallothionein-IA gene: differential induction by metal ions and glucocorticoids. Cell. 1984; 37: 263-272

Rieckmann P, Altenhofen B, Riegel A, Baudewig J, Felgenhauer K. Soluble adhesion molecules (sVCAM-1 and sICAM-1) in cerebrospinal fluid and serum correlate with MRI activity in multiple sclerosis. Ann Neurol 1997; 41: 326-333

Rieckmann P, Altenhofen B, Riegel A, Kallmann B, Felgenhauer K. Correlation of soluble adhesion molecules in blood and cerebrospinal fluid with magnetic resonance imaging activity in patients with multiple sclerosis. Mult Scler 1998; 4: 178-182

Rink L, Kirchner H. Recent progress in the tumor necrosis factor-alpha field. Int Arch Allergy Immunol 1996; 111: 199-209

Risch N. Corrections to "Linkage strategies for genetically complex traits. III. The effect of marker polymorphism on analysis of affected relative pairs". Am J Hum Genet 1992; 51: 673-675

Rivera-Quinones C, McGavern D, Schmelzer JD, Hunter SF, Low PA, Rodriguez M. Absence of neurological deficits following extensive demyelination in a class I-deficient murine model of multiple sclerosis. Nat Med 1998; 4: 187-193

Rivers TM, Schwentker FF. Encephalomyelitis accompanied by myelin destruction experimentally produced in monkeys. J Exp Med 1935; 61: 698-703

Rivers TM, Sprunt DH, Berry GP. Observations on attempts to produce acute disseminated encephalomyelitis in monkeys. J Exp Med 1933; 58: 39-53

Romero LI, Schettini G, Lechan RM, Dinarello CA, Reichlin S. Bacterial lipopolysaccharide induction of IL-6 in rat telencephalic cells is mediated in part by IL-1. Neuroendocrinology 1993; 57: 892-897

Roth MP, Viratelle C, Dolbois L, Delverdier M, Borot N, Pelletier L, Druet P, Clanet M, Coppin H. A genome-wide search identifies two susceptibility loci for experimental autoimmune encephalomyelitis on rat chromosomes 4 and 10. J Immunol 1999; 162: 1917-1922

Ruffini F, Furlan R, Poliani PL, Brambilla E, Marconi PC, Bergami A, Desina G, Glorioso JC, Comi G, Martino G. Fibroblast growth factor-II gene therapy reverts the clinical course and the pathological signs of chronic experimental autoimmune encephalomyelitis in C57BL/6 mice. *Gene Ther* 2001; 8: 1207-1213

Ruuls SR, Bauer J, Sontrop K, Huitinga I, 't Hart BA, Dijkstra CD. Reactive oxygen species are involved in the pathogenesis of experimental allergic encephalomyelitis in Lewis rats. *J Neuroimmunol* 1995; 56: 207-217

Sabelko-Downes KA, Russell JH, Cross AH. Role of Fas--FasL interactions in the pathogenesis and regulation of autoimmune demyelinating disease. *J Neuroimmunol* 1999; 100: 42-52

Sadatipour BT, Greer JM, Pender MP. Increased circulating antiganglioside antibodies in primary and secondary progressive multiple sclerosis. *Ann Neurol* 1998; 44: 980-983

Sadovnick AD, Armstrong H, Rice GP, Bulman D, Hashimoto L, Paty DW, Hashimoto SA, Warren S, Hader W, Murray TJ, et al. A population-based study of multiple sclerosis in twins: update. *Ann Neurol* 1993; 33: 281-285

Sadovnick AD, Dyment D, Ebers GC. Genetic epidemiology of multiple sclerosis. *Epidemiol Rev* 1997; 19: 99-106

Sadovnick AD, Ebers GC, Dyment DA, Risch NJ. Evidence for genetic basis of multiple sclerosis. The Canadian Collaborative Study Group. *Lancet* 1996; 347: 1728-1730

Sadovnick AD. Familial recurrence risks and inheritance of multiple sclerosis. *Curr Opin Neurol Neurosurg* 1993; 6: 189-194

Samoilova EB, Horton JL, Chen Y. Acceleration of experimental autoimmune encephalomyelitis in interleukin-10-deficient mice: roles of interleukin-10 in disease progression and recovery. *Cell Immunol* 1998a; 188: 118-124

Samoilova EB, Horton JL, Hilliard B, Liu TS, Chen Y. IL-6-deficient mice are resistant to experimental autoimmune encephalomyelitis: roles of IL-6 in the activation and differentiation of autoreactive T cells. *J Immunol* 1998b; 161: 6480-6486

Samson SL, Gedamu L. Molecular analyses of metallothionein gene regulation. *Prog Nucleic Acid Res Mol Biol* 1998; 59: 257-288

