REFERENCES

Aguayo, A. J., Charron, L., and Bray, G. M. (1976a) Potential of Schwann cell from unmyelinated nerves to produce myelin: a quantitative ultrastructural and radiographic study. **J Neurocytol.** 5:565-573.

Aguayo, A. J., Epps, J., Charron, L., and Bray G. M. (1976b) Multipotentiality of Schwann cells in cross-anastomosed and grafted myelinated and unmyelinated nerves: quantitative microscopyand radioautography. **Brain Res.** 104:1-20.

Arosio, P., Levi, S., Santambrogio, P., Cozzi, A., Luzzago, A., Cesareni, G., et al. (1991) Structural and functional studies of human ferritin H and L chains. **Curr Stud Hematol Blood Transfus.** 58:127-131.

Bansal, R., and Pfeiffer, S. E. (1987) Regulated galactolipid synthesis and cell surface expression in Schwann cell line D6P2T. **J Neurochem.** 49:1902-1911.

Beard, J. L. (2001) Iron biology in immune function, muscle metabolism and neuronal functioning. **J Nutr.** 131(2S-2):568S-579S.

Beard, J. L., Dawson, H., and Pinero, D. J. (1996) Iron metabolism: a comprehensive review. **Nutr Rev.** 54(10):295-317.

Beard, J. L., Wiesinger, J. A., and Connor, J. R. (2003) Pre- and post weaning iron deficiency alters myelination in Sprague-Dawley rats. **Dev Neurosci.** 25(5):308-315.

Benkovic, S. A., and Connor, J. R. (1993) Ferritin, transferrin, and iron in selected regions of the adult and aged rat brain. **J Comp Neurol.** 338(1):97-113.

Blissman, G., Menzies, S., Beard, J., Palmer, C., and Connor, J. (1996) The expression of ferritin subunits and iron in oligodendrocytes in neonatal porcine brains. **Dev Neurosci.** 18(4):274-281.

Bomford, A., Conlon-Hollingshead, C., and Munro, H. N. (1981) Adaptive responses of rat tissue isoferritins to iron administration. Changes in subunit synthesis, isoferritin abundance, and capacity for iron storage. **J Biol Chem.** 256(2):948-955.

Bourre, J. M. (1984) Cerebral fatty acids. Synthesis in situ and food intake. **Diabete Metab.** 10(5):324-31.

Breuer, W., Greenberg, E., and Cabantchik, Z. I. (1997) Newly delivered transferrin iron and oxidative cell injury. **FEBS Lett.** 403(2):213-219.

Brody, T. (1999) **Nutritional Biochemistry.** 2nd ed. San Diego: Academic Press.

Bunge, M. B., Bunge, R. P., Carey, D.J., Cornbrooks, C. J, Edridge, C. F., Williams, A. K., et al. (1983) Axonal and nonaxonal influences on Schwann cell development **Developing and Regenerating Vertebrate Nervous Systems.** New york.

Cammer, W. (1984) Carbonic anhydrase in oligodendrocytes and myelin in the central nervous system. **Ann N Y Acad Sci.** 429:494-497.

Cheepsunthorn, P., Palmer, C., and Connor, J. R. (1998) Cellular distribution of ferritin subunits in postnatal rat brain. **J Comp Neurol.** 400(1):73-86.

Connor, J. R., and Menzies, S. L. (1995) Cellular management of iron in the brain. **J Neurol Sci.** 134 Suppl: 33-44.

Connor, J. R., and Menzies, S. L. (1996) Relationship of iron to oligodendrocytes and myelination. **Glia.** 17(2):83-93.

Craelius, W., Migdal, M. W., Luessenhop, C. P., Sugar, A., and Mihalakis, I. (1982) Iron deposits surrounding multiple sclerosis plaques. **Arch Pathol Lab Med.** 106(8):397-9.

Crichton, R. R., Wilmet, S., Legssyer, R., and Ward, R. J. (2002) Molecular and cellular mechanisms of iron homeostasis and toxicity in mammalian cells. **J Inorg Biochem.** 91:9-18.

Dickinson, T. K., and Connor, J. R. (1994) Histological analysis of selected brain regions of hypotransferrinemic mice. **Brain Res.** 635(1-2):169-178.

