

CURRICULUM VITAE

NAME: NATHAN NELSON
DATE OF BIRTH: January 1, 1938
PLACE OF BIRTH: Avihail, ISRAEL
MARITAL STATUS: Married with three children
CITIZENSHIP: Israeli citizen

EDUCATION:

1965 B.Sc. Biology, Tel-Aviv University, Israel
1966 M.Sc. Plant Physiology, Tel-Aviv University, Israel
1970 Ph.D. Plant Biochemistry, Tel-Aviv University, Israel

BRIEF CHRONOLOGY OF EMPLOYMENT:

1970-1972 Postdoctoral Fellow, Biochemistry,
Cornell Univ., Ithaca, NY, with Prof. E. Racker.
1972-1977 Senior Lecturer, Dept. Biology, Technion, Haifa, Israel.
1977-1980 Associate Professor, Technion, Haifa, Israel.
1978-1979 Visiting Professor, Biocenter, University of Basel.
1980-1985 Professor, Dept. Biology, Technion, Haifa, Israel.
1983-1984 Visiting Professor, Section of Biochemistry,
Cornell University, Ithaca, NY.
1985-1986 Full Member, Department of Biochemistry,
Roche Institute of Molecular Biology, Nutley, NJ.
1986-1992 Laboratory Head, Department of Biochemistry,
Roche Institute of Molecular Biology, Nutley, NJ.
1992-1995 Full Member II, Roche Institute of Molecular Biology,
Nutley, NJ.
1995- 2006 Professor, Dept. Biochemistry, Tel Aviv University, Israel.

Summers of:

1973 and 1977 Visiting Professor, Section of Biochemistry,
Cornell University, Ithaca, NY.
1979 Visiting Professor, Dept. Physics, UCSD, La Jolla, CA.
1980, 81 and 82 Visiting Professor, Biocenter, University of Basel.

RESEARCH INTERESTS:

Membrane biotechnology; structure and function of biological membranes; photosynthesis; bioenergetics; metal-ion transporters; neurotransmitter transporters; structure and function of

proton-ATPase complexes; molecular biology of V-ATPase; structure and function of Photosystem I reaction centers and other chloroplast complexes; biogenesis and assembly of protein complexes in membranes; expression of genes encoding mammalian proteins in heterologous systems; molecular biology of metal-ion and neurotransmitter transporters. Bioenergetics.

EDITORIAL BOARDS:

J. of Bioenergetics and Biomembranes
J. of Experimental Biology

AWARDS:

1992 Humboldt Award
1997 Elected EMBO member
2000- Hold the Cathedra "Function of Membrane Transporters"
2006 Honorary professorship – Sichuan University
2007 Honorary Doctor – University of Bologna

ACTIVITIES:

2000- 2002 Member of the Board of Governors – Tel Aviv University
1998-2001 Vice Chairman of the International Advisory Board at the International Institute of Molecular and Cell Biology in Warsaw
2002-2004 Member of the Executive Council – Tel Aviv University
2002-2005 President of the Israel Society for Biochemistry and Molecular Biology
2005- Director of the Daniella Rich Institute for Structural Biology

SOCIETIES:

American Association for the Advancement of Science
American Society for Biochemistry and Molecular Biology
American Society for Cell Biology
Biophysical Society
Federation of American Societies for Experimental Biology
International Society for Plant Molecular Biology
International Society for Neurochemistry
Israel Society for Biochemistry and Molecular Biology
Society for Neuroscience
European Molecular Biology Organization

PUBLICATIONS:

Papers (more than 15,000 citations)

