

CURRICULUM VITAE

NAME: Julio L. Vergara

PLACE OF BIRTH: Santiago, Chile

EDUCATION:

Universidad Catolica de Chile	B.S.	1967	Biol. Sciences
Universidad Catolica de Chile	M.S.	1970	Biol. Sciences
Universidad Catolica de Chile	Ph.D	1972	Biol. Sciences
Duke University	Post Doc (T. Narahashi)	1973	Physiology
NIH	Post Doc (S. Rapoport)	1973-74	Physiology

PROFESSIONAL EXPERIENCE:

1972-1975	<i>Research Assistant</i> , Departamento de Fisiologia y Biofisica, Facultad de Medicina, Universidad de Chile.
1975-1976	<i>Associate Professor</i> , Departamento de Biologia, Facultad de Ciencias, Universidad de Chile (joint appointment).
1975-1976	<i>Associate Professor</i> , Departamento de Fisiologia y Biofisica, Facultad de Medicina, Universidad de Chile.
1977	<i>Visiting Scholar</i> , Department of Physiology, School of Medicine and Department of Physiology and Pharmacology, School of Dental Medicine, University of Pennsylvania.
1977-1980	<i>Assistant Professor</i> , Department of Physiology, UCLA School of Medicine.
1980-1984	<i>Associate Professor</i> , Department of Physiology, UCLA School of Medicine.
1984-Present	<i>Professor</i> , Department of Physiology, UCLA School of Medicine.
2008-present	<i>Distinguished Professor of Physiology</i> , Department of Physiology, David Geffen School of Medicine, UCLA

FELLOWSHIPS

1971	Chilean National Research Council Fellowship
1972	British Council Fellowship
1973-1974	Muscular Dystrophy Association Postdoctoral Fellowship

AFFILIATIONS

Member, Biophysical Society (1977 - Present)
Member, Society of General Physiology (1985 - Present)
Member, Brain Research Institute, UCLA (1981-Present)
Member Jerry Lewis Neuromuscular Research Center (JLNRC) UCLA (1977- Present)
Member, American Association for the Advancement of Science (AAAS), (1995-present)

HONORS (1995-2006)

Associate Director, Jerry Lewis Neuromuscular Research Center, UCLA (1990-1997)
NIAMS-EP, NIH Review Panel, 1997
NIAMS, NIH Special Review Panel, 1998
Ad-Hoc Member, NIH Respiratory and Applied Physiology Study Section (1999)
Special Grants Review Committee, NIAMS, NIH (1998-2002)
Elected fellow AAAS (1999)
Chair, NIAMS, NIH Special Review Panel (2001)
Chair, Training Program Advisory Committee, Department of Biomathematics, UCLA (2001-2002).
Ad Hoc member, CSR/NIH-MDCN-3 Study Section (2003)
Ad Hoc reviewer, Muscular Dystrophy Association Research Committee (2003)
American Heart Association Western States, Member, Study Section 5A (2003-2005)
NIH-NIAMS Board of Scientific Counselors, Member (2002-2008)
Skeletal Muscle Biology and Exercise Physiology (SMEP) Study Section, Member, CSR, NIH (2004-2009).
Editorial Board Journal of Biophysics (2008-present).
Outstanding Tutor Award, David Geffen School of Medicine, UCLA (2007 & 2008).

PUBLICATIONS

Research Papers

- 1) Keynes, R.D., Rojas, E., Taylor, R.E. & Vergara, J. Calcium and Potassium systems of a giant Barnacle Muscle Fiber under Membrane Potential Control. *Journal of Physiology* 229: 409-455, 1973.
- 2) Atwater, I., Rojas, E., & Vergara, J. Calcium influxes and Tension Development in Perfused Single Barnacle Muscle Fibers under Membrane Potential Control. *Journal of Physiology* 243: 523-551, 1974.
- 3) Vergara, J. and S.I. Rapoport. Fatigue in Frog Single Muscle Fibres. *Nature* 252: 727-728, 1974.
- 4) Bezanilla, F., E. Rojas, and J. Vergara. Excitation-contraction coupling in Barnacle Muscle Fibres under Membrane Potential Control. *Acta Physiologica Latinoamericana* 23: 497-501, 1973.
- 5) Zampighi, G., J. Vergara, and F. Ramon. On the Connection between the Transverse Tubule and the Plasma Membrane in Frog Semitendinosus Skeletal Muscle. *Journal of Cell Biology* 64: 734-740, 1975.
- 6) Vergara, J., and Bezanilla, F. Fluorescence Changes during Electrical Activity in Frog Muscle stained with Merocyanine. *Nature* 159: 684-686, 1976.
- 7) Vergara, J., S.I. Rapoport, and Nassar-Gentina, V. Fatigue and Post-tetanic Potentiation in Single Muscle Fibers of the Frog. *American Journal of Physiology* 232: C185-C189, 1977.