Samson SL, Paramchuk WJ, Gedamu L. The rainbow trout metallothionein-B gene promoter: contributions of distal promoter elements to metal and oxidant regulation. *Biochim Biophys Acta* 2001; 1517: 202-211

Santambrogio L, Hochwald GM, Saxena B, Leu CH, Martz JE, Carlino JA, Ruddell NH, Palladino MA, Gold LI, Thorbecke GJ. Studies on the mechanisms by which transforming growth factor-beta (TGF-beta) protects against allergic encephalomyelitis. Antagonism between TGF-beta and tumor necrosis factor. *J Immunol* 1993; 151: 1116-11127

Sato M, Sasaki M, Hojo H. Antioxidative roles of metallothionein and manganese superoxide dismutase induced by tumor necrosis factor-alpha and interleukin-6. *Arch Biochem Biophys* 1995; 316: 738-744

Sato M, Sasaki M, Hojo H. Tissue specific induction of metallothionein synthesis by tumor necrosis factor-alpha. *Res Commun Chem Pathol Pharmacol* 1992; 75: 159-172

Sato M, Yamaki J, Hamaya M, Hojo H. Synergistic induction of metallothionein synthesis by interleukin-6, dexamethasone and zinc in the rat. *Int J Immunopharmacol* 1996; 18: 167-172

Sawada J, Kikuchi Y, Shibusawa M, Mitsumori K, Inoue K, Kasahara T. Induction of metallothionein in astrocytes by cytokines and heavy metals. *Biol Signals* 1994; 3: 157-168

Sawcer S, Jones HB, Feakes R, Gray J, Smaldon N, Chataway J, Robertson N, Clayton D, Goodfellow PN, Compston A. A genome screen in multiple sclerosis reveals susceptibility loci on chromosome 6p21 and 17q22. *Nat Genet* 1996; 13: 464-468

Sayer FT, Oudega M, Hagg T. Neurotrophins reduce degeneration of injured ascending sensory and corticospinal motor axons in adult rat spinal cord. *Exp Neurol* 2002; 175: 282-296

Schluesener HJ, Sobel RA, Linington C, Weiner HL. A monoclonal antibody against a myelin oligodendrocyte glycoprotein induces relapses and demyelination in central nervous system autoimmune disease. *J Immunol* 1987; 139: 4016-4021

Schmidt S. Candidate autoantigens in multiple sclerosis. *Mult Scler* 1999; 5: 147-160

Schmied M, Breitschopf H, Gold R, Zischler H, Rothe G, Wekerle H, Lassmann H. Apoptosis of T lymphocytes in experimental autoimmune encephalomyelitis. Evidence for programmed cell death as a mechanism to control inflammation in the brain. *Am J Pathol* 1993; 143: 446-452

Scholz C, Patton KT, Anderson DE, Freeman GJ, Hafler DA. Expansion of autoreactive T cells in multiple sclerosis is independent of exogenous B7 costimulation. *J Immunol* 1998; 160: 1532-1538

Schrijver HM, Crusius JB, Uitdehaag BM, Garcia Gonzalez MA, Kostense PJ, Polman CH, Pena AS. Association of interleukin-1beta and interleukin-1 receptor antagonist genes with disease severity in MS. *Neurology* 1999; 52: 595-599

Schroeder JJ, Cousins RJ. Interleukin 6 regulates metallothionein gene expression and zinc metabolism in hepatocyte monolayer cultures. *Proc Natl Acad Sci U S A* 1990; 87: 3137-3141

Schwarz MA, Lazo JS, Yalowich JL, Allen WP, Whitmore M, Bergonia HA, Tzeng E, Billiar TR, Robbins PD, Lancaster JR, Pitt BR. Metallothionein protects against cytotoxic and DNA-damaging effect of NO. *Proc Natl Acad Sci USA* 1995; 92: 44452-44456

Sciavolino PJ, Vilcek J. Regulation of metallothionein gene expression by TNF-alpha and IFN-beta in human fibroblasts. *Cytokine* 1995; 7: 242-250

Sheline CT, Choi EH, Kim-Han JS, Dugan LL, Choi DW. Cofactors of mitochondrial enzymes attenuate copper-induced death in vitro and in vivo. *Ann Neurol* 2002; 52: 195-204

Shiraga H, Pfeiffer RF, Ebadi M. The effects of 6-hydroxydopamine and oxidative stress on the level of brain metallothionein. *Neurochem Int* 1993; 23: 561-566

Scott GS, Kean RB, Southan GJ, Szabo C, Hooper DC. Effect of mercaptoethylguanidine scavengers of peroxynitrite on the development of experimental allergic encephalomyelitis in PLSJL mice. *Neurosci Lett* 2001; 311: 125-128