Dickinson, T. K., and Connor, J. R. (1995) Cellular distribution of iron, transferrin, and ferritin in the hypotransferrinemic (Hp) mouse brain. **J Comp Neurol.** 355(1):67-80.

Espinosa de los Monteros, A., Chiapelli, F., Fisher, R. S., and de Vellis, J. (1988) Transferrin: an early marker of oligodendrocytes in culture. **Int J Dev Neurosci.** 6(2):167-175.

Fairbanks, V. F. (1999) Iron in Medicine and Nutrition. **Nutrition in Health and Disease.** 9th ed. Baltimore.

Farina, A. R., Tacconelli, A., Vacca, A., Maroder, M., Gulino, A., and Mackay, A. R. (1999) Transcriptional up-regulation of matrix metalloproteinase-9 expression during spontaneous epithelial to neuroblast phenotype conversion by SK-N-SH neuroblastoma cells, involved in enhanced invasivity, depends upon GT-BOX and Nuclear Factor kB elements. **Cell Growth Differ.** 10:353-367.

Fleming, M. D., Trenor, C. C. 3rd, Su, M. A., Foernzler, D., Beier, D. R., and Dietrich, W. F. (1997) Microcytic anaemia mice have a mutation in Nramp2, a candidate iron transporter gene. **Nat Genet.** 16(4):383-386.

Gandelman, K. Y., Pfeiffer, S. E., and Carson, J. H. (1989) Cyclic AMP regulation of P0 glycoprotein and myelin basic protein gene expression in semi-differentiated peripheral neurinoma cell line D6P2T. **Development.** 106(2):389-398.

Gunshin, H., Mackenzie, B., Berger, U. V., Gunshin, Y., Romero, M. F., Boron, W. F., et al (1997) Cloning and characterization of a mammalian proton-coupled metal-ion transporter. **Nature.** 388(6641):482-488.

Gutierrez, J. A., Yu, J., Rivera, S., and Wessling-Resnick, M. (1997) Functional expression cloning and characterization of SFT, a stimulator of Fe transport. **J Cell Biol.** 139(4):895-905.

Gutierrez, J. A., Inman, R. S., Akompong, T., Yu, J., and Wessling-Resnick, M. (1998) Metabolic depletion inhibits the uptake of nontransferrin-bound iron by K562 cells. **J Cell Physiol.** 177(4):585-592.

Hai, M., Muja, N., DeVries, G. H., Quarles, R. H., and Patel, P. I. (2002) Comparative analysis of Schwann cell lines as model systems for myelin gene transcription studies. **J Neurosci Res.** 69:497-508.

Halliwell, B. and Gutteridge, J.M.C. (1999). **In: Free radicals in Biology and Medicine.** 3rd ed. Oxford Science Publications.

Harrison, R. G. (1924) Neuroblast versus sheath cell in the development of peripheral nerves. **J Comp Neurol.** 37:123-194.

Hentze, M. W., and Kuhn, L. C. (1996) Molecular control of vertebrate iron metabolism: mRNA-based regulatory circuits operated by iron, nitric oxide, and oxidative stress. **Proc Natl Acad Sci U S A.** 93(16):8175-8182. Review.

Hentze, M. W., Muckenthaler, M. U., and Andrews, N. C. (2004) Balancing acts: molecular control of mammalian iron metabolism. **Cell.** 117(3):285-297. Review.

Hirsh, M., Konijn, A. M., and Iancu, T. C. (2002) Acquistion, storage and release of iron by cultured human hepatoma cells. **J Hepatol.** 36:30-38.

Iacopetta, B. J., and Morgan, E. H. (1983) The kinetics of transferrin endocytosis and iron uptake from transferrin in rabbit reticulocytes. **J Biol Chem.** 258(15):9108-9115.

Jessen, K. R. (2004) Glial cells. **Int J Biochem Cell Biol.** 36(10):1861-1867

Jessen, K. R., Mirsky, R., and Morgan, L. (1987) Axonal signals regulate the differentiation of non-myelin-forming Schwann cells: an immunohisto chemical study of galactocerebroside in transected and regenerating nerves. **J Neurosci.** 7:3362-3369.