- 8) Bezanilla, F., and Vergara, J. Fluorescence signals from Frog Skeletal Muscle Fibers. In: Biophysical Aspects of Cardiac Muscle. M. Morad, Ed., Academic Press, New York, pp. 229-254, 1978.
- 9) Vergara, J., Bezanilla, & Salzberg, B.M. Nile Blue fluorescence signals from cut single muscle fibers under voltage or current clamp conditions. *Journal of General Physiology* 72: 775-800, 1978.
- 10) Nassar-Gentina, V., J.V. Passonneau, J.L.Vergara, and S.I. Rapoport. Metabolic Correlate of Fatigue and of Recovery from Fatigue in single Frog Muscle Fibers. *Journal of General Physiology* 72: 593-606
- 11) Caputo, C., J. Vergara, and F. Bezanilla. Local anesthetics inhibit Tension Development and Nile Blue fluorescence Signal in Frog Muscle Fibers. *Nature* 277: 401-402, 1979
- 12) Bezanilla, F., and Vergara, J. Properties of Excitable Membranes. In: Membrane Structure and Function, E.E. Bittar, Ed., Volume II, Chapter 2, pp. 53-112, 1980
- 13) Vergara, J., and Bezanilla, F. Optical Studies of E-C coupling with potentiometric dyes. In: Regulation of Muscle Contraction: Excitation-Contraction Coupling, Alan D. Grinnell, and Mary A.B. Brazier, Eds., Academic Press, New York, pp. 67-77, 1981
- 14) Palade, P. & Vergara, J. Detection of Ca²⁺ with optical methods. In: Regulation of Muscle Contraction: Excitation-Contraction Coupling, A.D. Grinnell and M.A.B. Brazier, eds., Academic Press, New York, pp. 143-160, 1981.
- 15) Palade, P. & Vergara, J. Arsenazo III and antipyrylazo III calcium transients in single skeletal muscle fibers. *Journal of General Physiology* 79: 679-707, 1982.
- 16) Bezanilla, F., Vergara, J. and Taylor, R.E. Voltage clamping of excitable membranes. In: Biophysical Methods - Methods in Experimental Physics. H. Lecar and G. Ehrenstein, eds., Academic Press, N.Y., pp. 445-511, 1982.
- 17) Bezanilla, F. and Vergara, J. Optical studies of excitation-contraction coupling in muscle. In: Diseases of the Motor Unit (Sixth International Conference sponsored by the Muscular Dystrophy Association). D.L. Schotland, M.D., ed., J. Wiley and Sons, N.Y., pp. 561-563, 1982.
- 18) Vergara, J. & Caputo, C. Effects of Tetracaine on Charge Movements and Calcium Signals in Frog Skeletal Muscle Fibers *Proceedings of the National Academy of Sciences USA* 80: 1477-1481, 1983
- 19) Lopez, J. R., Alamo, L., Caputo, C., Dipolo, R. & Vergara, J. Determination of free ionic Ca²⁺ in Frog Skeletal Muscle Fibers. *Biophysical Journal* 43: 1-4, 1982
- 20) Heiny, J.A., and Vergara, J. Optical Signals from the Surface and T-system membranes in skeletal muscle fibers. *Journal of General Physiology* 80: 203-230, 1982