Scott GS, Spitsin SV, Kean RB, Mikheeva T, Koprowski H, Hooper DC. Therapeutic intervention in experimental allergic encephalomyelitis by administration of uric acid precursors. *Proc Natl Acad Sci U S A* 2002; 99: 16303-16308

Scott GS, Virag L, Szabo C, Hooper DC. Peroxynitrite-induced oligodendrocyte toxicity is not dependent on poly(ADP-ribose) polymerase activation. *Glia* 2003; 41: 105-116

Searle PF, Davison BL, Stuart GW, Wilkie TM, Norstedt G, Palmiter RD. Regulation, linkage, and sequence of mouse metallothionein I and II genes. *Mol Cell Biol* 1984; 4: 1221-1230

Secondary Progressive Efficacy Clinical Trial of Recombinant Interferon-beta-1a in MS (**SPECTRIMS**) Study group. Randomized controlled trial of interferon- beta-1a in secondary progressive MS: Clinical results. *Neurology* 2001; 56: 1496-1504

Segal BM, Cross AH. Fas(t) track to apoptosis in MS: TNF receptors may suppress or potentiate CNS demyelination. *Neurology* 2000; 55: 906-907

Sellebjerg F, Christiansen M, Garred P. MBP, anti-MBP and anti-PLP antibodies, and intrathecal complement activation in multiple sclerosis. *Mult Scler* 1998; 4: 127-131

Serkkola E, Hurme M. Synergism between protein-kinase C and cAMP-dependent pathways in the expression of the interleukin-1 beta gene is mediated via the activator-protein-1 (AP-1) enhancer activity. *Eur J Biochem* 1993; 213: 243-249

Sewell AK, Jensen LT, Erickson JC, Palmiter RD, Winge DR. Bioactivity of metallothionein-3 correlates with its novel beta domain sequence rather than metal binding properties. *Biochemistry* 1995; 34: 4740-4747

Sharief MK, Douglas M, Noori M, Semra YK. The expression of pro- and anti-apoptosis Bcl-2 family proteins in lymphocytes from patients with multiple sclerosis. *J Neuroimmunol* 2002a; 125: 155-162

Sharief MK, Matthews H, Noori MA. Expression ratios of the Bcl-2 family proteins and disease activity in multiple sclerosis. *J Neuroimmunol* 2003; 134: 158-165

Sharief MK, Matthews H, Noori MA. Expression ratios of the Bcl-2 family proteins and disease activity in multiple sclerosis. *J Neuroimmunol* 2003; 134: 158-165

Sharief MK, Noori MA, Douglas MR, Semra YK. Upregulated survivin expression in activated T lymphocytes correlates with disease activity in multiple sclerosis. *Eur J Neurol* 2002b; 9: 503-510

Shiraga H, Pfeiffer RF, Ebadi M. The effects of 6-hydroxydopamine and oxidative stress on the level of brain metallothionein. *Neurochem Int* 1993; 23: 561-566

Sicotte NL, Liva SM, Klutch R, Pfeiffer P, Bouvier S, Odesa S, Wu TC, Voskuhl RR. Treatment of multiple sclerosis with the pregnancy hormone estriol. *Ann Neurol* 2002; 52: 421-428

Simmons RD, Bernard CC, Singer G, Carnegie PR. Experimental autoimmune encephalomyelitis. An anatomically-based explanation of clinical progression in rodents. *J Neuroimmunol* 1982; 3: 307-318

Slater EP, Cato AC, Karin M, Baxter JD, Beato M. Progesterone induction of metallothionein-IIA gene expression. *Mol Endocrinol* 1988; 2: 485-491

Slater TF. Free-radical mechanisms in tissue injury. *Biochem J* 1984; 222: 1-15

Smith EJ, Blakemore WF, McDonald WI. Central remyelination restores secure conduction. *Nature* 1979; 280: 395-396

Smith KJ, Kapoor R, Felts PA. Demyelination: the role of reactive oxygen and nitrogen species. *Brain Pathol* 1999; 9: 69-92

Smith KJ, Kapoor R, Hall SM, Davies M. Electrically active axons degenerate when exposed to nitric oxide. *Ann Neurol* 2001; 49: 470-476

Smith KJ, Lassmann H. The role of nitric oxide in multiple sclerosis. Lancet Neurol 2002; 1: 232-241

Soderstrom M. Multiple sclerosis: rationale for early treatment. Neurol Sci 2003; 24: S298-300

Sorensen TL, Tani M, Jensen J, Pierce V, Lucchinetti C, Folcik VA, Qin S, Rottman J, Sellebjerg F, Strieter RM, Frederiksen JL, Ransohoff RM. Expression of specific chemokines and chemokine receptors in the central nervous system of multiple sclerosis patients. J Clin Invest 1999; 103: 807-815