205. Grossman, T.R. and Nelson, N. (2003) Effect of sodium lithium and protons on the electrophysiological properties of the four mouse GABA transporters expressed in *Xenopus* oocytes. **Neurochem. Internat.** 43, 431-443.
206. Whitlow, R.D., Sacher, A., Loo, D.D.F., Nelson, N. and Eskandari, S. (2003). The Anticonvulsant Valproate Increases the Turnover Rate of γ -Aminobutyric Acid Transporters. **J. Biol. Chem.** 278, 17716-17726.
207. Aviezer-Hagai, K., Padler-Karavani, V. and Nelson, N. (2003). Biochemical support for the V-ATPase rotary mechanism: antibody against HA-tagged Vma7p or Vma16p but not Vma10p inhibits activity. **J. Exp. Biol.** 206, 3227-3237.
208. Nelson, N. (2003). A Journey From Mammals to Yeast With Vacuolar H⁺-ATPase (V-ATPase). **J. Bioenerg. Biomembr.** 35, 281-289.
209. Ben-Shem, A., Nelson, N. and Frolow, F. (2003). Crystallization and initial X-ray diffraction studies of higher plant photosystem I. **Acta Cryst.** D59, 1824-1827.
210. Cohen, A., Nevo, Y. and Nelson, N. (2003). The first external loop of the metal-ion transporter DCT1 is involved in metal-ion binding and specificity. **Proc. Natl. Acad. Sci. USA** 100, 10694-10699.
211. Sperk, G., Schwarzer, C., Heilman, J., Furtinger, S., J Reimer, R., Edwards R.H. and Nelson, N. (2003). Expression of Plasma Membrane GABA Transporters but not of the Vesicular GABA Transporter in Dentate Granule Cells after Kainic Acid Seizures. **Hippocampus** 13, 806–815.
212. Ben-Shem, A., Frolow, F. and Nelson, N. (2003). The crystal structure of plant photosystem I. **Nature** 426, 630-635.
213. Ben-Shem, A. Frolow, F. and Nelson, N. (2004). Evolution of Photosystem I – from Symmetry through Pseudosymmetry to Assymetry. **FEBS Lett.** 564, 274-280.
214. Ben-Shem, A., Frolow, F. and Nelson, N. (2004). Light-harvesting features revealed by the structure of plant photosystem I. **Photosynth. Res.** 81, 239-250.
215. Nelson, N. and Ben-Shem, A. (2004). The complex architecture of oxygenic photosynthesis. **Nat. Rev. Mol. Cell Biol.** 5, 971-982.
216. Drory, O., Mor, A., Frolow, F. and Nelson, N. (2004) Expression, crystallization and phasing of vacuolar H⁺-ATPase subunit C (Vma5p) of *Saccharomyces cerevisiae*. **Acta Cryst.** D60, 1906-1909.
217. Drory, O., Frolow, F. and Nelson, N. (2004). Crystal structure of yeast V-ATPase subunit C reveals its stator function. **EMBO Rep.** 5, 1148-1152.

218. Nevo, Y. and Nelson, N. (2004). The Mutation F227I Increases the Coupling of Metal Ion Transport in DCT1. **J. Biol. Chem.** 279, 53056-53061.
219. Karakossian, M.H., Spencer, S.R., Gomez1, A.Q., Padilla, O.R., Sacher, A., Loo, D.D.F., Nelson, N. and Eskandari, S. (2005). Novel Properties of a Mouse γ -Aminobutyric Acid Transporter (GAT4). **J. Membr. Biol.** 203, 65-82
220. Cohen-Kfir, E., Lee, W., Eskandari, S. and Nelson, N. (2005). Zinc Inhibition of the γ -Aminobutyric Acid Transporter-4 (GAT4) Reveals a Novel Link between Excitatory and Inhibitory Neurotransmission. **Proc. Natl. Acad. Sci. USA** 102, 6154-6159.
221. Junge, W. and Nelson, N. (2005). Nature's rotary electromotors. **Science** 308, 642-644.
222. Nelson, N. and Ben-Shem, A. (2005). The structure of photosystem I and evolution of photosynthesis. **BioEssays** 27, 914-922.
223. Jolley, C., Ben-Shem, A., Nelson, N. and Fromme, P. (2005). Structure of plant photosystem I revealed by theoretical modeling. **J. Biol. Chem.** 280, 33627-33636
224. Sener, M.K., Jolley, C., Ben-Shem, A., Fromme, P., Nelson, N., Croce, R. and Schulten, K. (2005). Evolution of the excitation transfer network in photosystem I from cyanobacteria to plants. **Biophys J.** 89, 1630-1642.
225. Amunts, A., Ben-Shem A. and Nelson N. (2005). Solving the structure of plant photosystem I – biochemistry is vital. **Photochem. Photobiol. Sci.** 4, 1011 - 1015
226. Nelson, N. and Yocum, C. (2006). Structure and Function of Photosystems I and II. **Annu. Rev. Plant Biol.** 57, 521-565.
227. Droy, O. and Nelson N. (2006). Structural and functional Features of Yeast V-ATPase subunit C. **Biochim. Biophys. Acta** 1757, 297-303.
228. Droy, O. and Nelson N. (2006). The emerging structure of vacuolar ATPase. **Physiology** 21, 317-325.
229. Nevo, Y. and nelson N. (2006). The NRAMP family of metal-ion transporters. **Biochim. Biophys. Acta** 1763, 609-620.
230. Amunts, A., Drory, O. and Nelson, N. (2007). The structure of a plant photosystem I supercomplex at 3.4 Å resolution. **Nature** 447, 58-63.
231. Tuller, T., Chor, B. and Nelson, N. (2007). Forbidden penta-peptides. **Protein Science** 16, 2251-2259.