- 21) Heiny, J.A., F.M. Ashcroft, and J. Vergara. T-system Optical Signals Associated with Inward Rectification in Skeletal Muscle. *Nature* 301: 164-166, 1983
- 22) Palade, P. and Vergara, J. Stoichiometries of Arsenazo III-Ca complexes. *Biophysical Journal* 43: 355-369, 1983.
- 23) Vergara, J., Delay, M., Heiny, J. and Ribalet, B. Optical studies of T-system potential and calcium release in skeletal muscle fibers. In: The Physiology of Excitable Cells. A.D. Grinnell and W.J. Moody, Jr., eds., Allan Liss, pp. 343-355, 1983.
- 24) DiPolo, R., Rojas, H., Vergara, J., Lopez, R., and Caputo, C. Measurements of intracellular ionized Ca^{2+} in squid giant axons using Ca-selective electrodes. *Biochemical et Biophysical Acta* 728: 311-318, 1983
- 25) Lopez, J.R., Alamo, L., Caputo, C., Vergara, J., y DiPolo, R. Determinación de la concentración intracelular de Mg^{2+} libre en fibras de músculo esquelético. *Acta Científica Venezolana* 34: 208, 1983.
- 26) Heiny, J.A. and Vergara, J. Dichroic behavior of the absorbance signals from dyes NK2367 and WW375 in skeletal muscle fibers. *Journal of General Physiology* 84: 805-837, 1984.
- 27) Lopez, J.R., Alamo, L., Caputo, C., Vergara, J. and DiPolo, R. Direct measurement of intracellular free magnesium in frog skeletal muscle using magnesium selective microelectrodes. *Biochemical et Biophysical Acta* 804: 1-7, 1984.
- 28) Ashcroft, F.M., Heiny, J.A. and Vergara, J. Inward rectification in the transverse tubular system of frog skeletal muscle studies with potentiometric dyes. *Journal of Physiology* 359: 269-291, 1985.
- 29) Vergara, J., Kreman, M., Zampighi, G. and Simon, S. An atomizer for a dime. *Journal of Chemical Education* 62: 244, 1985.
- 30) Vergara, J. and Delay, M. The use of metallochromic Ca indicators in skeletal muscle. *Cell Calcium* 6: 119-132, 1985.
- 31) Vergara, J., Tsien, R.Y. and Delay, M. Inositol (1,4,5) trisphosphate: A possible chemical link in excitation-contraction coupling in muscle. *Proceedings of the National Academy of Sciences USA* 82: 6352-6356, 1985.
- 32) Delay, M., Ribalet, B., and Vergara, J. Caffeine potentiation of calcium release in frog skeletal muscle fibers. *Journal of Physiology* 375: 535-559, 1986.
- 33) Vergara, J. and Delay, M. A transmission delay and the effect of temperature at the triadic junction of skeletal muscle. *Proceedings of the Royal Society London, Series B* 229: 97-110, 1986.
- 34) Vergara, J., Asotra, K., and Delay, M. A chemical link in excitation-contraction coupling

in skeletal muscle. In: Cell Calcium and Membrane Transport. L.J. Mandel and D.C. Eaton, eds., Rockefeller Press, N.Y., pp. 134-151, 1987.

35) Vergara, J. and Asotra, K. A chemical transmission mechanism of excitation-contraction coupling in skeletal muscle. *News in Physiological Sciences* 2: 182-186, 1988.

36) Lagos, N., and Vergara, J. Phosphoinositides in frog skeletal muscle: A quantitative analysis. *Biochemical et Biophysical Acta* 1043: 235-244, 1990.

37) Vergara, J., Lagos, N., and Compagnon, D. A chemical mechanism of excitation - contraction coupling in skeletal muscle. In: Transduction in Biological Systems. C. Hidalgo, E. Jaimovich, J. Bacigalupo and J. Vergara., Eds., Plenum Press, pp. 415-427, 1990 .

38) Vergara, J., Di Franco, M., Compagnon, D., and Suarez-Isla, B. Imaging of calcium transients in skeletal muscle fibers. *Biophysical Journal* 59: 12-24, 1991.

39) Asotra, K., Lagos, N., and Vergara, J. Synthesis of polyphosphoinositides in transverse tubule and sarcoplasmic reticulum membranes of frog skeletal muscle. *Biochemical et Biophysical Acta* 1081: 229-237, 1991.

40) Sanchez, X., Carrasco, M.A., Vergara, J. & Hidalgo, C. Inositol 1,4,5-trisphosphate phosphatase activity in membranes isolated from amphibian skeletal muscle. *FEBS Letters* 279: 58-60, 1991.

41) Vergara, J. and DiFranco, M. Imaging of calcium transients during excitation-contraction coupling in skeletal muscle fibers. *Advances in Experimental and Medical Biology* 311: 227-236, 1992.

42) Compagnon, D., Lagos, N., and Vergara, J. Phosphoinositides in barnacle muscle: A quantitative analysis. *Biochemical et Biophysical Acta* 1167:94-101, 1993.

43) Escobar, A., Monck, J., Fernandez, J.M. & Vergara, J. Localization of the site of Ca^{2+} release at the level of a single sarcomere in skeletal muscle fibers. *Nature* 367: 739-741, 1994.