Spitsin S, Hooper DC, Leist T, Streletz LJ, Mikheeva T, Koprowski H. Inactivation of peroxynitrite in multiple sclerosis patients after oral administration of inosine may suggest possible approaches to therapy of the disease. Mult Scler 2001; 7: 313-319

Springer TA. Traffic signals for lymphocyte recirculation and leukocyte emigration: the multistep paradigm. Cell 1994; 76: 301-314

Stahl N, Boulton TG, Farruggella T, Ip NY, Davis S, Witthuhn BA, Quelle FW, Silvennoinen O, Barbieri G, Pellegrini S, et al. Association and activation of Jak-Tyk kinases by CNTF-LIF-OSM-IL-6 beta receptor components. Science 1994; 263: 92-95

Stanislaus R, Singh AK, Singh I. Lovastatin treatment decreases mononuclear cell infiltration into the CNS of Lewis rats with experimental allergic encephalomyelitis. J Neurosci Res 2001; 66: 155-162

Steinman L. Multiple sclerosis: a coordinated immunological attack against myelin in the central nervous system. Cell 1996; 85: 299-302

Stepaniak JA, Wolf NA, Sun D, Swantborg RH. Interstrain variability of autoimmune encephalomyelitis in rats: multiple encephalitogenic myelin basic protein epitopes for DA rats. J Neuroimmunol 1997; 78: 79-85

Sternberg EM, Hill JM, Chrousos GP, Kamilaris T, Listwak SJ, Gold PW, Wilder RL. Inflammatory mediator-induced hypothalamic-pituitary-adrenal axis activation is defective in streptococcal cell wall arthritis-susceptible Lewis rats. Proc Natl Acad Sci USA 1989; 86: 2374-2378

Sternberg EM, Wilder RL, Gold PW, Chrousos GP. A defect in the central component of the immune system-hypothalamic-pituitary-adrenal axis feedback loop is associated with susceptibility to experimental arthritis and other inflammatory diseases. Ann NY Acad Sci 1990; 594: 289-292

Stevens DB, Chen K, Seitz RS, Sercarz EE, Bronstein JM. Oligodendrocyte-specific protein peptides induce experimental autoimmune encephalomyelitis in SJL/J mice. J Immunol 1999; 162: 7501-7509

Stinissen P, Raus J, Zhang J. Autoimmune pathogenesis of multiple sclerosis: role of autoreactive T lymphocytes and new immunotherapeutic strategies. Crit Rev Immunol 1997; 17: 33-75. Review

Storch M, Lassmann H. Pathology and pathogenesis of demyelinating diseases. Curr Opin Neurol 1997; 10: 186-192. Review

Storch MK, Piddesden S, Haltia M, Ilvanainen M, Morgan P, Lassmann H. Multiple sclerosis: in situ evidence for antibody- and complement-mediated demyelination. Ann Neurol 1998; 43: 465-471

Suckling AJ, Pathak S, Jagelman S, Webb HE. Virus-associated demyelination. A model using avirulent Semliki Forest virus infection of mice. *J Neurol Sci* 1978; 39: 147-154

Sun AY, Chen YM. Oxidative stress and neurodegenerative disorders. *J Biomed Sci* 1998; 5: 401-414

Sun D, Whitaker JN, Huang Z, Liu D, Colecloough C, Wekerle H, Raine CS. Myelin antigen-specific CD8+ T cells are encephalitogenic and produce severe disease in C57BL/6 mice. *J Immunol* 2001; 166: 7579-7587

Syburra C, Passi S. Oxidative stress in patients with multiple sclerosis. *Ukr Biokhim Zh* 1999; 71: 112-115

Takahashi K, Aranami T, Endoh M, Miyake S, Yamamura T. The regulatory role of natural killer cells in multiple sclerosis. *Brain* 2004; 127: 1917-1927

Takahashi K, Miyake S, Kondo T, Terao K, Hatakenaka M, Hashimoto S, Yamamura T. Natural killer type 2 bias in remission of multiple sclerosis. *J Clin Invest* 2001; 107: 23-29

Tamai KT, Gralla EB, Ellerby LM, Valentine JS, Thiele DJ. Yeast and mammalian metallothioneins functionally substitute for yeast copper-zinc superoxide dismutase. *Proc Natl Acad Sci U S A* 1993; 90: 8013-8017

Tamatani M, Ogawa S, Niitsu Y, Tohyama M. Involvement of Bcl-2 family and caspase-3-like protease in NO-mediated neuronal apoptosis. *J Neurochem* 1998; 71: 1588-1596

