Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Tocopherol activity correlates with its location in a membrane: A new perspective on the anti-oxidant Vitamin E DREW MARQUARDT, Department of Physics, Brock University, JUSTIN WILLIAMS, Department of Physics, Indiana University Purdue University Indianapolis, NORBERT KUCERKA, National Research Council, Canadian Neutron Beam Centre, JEFFREY ATKINSON, Department of Chemistry, Brock University, JOHN KATSARAS, Oak Ridge National Laboratory, Oak Ridge, STEPHEN WASSALL, Department of Physics, Indiana University Purdue University Indianapolis, THAD HARROUN, Department of Physics, Brock University — There are no proven health benefits to supplementing with Vitamin E, so why do we require it for healthy living? The whole notion that vitamin E is an in-vivo antioxidant is now being seriously questioned. Using neutron diffraction and supporting techniques, we have correlated vitamin E's location in model membranes with its antioxidant activity. experiments were conducted using phosphatidylcholine (PC) bilayers whose fatty acid chains varied in their degree of unsaturation. We observe vitamin E up-right in all lipids examined, with its overall height in the bilayer lipid dependant. Interestingly we observe vitamin E's hydroxyl in the headgroup region of the bilayer for both the fully saturated and poly unsaturated lipids. Vitamin E was most effective at intercepting water borne oxidants than radical initiated within the bilayer core. However for lipids where vitamin E resides slightly lower (glycerol backbone) we observe comparable antioxidant activity against both water borne and hydrocarbon borne oxidants. Thus showing lipid species can modulate the location of vitamin E's activity.

Drew Marquardt
Department of Physics, Brock University,
St. Catharines, Ontario L2S 3A1, Canada

Date submitted: 27 Nov 2012 Electronic form version 1.4