232. Amunts, A. and Nelson, N. (2008). Functional organization of a plant Photosystem I: evolution of a highly efficient photochemical machine. **Plant Physiol. Biochem.** 46, 228-237.
233. Saroussi, S. and Nelson, N. (2009). Vacuolar H⁺-ATPase—an enzyme for all seasons. *Pflügers Arch.* – **Eur. J. Physiol.** 457, 581-587.
234. van Oort, B., Amunts, A., Borst, J., van Hoek, A., Nelson, N., van Amerongen, H. and Croce, R. (2008). Picosecond Fluorescence of Intact and Dissolved PSI-LHCI Crystals **Biophys. J.** 95, 5851-5861.
235. Nelson, N. (2009). Plant Photosystem I – The Most Efficient Nano-Photochemical Machine. **J. Nanosci. Nanotechnol.** 9, 1709–1713.
236. Amunts, A. and Nelson, N. (2009). Plant photosystem I design in light of evolution. **Structure** 17, 637-650.
237. Sharon, I., Alperovitch, A., Rohwer, F., Haynes, M. Glaser, F. Atamaa-Ismaeel, N., Pinter, R.Y., Partensky, F., Koonin, E.V., Wolf, Y.I., Nelson, N. and Oded Béjà, O. (2009). All in one: Photosystem-I gene cassettes in marine phages. **Nature** in press
238. Sharon, I., Alperovitch, A., Rohwer, F., Haynes, M. Glaser, F. Atamaa-Ismaeel, N., Pinter, R.Y., Partensky, F., Koonin, E.V., Wolf, Y.I., Nelson, N. and Oded Béjà, O. (2009). Photosystem I gene cassettes are present in marine virus genomes. **Nature** 461, 258-262.
239. Amunts, A., Toporik, H., Borovikova, A. and Nelson, N. (2010). Structure determination and improved model of plant photosystem I. **J Biol Chem.** 285, 3478-3486.
240. Leviatan, S., Sawada, K., Moriyama, Y. and Nelson N. (2010). A combinatorial method for overexpression of membrane proteins in E. coli. **J Biol Chem.** 285, 23548-23556.
241. Alperovitch-Lavy A, Sharon I, Rohwer F, Aro EM, Glaser F, Milo R, Nelson N, Béjà O. (2011). Reconstructing a puzzle: existence of cyanophages containing both photosystem-I and photosystem-II gene suites inferred from oceanic metagenomic datasets. **Environ Microbiol.** 13, 24–32.
242. Nelson, N. (2011). Photosystems and global effects of oxygenic photosynthesis. **Biochim. Biophys. Acta** 1807, 856-863.

Chapters

48. Ben-Shem A and Nelson N (2005) System biology of photosystem I – formation of supercomplexes. In: Van der Est A and Bruce D (eds) *Photosynthesis: Fundamental Aspects to Global Perspectives*, pp 770–772. Alliance Communications Group, Lawrence, Kansas

49. Nelson, N. and Ben-Shem, A. (2005). Structure, Function and Regulation of Plant Photosystem I. In: Photosystem I. Golbeck JH editor, Kluwer academic publishing. Dordrecht.
50. Amunts, A., Drory, O. and Nelson, N. (2007). A glimpse into the atomic structure of plant photosystem I. **Proc. XIII Internatl. Cong. Photosynthesis,**
51. Amunts A., Drory O., Nelson N., (2008) A glimpse into the atomic structure of plant Photosystem I. WILEY-VCH book on "*Photosynthetic Proteins Complexes*", 65-82, edited by P. Fromme