Tanuma N, Shin T, Kogure K, Matsumoto Y. Differential role of TNF-alpha and IFN-gamma in the brain of rats with chronic relapsing autoimmune encephalomyelitis. *J Neuroimmunol* 1999; 96: 73-79

Thomas JP, Bachowski GJ, Girotti AW. Inhibition of cell membrane lipid peroxidation by cadmium- and zinc-m metallothioneins. *Biochim Biophys Acta* 1986; 884: 448-461

Thoua NM, van Noort JM, Baker D, Bose A, van Sechel AC, van Stipdonk MJ, Travers PJ, Amor S. Encephalitogenic and immunogenic potential of the stress protein alphaB-crystallin in Biozzi ABH (H-2A(g7)) mice. *J Neuroimmunol* 2000; 104: 47-57

Thornalley PJ, Vasak M. Possible role for metallothionein in protection against radiation-induced oxidative stress. Kinetics and mechanism of its reaction with peroxide and hydroxyl radicals. *Biochim Biophys Acta* 1985; Acta 827: 36-44

Touil T, Deloire-Grassin MS, Vital C, Petry KG, Brochet B. In vivo damage of CNS myelin and axons induced by peroxynitrite. *Neuroreport* 2001; 12: 3637-3644

Trapp BD, Peterson J, Ransohoff RM, Rudick R, Mork S, Bo L. Axonal transection in the lesions of multiple sclerosis. *N Engl J Med* 1998; 338: 278-285

Trojano M, Avolio C, Liuzzi GM, Ruggieri M, Defazio G, Liguori M, Santacroce MP, Paolicelli D, Giuliani F, Riccio P, Livrea P. Changes of serum sICAM-1 and MMP-9 induced by rIFNbeta-1b treatment in relapsing-remitting MS. *Neurology* 1999; 53: 1402-1408

Trotter JL, Clifford DB, McInnis JE, Griffeth RC, Bruns KA, Perlmuter MS, Anderson CB, Collins KG, Banks G, Hicks BC. Correlation of immunological studies and disease progression in chronic progressive multiple sclerosis. *Ann Neurol* 1989; 25: 172-178

Tsangaris GT, Tzortzatou-Stathopoulou F. Metallothionein expression prevents apoptosis: a study with antisense phosphorothioate oligodeoxynucleotides in human T cell line. *Anticancer Res* 1998; 18: 2423-2433

Tsuji S, Kobayashi H, Uchida Y, Ihara Y, Miyatake T. Molecular cloning of human growth inhibitory factor cDNA and its down-regulation in Alzheimer's disease. *EMBO J* 1992; 11: 4843-4850

Tubridy N, Behan PO, Capildeo R, Chaudhuri A, Forbes R, Hawkins CP, Hughes RA, Palace J, Sharrack B, Swingler R, Young C, Moseley IF, MacManus DG, Donoghue S, Miller DH. The effect of anti-alpha4 integrin antibody on brain lesion activity in MS. The UK Antegren Study Group. *Neurology* 1999; 53: 466-472

Tuohy VK, Yu M, Yin L, Kawczak JA, Johnson JM, Mathisen PM, Weinstock-Guttman B, Kinkel RP. The epitope spreading cascade during progression of experimental autoimmune encephalomyelitis and multiple sclerosis. *Immunol Rev* 1998; 164: 93-100

Uchida Y. Growth-inhibitory factor in brain. In: *Methallothionein III*. Suzuki Kt, Imura N, Kimura M ed. Birkhäuser Verlag. Basel 1993; 315-328

Uchida Y. Growth-inhibitory factor, metallothionein-like protein, and neurodegenerative diseases. *Biol Signals* 1994; 3: 211-215

Uchida Y, Ihara Y. The N-terminal portion of growth inhibitory factor is sufficient for biological activity. *J Biol Chem* 1995; 270: 3365-3369

Uchida Y, Takio K, Titani K, Ihara Y, Tomonaga M. The growth inhibitory factor that is deficient in the Alzheimer's disease brain is a 68 amino acid metallothionein-like protein. *Neuron* 1991; 7: 337-347

van der Laan LJ, van der Goes A, Wauben MH, Ruuls SR, Dopp EA, De Groot CJ, Kuijpers TW, Elices MJ, Dijkstra CD. Beneficial effect of modified peptide inhibitor of alpha4 integrins on experimental allergic encephalomyelitis in Lewis rats. *J Neurosci Res* 2002; 67: 191-199

van der Veen RC, Trotter JL, Clark HB, Kapp JA. The adoptive transfer of chronic relapsing experimental allergic encephalomyelitis with lymph node cells sensitized to myelin proteolipid protein. *J Neuroimmunol* 1989; 21: 183-191

van Noort JM, van Sechel AC, Bajramovic JJ, el Ouagmiri M, Polman CH, Lassmann H, Ravid R. The small heat-shock protein alpha B-crystallin as candidate autoantigen in multiple sclerosis. *Nature* 1995; 375: 798-801

van Snick J. Interleukin-6: an overview. *Annu Rev Immunol* 1990; 8: 253-278

van Veen T, Crusius JB, Schrijver HM, Bouma G, Killestein J, van Wijnen L, Salvador Pena A, Polman CH, Uitdehaag BM. Interleukin-12p40 genotype plays a role in the susceptibility to multiple sclerosis. *Ann Neurol* 2001; 50: 275