44) Sanchez, J.A. & Vergara, J. Modulation of action potential and Ca^{2+} transients by flash photolysis of caged cAMP in single skeletal muscle fibres. *American Journal of Physiology* 266/5: C1291-C1300, 1994.

45) Monck, J. R., Robinson, I.M., Escobar, A.L., Vergara, J.L. & Fernandez, J.M. Pulsed Laser imaging of rapid Ca^{2+} gradients in excitable cells. *Biophysical Journal* 67: 505-514, 1994.

46) Escobar, A.L., Cifuentes, F., and Vergara, J.L. Detection of Ca^{2+} elicited by flash photolysis of DM-nitrophen with a rapid indicator. *FEBS Letters* 364: 335-338, 1995.

47) Matsuyama, S.S., Yamaguchi, D.T., Vergara, J.L. and Jarvik, L.F. Tetraethylammonium-induced calcium concentration changes in skin fibroblasts from patients with Alzheimer disease. *Dementia* 6: 241-244, 1995.

- 48) Kim A.M., DiFranco, M., and Vergara, J.L. A gap isolation method to investigate electrical and mechanical properties of fully contracting skeletal muscle fibers. *Biophysical Journal* 91: 924-931, 1996.
- 49) Velez, P., Gyorke, S., Escobar, A., Vergara, J.L. and Fill, M. Adaptation of single cardiac ryanodine receptor channels. *Biophysical Journal* 72: 691-697, 1997.
- 50) Escobar, A.L., Velez,P., Kim, A. M., Cifuentes, F., Fill, M., and Vergara, J.L. Kinetic properties of DM-nitrophen and calcium indicators: rapid transient response to flash photolysis. *Pflügers Archiv* 434: 615-631, 1997.
- 51) Yazejian, B., DiGregorio, D. A., Vergara, J. L., Poage, R.E., Meriney, S. D., and Grinnell, A.D. Direct measurements of presynaptic calcium and calcium-activated potassium currents regulating neurotransmitter release at cultured *Xenopus* nerve-muscle synapses. *Journal of Neuroscience* 17: 2990-3001, 1997.
- 52) DiGregorio, D. and Vergara, J.L. Localized detection of action potential induced presynaptic calcium transients at a neuromuscular junction. *Journal of Physiology* 505: 585-592, 1997.
- 53) Kim A.M. and Vergara, J.L. 1998. Fast voltage gating of Ca²⁺ release in skeletal muscle revealed by supercharging pulses. *Journal of Physiology* 511: 509-518.
- 54) Kim, A.M. and Vergara, J.L. 1998. Supercharging accelerates T-tubule membrane potential changes in voltage clamped frog skeletal muscle fibers. *Biophysical Journal* 75: 2098-2116.
- 55) DiFranco, M, Quiñonez, M., DiGregorio,D., Kim, A.M., Pacheco, R. and Vergara, J.L. 1999. Inverted double gap isolation chamber for high-resolution calcium fluorimetry in skeletal muscle fibers. *Pflügers Archiv* 483/3: 412-418.
- 56) DiGregorio, D., Peskoff, A., and Vergara, J. 1999. Measurement of action potential-induced presynaptic calcium domains at a cultured neuromuscular junction. *Journal of Neuroscience* 19(18):7846-7859.
- 57) Cifuentes, F., Vergara, J. and Hidalgo, C. 2000. Sodium-calcium exchange in amphibian skeletal muscle fibers and isolated transverse tubules. *Am. J. of Physiology. Cell Physiology*, 279: C89-C97.
- 58) Nägerl, U.V., Novo, D., Mody, I., and Vergara, J.L. 2000. Binding Kinetics of Calbindin-D_{28k} Determined by Flash Photolysis of Caged Ca²⁺. *Biophysical Journal* 79: 3009-3018.
- 59) Pattillo, J.M, Yazejian,B., DiGregorio, D., Vergara, J.L., Grinnell, A.D., and Meriney, S. 2001. Contribution of Presynaptic Calcium-Activated Potassium Currents to Transmitter Release Regulation in Cultured *Xenopus* Nerve-Muscle Synapses. *Neuroscience* 102: 229-240.
- 60) Vergara, J.L., DiFranco, M. and Novo, D. 2001. Dimensions of calcium release domains in frog skeletal muscle fibers. *Proceedings of SPIE* 4259: 133-143.

