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Vitamin E isoforms regulate allergic disease

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A sthma is a heterogeneous disease resulting from complex interactions of environmental and genetic factors. The World Health Organization reported that the prevalence of asthma has increased over only a few decades suggesting an important role of the local environment. One environmental change over the past 40 years has been an increase in the d- γ -tocopherol isoform of vitamin E in the diet and in infant formulas. Our studies focus on regulation of allergic inflammation by the two most abundant forms of vitamin E (d- α -tocopherol and d- γ -tocopherol) in the diet and tissues. We demonstrated that α -tocopherol inhibits and γ -tocopherol elevates leukocyte recruitment across endothelium *in vitro* and endothelial cell protein kinase C α activation for eosinophil and dendritic cell recruitment during allergic inflammation. Specifically, γ -tocopherol is an agonist and α -tocopherol associate with better lung spirometry in adult humans. Notably, γ -tocopherol has the opposite function. In humans, a 5-folds higher plasma γ -tocopherol level associate with lower lung spirometry in adults by age 21, suggesting tocopherol isoforms have a regulatory role early in life. In clinical studies and animal models, offspring of allergic mothers have increased responsiveness to allergen challenge. We demonstrated that development of allergic responses in offspring is inhibited or elevated by maternal supplementation with α -tocopherol, respectively. These results have implications for supplementation of allergic mothers with tocopherol isoforms and for development of allergics in future generations.

Biography

Joan Cook-Mills has completed her PhD at Michigan State University and Postdoctoral studies at the University of Illinois at Chicago. She was an Assistant Professor at the University of Cincinnati and then became Associate Professor at Northwestern University. She is a currently a Professor in the Allergy/Immunology Division at Northwestern University in Chicago. She has published more than 50 papers in scientific journals and has served on study sections for the National Institutes for Health and the American Heart Association. Her research on vitamin E was in a press release from Northwestern University and then presented in the New York Times and other magazines.

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