Vanderlugt CL, Begolka WS, Neville KL, Katz-Levy Y, Howard LM, Eagar TN, Bluestone JA, Miller SD. The functional significance of epitope spreading and its regulation by co-stimulatory molecules. *Immunol Rev* 1998; 164: 63-72

Vanguri P. Interferon-gamma-inducible genes in primary glial cells of the central nervous system: comparisons of astrocytes with microglia and Lewis with brown Norway rats. *J Neuroimmunol* 1995; 56: 35-43

Velázquez RA, Cai Y, Shi Q, Larson AA. The distribution of zinc selenite and expression of metallothionein-III mRNA in the spinal cord and dorsal root ganglia of the rat suggest a role for zinc in sensory transmission. *J Neurosci* 1999; 19: 2288-2300

Viglietta V, Baecher-Allan C, Weiner HL, Hafler DA. Loss of functional suppression by CD4+CD25+ regulatory T cells in patients with multiple sclerosis. *J Exp Med* 2004; 199: 971-979

Villoslada P, Juste C, Tintore M, Llorenc V, Codina G, Pozo-Rosich P, Montalban X. The immune response against herpesvirus is more prominent in the early stages of MS. *Neurology* 2003; 60: 1944-1948

Vladimirova O, O'Connor J, Cahill A, Alder H, Butunoi C, Kalman B. Oxidative damage to DNA in plaques of MS brains. *Mult Scler* 1998; 4: 413-418

Vollmer TL. Multiple sclerosis: new approaches to immune-therapy. *The Neuroscientist* 1996; 2: 127-136

Voskuhl RR, Palaszynski K. Sex hormones in experimental autoimmune encephalomyelitis: implications for multiple sclerosis. *Neuroscientist* 2001; 7: 258-270

Voskuhl RR. Gender issues and multiple sclerosis. *Curr Neurol Neurosci Rep* 2002; 2: 277-286

Voskuhl RR. Myelin protein expression in lymphoid tissues: implications for peripheral tolerance. *Immunol Rev* 1998; 164: 81-92

Vyse TJ, Todd JA. Genetic analysis of autoimmune disease. *Cell* 1996; 85: 311-318

Waalkes MP, Hjelle JJ, Klaassen CD. Transient induction of hepatic metallothionein following oral ethanol administration. *Toxicol Appl Pharmacol* 1984; 74: 230-236

Waalkes MP, Klaassen CD. Postnatal ontogeny of metallothionein in various organs of the rat. *Toxicol Appl Pharmacol* 1984; 74: 314-320

Wabant E, Goodkin DE, Gee L, Bacchetti P, Sloan R, Stewart T, Andersson PB, Stabler G, Miller K. Serum MMP-9 and TIMP-1 levels are related to MRI activity in relapsing multiple sclerosis. *Neurology* 1999; 53: 1397-1401

Webb M. Metallothionein in regeneration, reproduction and development. *Experientia Suppl* 1987; 52: 483-498

Weerth S, Berger T, Lassmann H, Linington C. Encephalitogenic and neuritogenic T cell responses to the myelin-associated glycoprotein (MAG) in the Lewis rat. *J Neuroimmunol* 1999; 95: 157-164

Wegenka UM, Buschmann J, Luttkien C, Heinrich PC, Horn F. Acute-phase response factor, a nuclear factor binding to acute-phase response elements, is rapidly activated by interleukin-6 at the posttranslational level. *Mol Cell Biol* 1993; 13: 276-288

Wegenka UM, Luttkien C, Buschmann J, Yuan J, Lottspeich F, Muller-Esterl W, Schindler C, Roeb E, Heinrich PC, Horn F. The interleukin-6-activated acute-phase response factor is antigenically and functionally related to members of the signal transducer and activator of transcription (STAT) family. *Mol Cell Biol* 1994; 14: 3186-3196

Weiner LP. Pathogenesis of demyelination induced by a mouse hepatitis virus (JHM virus). *Arch Neurol* 1973; 28: 298-303

Weinschecker BG, Rodriguez M. Epidemiology of multiple sclerosis. In: *Handbook of neuroepidemiology. Neurological disease and therapy*. Gorelick PB, Alter M ed. Marcel Dekker. New York 1994; 29: 533-567