- 61) DiGregorio, D., Negrete, O., Jeromin, A., Peng, H.B. and Julio L. Vergara. 2001. Localization of Action Potential-induced Presynaptic Calcium Domains in Active Zones of a Cultured Neuromuscular Junction. *European Journal of Neuroscience* 14:1-16.
- 62) DiFranco, M., Novo, D. and Vergara, J. 2002. Characterization of the Calcium Release Domains during Excitation-Contraction Coupling in Skeletal Muscle Fibres. *Pflügers Archiv* 443:508-519.
- 63) Novo, D., DiFranco, M. and Vergara, J. 2003. Comparison between the predictions of diffusion-reaction models and localized Ca²⁺ transients in amphibian skeletal muscle fibers. *Biophysical Journal* 85: 1080-1097.
- 64) Woods, C.E., Novo, D., DiFranco, M and Vergara, J. 2004. Evoked sarcoplasmic reticulum calcium release is impaired in dystrophic mouse muscle fibers *Journal of Physiology (Lond)* 557: 59–75.
- 65) Faas, Guido C., Karacs, K., Vergara, J. L., and Mody, I. 2005. Kinetic Properties of DM-Nitrophen Binding to Calcium and Magnesium. *Biophysical Journal* 88:4421-4433.
- 66) Woods, C.E., Novo, D., DiFranco, M and Vergara, J. 2005. Propagation in the transverse tubular system and voltage dependence of calcium release in normal and mdx muscle fibres. *Journal of Physiology (Lond)* 568: 867-880.
- 67) DiFranco, M., Capote, J., and Vergara, J. L. 2005. Optical Imaging and Functional Characterization of the Transverse Tubular System of Mammalian Muscle Fibers using the Potentiometric Indicator di-8-ANEPPS. *J. Membrane Biology* 209: 141-153 (2005).
- 68) DiFranco, M., Neco, P., Capote, J., Meera, P., and Vergara, J. L. 2006. Quantitative Evaluation of Mammalian Skeletal Muscle as a Heterologous Protein Expression System. *Protein Expression and Purification* 47: 281-288.
- 69) Gomez, J., Neco, P., DiFranco, M., and Vergara, J. L. 2006. Calcium release domains in mammalian skeletal muscle studied with two-photon imaging and spot detection techniques. *Journal General Physiology* 127: 623 – 637 (Cover article).
- 70) Vergara, J. L. and DiFranco, M. 2006. Modulation by caffeine of calcium release microdomains in frog skeletal muscle. *Biological Research* vol.39, no.3, p.567-581.
- 71) Faas, G, Schwaller, B., Vergara, J.L. and, Mody, I. 2007. Resolving the Fast Kinetics of Cooperative Binding: New Insights into the Regulation of Cellular Ca²⁺. *PLoS Biology* 5:e311.
- 72) DiFranco, M., Capote, J., Quinonez, M., and Vergara, J. L. 2007. Voltage-dependent Dynamic FRET Signals from the Transverse Tubules in Mammalian Skeletal Muscle Fibers. *Journal of General Physiology* 130:581-600 (Cover article).

- 73) Morgado-Valle, C., Beltran-Parraza, L., DiFranco, M., Vergara, J.L., and Feldman, J.L. 2008. Somatic Ca²⁺ dynamics in active preBötzing complex inspiratory neurons. *Journal of Physiology* 586 (Pt 18):4531-40.
- 74) DiFranco, M., Capote, J., Quinonez, M., and Vergara, J. L. 2008. Dystrophic Skeletal Muscle Fibers Display Alterations at the level of Calcium Release Microdomains. *Proceedings of the National Academy of Sciences* 105(38):14698-703.
- 75) DiFranco, M., Capote, J., Quinonez, M., and Vergara, J. L. 2009. DNA transfection of mammalian skeletal muscles using in vivo electroporation. *Journal of Visualized Experiments* (in press).

BOOKS

- Transduction in Biological Systems. C. Hidalgo, E. Jaimovich, J. Bacigalupo and J. Vergara., Eds., Plenum Press, 1990.

TEACHING SOFTWARE

- The Nerve Impulse. (1986) University of California. Vergara, J. L. and Bezanilla, F.
- The Nerve Impulse. An Interactive Software Package. (1989). Jurisic, N, Bezanilla, F. and Vergara, J.L.

ABSTRACTS

- *More than 120 Abstracts and presentations in scientific congresses*

PATENTS

- International Patent WO/2006/042147. Large-Scale Production of Recombinant Transmembrane and Cytosolic Proteins. 20/04/2006.
- United States National Stage Patent Application No. 11/664,832. Large-Scale Production of Recombinant Transmembrane and Cytosolic Proteins. (Filed 11/08/2007. Patent Pending)