Johansson, H. E., and Theil, E. C. (2002) **In molecular and cellular iron transport.** Marcel Dekker, Inc. New York.

Karin, M., and Mintz, B. (1981) Receptor-mediated endocytosis of transferrin in developmentally totipotent mouse teratocarcinoma stem cells. **J Biol Chem.**

256(7):3245-3252.

Ke, Y., and Ming Qian, Z. (2003) Iron misregulation in the brain: a primary cause of neurodegenerative disorders. **Lancet Neurol.** 2(4):246-253. Review.

Klausner, R. D., Van Renswoude, J., Ashwell, G., Kempf, C., Schechter, A. N., and Dean, A. (1983) Receptor-mediated endocytosis of transferrin in K562 cells. **J Biol Chem.** 258(8):4715-4724.

Klausner, R. D., Rouault, T. A., and Harford, J. B. (1993) Regulating the fate of mRNA: the control of cellular iron metabolism. **Cell.** 72(1):19-28. Review.

Larkin, E. C., and Rao, G. A. (1990) Importance of fetal and neonatal iron: adequacy for normal development of central nervous system. **Brain behaviour, and iron in the infant diet.** London: Springer-Verlag.

Ledeen, R. W. (1992) Enzymes and receptors of myelin. **Myelin: Biology and Chemistry.** Boca Raton, FL: CRC Press.

Le Douarin, N. M., and Dupin, E. (1993) Cell lineage analysis in neural crest ontogeny. **J Neurobiol.** 24:146-161.

Lin, H. H., and Connor, J. R. (1989) The development of the transferrin-transferrin receptor system in relation to astrocytes, MBP and galactocerebroside in normal and myelin-deficient rat optic nerves. **Brain Res Dev Brain Res.** 49(2):281-293.

Liu, Y., and Templeton, D. M. (2006) Iron-loaded cardiac myocytes stimulate cardiac myofibroblast DNA synthesis. **Mol Cell Biochem.** 281(1-2):77-85.

Martenson, R. E. (1992) **Myelin Biology and Chemistry.** 1st ed. Florida: CRC Press.

Martini, R., and Schachner, M. (1986) Immunoelectron microscopic localization of neural cell adhesion molecules (L1, N-CAM, and MAG) and their shared carbohydrate epitope and myelin basic protein in developing sciatic nerve. **J Cell Biol.** 103:2439-2448.

Miller, M. W., Roskams, A. J., and Connor, J. R. (1995) Iron regulation in the developing rat brain: effect of in utero ethanol exposure. **J Neurochem.**

65(1):373-80.

Mirsky, R., and Jessen, K. R. (1990) Schwann cell development and the regulation of myelination. **Sem Neurosci.** 2:423-436.

Muja, N., Blackman, S. C., Le Breton, G. C., and De Vries, G. H. (2001) Identification and functional characterization of thromboxane A2 receptors in Schwann cells. **J Neurochem.** 78:446-456.

Owens, G. C., and Bunge, R. P. (1989) Evidence for an early role for myelin-associated glycoprotein in the process of myelination. **Glia.** 2(2):119-28.

Papanikolaou, G., and Pantopoulos, K. (2005) Iron metabolism and toxicity. **Toxicol Appl Pharmacol.** 202(2):199-211.

Parkes, J. G., Hussain, R. A., Olivieri, N. F., and Templeton, D. M. (1993) Effects of iron loading on uptake, speciation and chelation of iron in cultured myocardial cells. **J Lab Clin Med.** 122:36-47.

Pleasure, D., Abramsky, O., Silberberg, D., Quinn, B., Parri, J., and Saida, T. (1977) Lipid synthesis by an oligodendroglial fraction in suspension culture. **Brain Res.** 134(2):377-82.

Ponka, P., and Lok, C. N. (1999) The transferrin receptor: role in health and disease. **Int J Biochem Cell Biol.** 31(10):1111-1137.

Qian, Z. M., and Morgan, E. H. (1991) Effect of metabolic inhibitors on uptake of non-transferrin-bound iron by reticulocytes. **Biochim Biophys Acta.** 1073(3):456-462.

Quail, E. A., and Morgan, E. H. (1994) Role of membrane surface potential and other factors in the uptake of non-transferrin-bound iron by reticulocytes. **J Cell Physiol.** 159(2):238-244.