Weinshenker BG, O'Brien PC, Petterson TM, Noseworthy JH, Lucchinetti CF, Dodick DW, Pineda AA, Stevens LN, Rodriguez M. A randomized trial of plasma exchange in acute central nervous system inflammatory demyelinating disease. *Ann Neurol* 1999; 46: 878-886

Weinshenker BG. The natural history of multiple sclerosis: update 1998. *Semin Neurol*. 1998; 18: 301-7

Weissert R, Wallstrom E, Storch MK, Stefferl A, Lorentzen J, Lassmann H, Linington C, Olsson T. MHC haplotype-dependent regulation of MOG-induced EAE in rats. *J Clin Invest* 1998; 102: 1265-1273

Wekerle H, Kojima K, Lannes-Vieira J, Lassmann H, Linington C. Animal models. *Ann Neurol* 1994; 36: S47-53

Wekerle H, Linington C, Lassmann H, Meyermann. Cellular immune reactivity within the CNS. *Trends Neurosci* 1986; 9: 271-277

Wekerle H. Immune pathogenesis of multiple sclerosis. Brain autoimmune reactivity and its control by neuronal function. *Mult Scler* 1998; 4: 136-137

Weller M, Constam DB, Malipiero U, Fontana A. Transforming growth factor-beta 2 induces apoptosis of murine T cell clones without down-regulating bcl-2 mRNA expression. *Eur J Immunol* 1994; 24: 1293-1300

Weller RO. Animal models in demyelinating disease. *Curr Opin Neurol Neurosurg* 1991; 4: 221-230

Whitacre CC. Sex differences in autoimmune disease. *Nat Immunol* 2001; 2: 777-780

Williams JG, Jurkovich GJ, Maier RV. Interferon-gamma: a key immunoregulatory lymphokine. *J Surg Res* 1993; 54: 79-93

Windhagen A, Anderson DE, Carrizosa A, Balashov K, Weiner HL, Hafler DA. Cytokine secretion of myelin basic protein reactive T cells in patients with multiple sclerosis. *J Neuroimmunol* 1998; 91: 1-9

Windhagen A, Newcombe J, Dangond F, Strand C, Woodroffe MN, Cuzner ML, Hafler DA. Expression of costimulatory molecules B7-1 (CD80), B7-2 (CD86), and interleukin 12 cytokine in multiple sclerosis lesions. *J Exp Med* 1995; 182: 1985-1996

Wingerchuk DM, Lucchinetti CF, Noseworthy JH. Multiple sclerosis: current pathophysiological concepts. *Lab Invest* 2001; 81: 263-281

Wingerchuk DM, Weinshenker BG. Multiple sclerosis: epidemiology, genetics, classification, natural history, and clinical outcome measures. *Neuroimaging Clin N Am* 2000; 10: 611-624

Wraith DC, Smilek DE, Mitchell DJ, Steinman L, McDevitt HO. Antigen recognition in autoimmune encephalomyelitis and the potential for peptide-mediated immunotherapy. *Cell* 1989; 59: 247-255

Wujek JR, Bjartmar C, Richer E, Ransohoff RM, Yu M, Tuohy VK, Trapp BD. Axon loss in the spinal cord determines permanent neurological disability in an animal model of multiple sclerosis. *J Neuropathol Exp Neurol* 2002; 61: 23-32

Wujek JR, Haleem-Smith H, Yamada Y, Lipsky R, Lan YT, Freese E. Evidence that the B2 chain of laminin is responsible for the neurite outgrowth-promoting activity of astrocyte extracellular matrix. *Brain Res Dev Brain Res* 1990; 55: 237-247

Yagle MK, Palmiter RD. Coordinate regulation of mouse metallothionein I and II genes by heavy metals and glucocorticoids. *Mol Cell Biol* 1985; 5: 291-294

Yamada M, Hayashi S, Hozumi I, Inuzuka T, Tsuji S, Takahashi H. Subcellular localization of growth inhibitory factor in rat brain: light and electron microscopic immunohistochemical studies. *Brain Res* 1996; 735: 257-264

Yanagitani S, Miyazaki H, Nakahashi Y, Kuno K, Ueno Y, Matsushita M, Naitoh Y, Taketani S, Inoue K. Ischemia induces metallothionein III expression in neurons of rat brain. *Life Sci* 1999; 64: 707-715

Yednock TA, Cannon C, Fritz LC, Sanchez-Madrid F, Steinman L, Karin N. Prevention of experimental autoimmune encephalomyelitis by antibodies against alpha 4 beta 1 integrin. *Nature* 1992; 356: 63-66

Yeh EA, Collins A, Cohen ME, Duffner PK, Faden H. Detection of coronavirus in the central nervous system of a child with acute disseminated encephalomyelitis. *Pediatrics* 2004; 113: 73-76