Raivich, G., Graeber, M. B., Gehrmann, J., and Kreutzberg, G. W. (1991) Transferrin receptor expression and iron uptake in the injured and regenerating rat sciatic nerve. **Eur J Neurosci.** 3(10):919-927.

Rogers, J. T., and Lahiri, D. K. (2004) Metal and inflammatory targets for Alzheimer's disease. **Curr Drug Targets.** 5(6):535-551.

Salis, C., Goedelmann, C. J., Pasquini, J. M., Soto, E. F., and Setton-Avruj, C. P. (2002) HoloTransferrin but not ApoTransferrin prevents Schwann cell de-differentiation in culture. **Dev Neurosci.** 24(2-3):214-221.

Scherer, S. S. (1997) The biology and pathobiology of Schwann cells. **Curr Opin Neurol.** 10:386-397.

Scherer, S. S., and Salzer, J. L. (1996) Axon-Schwann cell interactions in peripheral nerve regeneration. **Glial cell development.** Oxford: Bios Scientific.

Schwartz, J. H. (1991) **Principles of Neural Science.** 3rd Connecticut: Prentice-Hall International Inc.

Tansey, F. A., and Cammer, W. (1988) Acetyl-CoA carboxylase in rat brain. I. Activities in homogenates and isolated fractions. **Brain Res.** 471(1):23-30.

Telfer, J. F., and Brock, J. H. (2004) Proinflammatory cytokines increase iron uptake into human monocytes and synovial fibroblasts from patients with rheumatoid arthritis. **Med Sci Monit.** 10(4):BR91-95.

Theil, E. C. (1994) Iron regulatory elements (IREs): a family of mRNA non-coding sequences. **Biochem J.** 15:304-308.

Vaisman, B., Meyron-Holtz, E. G., Fibach, E., Krichevsky, A. M., and Konijn, A. M. (2000) Ferritin expression in maturing normal human erythroid precursors. **Br J Haematol.** 110(2):394-401.

Webster, H. D., Palkovits, C. G., Stoner, G. L., Favilla, J. T., Frail, D. E., and Braun, P. E. (1983) Myelin-associated glycoprotein electron microscopic immunocytochemical localization in compact developing and adult central nervous system myelin. **J Neurochem.** 41:1469-1479.

Webster, H. F. (1993) Development of peripheral nerve fibers. **Peripheral neuropathy.** 3rd ed. Philadelphia: Saunders.

Weinberg, H. J., and Spencer, P. S. (1976) Studies on the control of myelinogenesis. II. Evidence for neuronal regulation of myelin production. **Brain Res.** 113:

363-378.

Welch, K. D., Davis, T. Z., Van Eden, M. E., and Aust. S. D. (2002) Deleterious iron-mediated oxidation of biomolecules. **Free Radic Biol Med.** 32(7):577-583.

Xiong, S., She, H., Takeuchi, H., Han, B., Engelhardt, J. F., Barton, C. H., (2003) Signaling role of intracellular iron in NF-kappaB activation. **J Biol Chem.** 278(20):17646-17654.

Yip, R., and Dallman, P. R. (1996) Iron. **Present Knowledge in Nutrition.** 7th ed. Washington D.C.: ILSI Press.

APPENDICES

APPENDIX A

CHEMICAL AGENTS AND INSTRUMENTS

A. Laboratory supplies

Aerosol resistance pipette tip: 10,200, and 1000 μl (Oxygen, USA)

Aluminum foils (3M FOIL®, USA)

Autoclave tape (3M, USA)

Beakers: 50 ml, 1,000 ml (Pyrex®, USA)

Bottle top filter 0.22 μM (Costar®, USA)

Coplin staining jars

Cryotube (Sorenson™, USA)

Cylinders (Pyrex®, England)

Disposable gloves (Latex, Thailand)

Eppendorf tube

Glass pipettes: 5 and 10 ml (Witeg, Germany)

Humidified chamber

Microscope glass cover slips (Chance, England)

96 multiwell plates (Nunc, USA)

Parafilm (American National Can™, USA)

Pipette boy (Falcon®, USA)

Plastic cover slips (ApopTag®)

Reagent bottles: 250 ml, 500 ml, 1000 ml (Duran®, Germany)

Slide (Soilbrand, China)

Slide box

Slide film (Eritchrome 400, Kodak)

Slotted microscope slide staining dish

Sterile membrane filters (Whatman®, Japan)

Sterile millipore 0.22 μM (Millex®-GP, USA)

Sterile polypropylene centrifuge tube: 15 ml, 50 ml. (Corning®, USA)

T 25 Tissue Culture flasks (Corning®, USA)

T 75 Tissue Culture flasks (Corning®, USA)

Tube rack

B. Equipments

Autoclave (HICLAVE™, HIRAYAMA)

Autopipette (Gilson, France)

Balance (Precisa, Switzerland)

CO_2- Incubator (REVCOULTIMA)

Differential counter

ELISA Microplate Reader (Multiskan EX)

Freezer – 20° C (SANYO, Japan)

Freezer – 80° C (SANYO, Japan)

Hemocytometer (Boeco, Germany)

Hot Plate Stirrer (HL Instrument, Thailand)

Incubator (Heraeus)

Light microscope (Olympus, Japan)

Low- speed centrifuge (Beckman)

pH meter (ECOMET, Korea)

Refrigerator 4°C (SANYO, Japan)

Spectrophotometer (BIO-RAD, USA)

Timer

Thermometer

Ultrasonicator (Virtis, USA)

Vacuum pump

Vortex (Labnet, USA)

C. General Reagents

Absolute ethanol (Merck, Germany)

Acetic acid (Merck, Germany)

Ascorbic acid (Sigma, Germany)

Bovine Serum Albumin (Gibco®, USA)

Clorox (Clorox, USA)

DMSO (Euroclone ®, Italy)

Dulbecco's modified Eagle's medium (JRH, Germany)

Fetal Bovine Serum (Hyclone, Germany)

Glucose

HEPES (Hyclone, Germany)

Hydrochloric acid: (Hyclone, Germany)

Kojic acid (Sigma, Germany)

L- Tyrosine (Sigma, Germany)

L- Glutamine (Gibco BRL)

Paraformaldehyde powder (Sigma, Germany)

Penicillin-Streptomycin (Hyclone, Germany)

Potassium chloride (BDH)

Potassium hydrogen phosphate (Baker, USA)

Sodium chloride (BDH)

Sodium hydroxide (Merck, Germany)

Tyrosinase enzyme (Sigma, Germany)

di- Sodium hydrogen phosphate monobasic (BDH)

Sodium bicarbonate (Baker, USA)

0.4% Trypan blue dye (Sigma, USA)

APPENDIX B

SPECIFIC BUFFER FOR WESTERN BLOT

Buffers preparations for western blot

1.5 M Tris base (pH 8.8) 100 ml

Tris base	18.171	g
dH_2O	80	ml

Adjust the pH to 8.8 with conc. HCl and conc.NaOH

Adjust the volume to 100 ml with dH_2O

1 M Tris base (pH6.8) 100 ml

Tris base	12.14	g
dH_2O	80	ml

Adjust the pH to 6.8 with conc. HCl and conc.NaOH

Adjust the volume to 100 ml with dH_2O

0.5 M Tris-HCl 100 ml

Tris base	6	g
dH_2O	40	ml

Adjust the pH to 6.8 with conc. HCl

Adjust the volume to 100 ml with dH_2O

10% SDS 100 ml

SDS	10	g

Adjust the volume to 100 ml with dH_2O

1x Triton lysis buffer 100 ml

25 mM Tris-HCl (pH 8.0)	0.4	g
150 mM NaCl	0.88	g
0.5% Triton X-100	0.5	ml
5 mM EDTA	0.186	g
dH_2O	100	ml