Youn J, Hwang SH, Ryoo ZY, Lynes MA, Paik DJ, Chung HS, Kim HY. Metallothionein suppresses collagen-induced arthritis via induction of TGF-beta and down-regulation of proinflammatory mediators. *Clin Exp Immunol* 2002; 129: 232-239

Young DA, Lowe LD, Booth SS, Whitters MJ, Nicholson L, Kuchroo VK, Collins M. IL-4, IL-10, IL-13, and TGF-beta from an altered peptide ligand-specific Th2 cell clone down-regulate adoptive transfer of experimental autoimmune encephalomyelitis. *J Immunol* 2000; 164: 3563-3572

Youssef S, Stuve O, Patarroyo JC, Ruiz PJ, Radosevich JL, Hur EM, Bravo M, Mitchell DJ, Sobel RA, Steinman L, ZamvilThe HMG-CoA reductase inhibitor, atorvastatin, promotes a Th2 bias and reverses paralysis in central nervous system autoimmune disease. *Nature* 2002; 420: 78-84

Yu M, Kinkel RP, Weinstock-Guttman B, Cook DJ, Tuohy VK. HLA-DP: a class II restriction molecule involved in epitope spreading during the development of multiple sclerosis. *Human Immunol* 1998; 59: 14-24

Yudkin PL, Ellison GW, Ghezzi A, Goodkin DE, Hughes RA, McPherson K, Mertin J, Milanese C. Overview of azathioprine treatment in multiple sclerosis. *Lancet* 1991; 338: 1051-1055

Yuguchi T, Kohmura E, Sakaki T, Nonaka M, Yamada K, Yamashita T, Kishiguchi T, Sakaguchi T, Hayakawa T. Expression of growth inhibitory factor mRNA after focal ischemia in rat brain. *J Cereb Blood Flow Metab* 1997; 17: 745-752

Yuguchi T, Kohmura E, Yamada K, Sakaki T, Yamashita T, Otsuki H, Kataoka K, Tsuji S, Hayakawa T. Expression of growth inhibitory factor mRNA following cortical injury in rat. *J Neurotrauma* 1995; 12: 299-306

Zamvil SS, Steinman L. The T lymphocyte in experimental allergic encephalomyelitis. *Ann Rev Immunol* 1990; 8: 579-621

Zargarova T, Kulakova O, Prassolov V, Zharmukhamedova T, Tsyganova V, Turobov V, Ivanov D, Parfenov M, Sudomoina M, Chernajovsky Y, Favorova O. Prevention of experimental autoimmune encephalomyelitis in DA rats by grafting primary skin fibroblasts engineered to express transforming growth factor-beta1. *Clin Exp Immunol* 2004; 137: 313-319

Zhang D, Sun M, Samols D, Kushner I. STAT3 participates in transcriptional activation of the C-reactive protein gene by interleukin-6. *J Biol Chem* 1996; 271: 9503-9509

Zhang SM, Hernan MA, Olek MJ, Spiegelman D, Willett WC, Ascherio A. Intakes of carotenoids, vitamin C, and vitamin E and MS risk among two large cohorts of women. *Neurology* 2001; 57: 75-80

Zhang X, Koldzic DN, Izikson L, Reddy J, Nazareno RF, Sakaguchi S, Kuchroo VK, Weiner HL. IL-10 is involved in the suppression of experimental autoimmune encephalomyelitis by CD25+CD4+ regulatory T cells. *Int Immunol* 2004; 16: 249-256

Zhang Z, Fuentes NL, Fuller GM. Characterization of the IL-6 responsive elements in the gamma fibrinogen gene promoter. *J Biol Chem* 1995; 270: 24287-24291

Zheng H, Berman NE, Klaassen CD. Chemical modulation of metallothionein I and III mRNA in mouse brain. *Neurochem Int* 1995; 27: 43-58

Zhong MC, Cohen L, Meshorer A, Kerlero de Rosbo N, Ben-Nun A. T-cells specific for soluble recombinant oligodendrocyte-specific protein induce severe clinical experimental autoimmune encephalomyelitis in H-2(b) and H-2(s) mice. *J Neuroimmunol* 2000; 105: 39-45

Zipp F. Apoptosis in multiple sclerosis. *Cell Tissue Res* 2000; 301: 163-171

Zlotnik A, Yoshie O. Chemokines: a new classification system and their role in immunity. *Immunity* 2000; 12: 121-127

Zou K, Gong JS, Yanagisawa K, Michikawa M. A novel function of monomeric amyloid beta-protein serving as an antioxidant molecule against metal-induced oxidative damage. *J Neurosci* 2002; 22: 4833-4841