10x Laemmli running buffer (pH 8.3) 1 liter

Tris base	30.3	g
Glycine	144.2	g
SDS	10	g
dH_2O	900	ml

Adjust the pH to 8.3 with conc. HCl and conc.NaOH

Adjust the volume to 1 liter with dH_2O

1x Transfer buffer 1 liter

Tris base	5.8	g
Glycine	2.9	g
SDS	0.37	g

Adjust the volume to 800 ml with dH_2O

100% Methanol	200	ml

Blocking buffer

5% non fat dry milk in TBS

10x TBS washing buffer (pH 7.4) 1 liter

Tris base	30	g
NaCl	80	g
KCl	2	g
dH_2O	800	ml

Adjust the pH to 7.4 with conc. HCl

Adjust the volume to 1 liter with dH_2O

Stain 0.5% coomassei blue 500 ml

Methanol	200	ml
Acetic acid	50	ml
coomassei blue	2.5	g

Adjust the volume to 500 ml with dH_2O

Destain 500 ml

Methanol	150	ml
Acetic acid	50	ml

Adjust the volume to 500 ml with dH_2O

APPENDIX C

RT-PCR AND SPECIFIC BUFFER

1. Preparation of the reaction mix for cDNA synthesis

Before starting the experiment thaw all reagents except of the polymerase, mix them throughly and centrifuge briefly. Use a sterile microcentrifuge tube to add the reagents to the reaction mix in a fixed order as outlined in the table.

Table 5 Preparation of the reaction mix for cDNA synthesis

RT Reacion	Volume/1 sample (μl)	Volume/2 sample (μl)	Volume/3 sample (μl)	Volume/4 sample (μl)
10X Reaction Buffer	2	4	6	8
25mM MgCl2	4	8	12	16
dNTP	2	4	6	8
Random Primer	2	4	6	8
RNase Inhiitor	1	2	3	4
AMV Reverstranscriptase	1	2	3	4
Master Mix	12	24	36	48
Master Mix Aliquot	12	2x12	3x12	4x12
2 ug of RNA (Xi)	Xi	2xXi	3xXi	4xXi
RNase Free Water (20-12-Xi)	(20-12-Xi)	(20-12-Xi)	(20-12-Xi)	(20-12-Xi)
Total Volume	20	2x20	3x20	4x20

i = the number labeled in each sample.

2. Preparation of the reaction mix for PCR

Before starting the experiment thaw all reagents except of the polymerase, mix them thorughly and centrifuge briefly. Use a sterile microcentrifuge tube to add the reagents to the reaction mix in a fixed order as outlined in the table.

Table 6 Preparation of the reaction mix for PCR

PCR Reacion	Volume/1 sample (μl)	Volume/2 sample (μl)	Volume/3 sample (μl)	Volume/4 sample (μl)
10X Reaction Buffer	2.5	5	7.5	10
25mM MgCl2	1.5	3	4.5	6
dNTP	0.5	1	1.5	2
Taq	0.2	0.4	0.6	0.8
Forward Primer	0.7	1.4	2.1	2.8
Reward Primer	0.7	1.4	2.1	2.8
Master Mixt	6.1	12.2	18.3	24.4
Master Mix Aliquot	6.1	2x6.1	3x6.1	4x6.1
cDNA	5	2x5	3x5	4x5
RNase Free Water (25-6.1-5)	13.9	2x13.9	3x13.9	4x13.9
Total Volume/sample	25	2x25	3x25	4x25

3. Buffers prepations for RT-PCR

10x Ficoll loading buffer 10 ml

Ficoll	25	g
Bromphenol blue	0.025	g
0.5 M EDTA (pH 8.0)	0.2	ml

Adjust volume to 10 ml with dH_2O, Store at $-20^{\circ}c$.

1.5% Agarose gel (w/v) 100 ml

Agarose	1.5	g
1x TBE	100	ml

Dissolve by heating and occational mixing until no granules of agarose are visible. Add ethidium bromide (stock 10 mg/ml) 10 μl (final concentration 1 μg/ml)

10x TBE buffer (pH 8.0) 1 liter

Tris base	108	g
EDTA $2H_2O$ (pH 8.0)	40	ml
dH_20	800	ml
Slowly add the boric acid, anhydrous	55	g

Adjust the pH to 8.0 with conc.HCl

Adjust the volume to 1 liter with dH_2O

1x TBE buffer 1 liter

10x TBE buffer	100	ml
dH2O	900	ml

Adjust the pH to 7.4 with conc. HCl

Adjust the volume to 1 liter with dH_2O

BIOGRAPHY

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Birth date	May 30, 1981	**Age**	25
Nationality	Thai		
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