



## Introduction

**W**e are very proud of this supplement, which represents the proceedings of an experts roundtable meeting titled “Epilepsy in Women: The Biological Basis for the Female Experience,” held in February 2003 in New York City. More than 20 physicians and scientists participated in this event, sharing ideas and discussing innovative research that sheds light on the biological basis for gender differences in epilepsy. The experts roundtable meeting set the agenda for a series of programs and an Internet-based CME activity dedicated to educating neurologists and other health care professionals about issues critical to the treatment of epilepsy in women. As the use of antiepileptic drugs (AEDs) for disorders other than epilepsy grows, so must the awareness of all health care providers using AEDs in female patients.

We thank all of those who participated in the experts roundtable meeting for their valuable contributions, the American Epilepsy Society for sponsoring the initiative, and GlaxoSmithKline for providing an educational grant in support of these programs.

Basic concepts involving the effects of female sex steroids on central nervous system (CNS) activity are essential to understanding how epilepsy in women is influenced by changes in reproductive status and by reproductive cycles. In the first article in this supplement, neuroscientists **Sheryl Smith** and **Catherine Woolley** address the cellular and molecular effects of steroid hormones on excitation and inhibition within the CNS and describe their own recent discoveries in this area. Through multiple mechanisms, the ovarian hormones estrogen and progesterone have opposing effects on seizure threshold. Estrogen enhances excitatory input and progesterone enhances inhibitory responses, providing the basis for fluctuations in seizure expression across the menstrual cycle.

Next, **Nancy Foldvary-Schaefer**, **Cynthia Harden**, **Andrew Herzog**, and **Tommaso Falcone** review the

relationship between hormones and seizures in women over the reproductive life span. Governed by the hypothalamic-pituitary-gonadal axis, the normal menstrual cycle is characterized by fluctuations in estrogen and progesterone that result in periods of seizure susceptibility. This phenomenon, known as catamenial epilepsy, affects at least one third of women with epilepsy. The pathophysiology and clinical presentation of this disorder are discussed, as are diagnostic and treatment approaches. Dr. Harden also shares data on her recent work investigating the relationship between menopause and seizure control in older women.

Reproductive health in women with epilepsy is addressed by **Martha Morrell** and **Georgia Montouris**. Women with epilepsy are at increased risk for a variety of reproductive endocrine disorders that result in menstrual cycle abnormalities and infertility. Drs. Morrell and Montouris review recent work regarding mechanisms responsible for anovulation and polycystic ovary-like syndrome in women with epilepsy. Signs and symptoms of reproductive dysfunction, both general and specific to women treated with AEDs, are reviewed.

Neurologist **Mark Yerby** and his coauthors **Peter Kaplan** and **Teresa Tran** review pregnancy outcomes in women with epilepsy, as well as the effect of pregnancy on seizures. Data are now emerging from pregnancy registries tracking the outcome of children born to mothers using AEDs during pregnancy. These data are essential for counseling women regarding AED use during pregnancy. An update on pregnancy registry findings and a practical approach for managing epilepsy during pregnancy are provided.

The effects of AED exposure on neurodevelopment are of growing concern to mothers with epilepsy and their health care providers. **Kimford Meador**, a neurologist and epileptologist, and **Mary Zupanc**, a pediatric neurologist and epileptologist, review the factors affecting neurodevelopment in

offspring of women with epilepsy and recent studies of the intelligence and educational needs of children exposed to AEDs in utero. Ongoing research, including the Neurodevelopmental Effects of Antiepileptic Drugs (NEAD) study, led by Dr. Meador, is expected to clarify some of the unresolved controversies in this area.

Bone health is a major concern for all women. An association between AEDs and bone loss in adults and children was first reported more than 3 decades ago. As the use of AEDs for disorders other than epilepsy, such as pain and psychiatric and sleep disorders, continues to soar, millions of women may be at risk for bone disease. **Alison Pack** and her coauthors **Barry Gidal** and **Blanca Vazquez** review this literature and share the findings of Dr. Pack's

most recent work.

Finally, **Patricia Penovich**, a leader in women's health issues in epilepsy, and her coauthors **Vasiliki Economou** and neuroscience nurse **Karen Eck** provide general recommendations for the care of women with epilepsy. They cover contraceptive options, management strategies for the treatment of women with epilepsy during pregnancy and the postpartum period, and guidelines for calcium and vitamin D supplementation and diagnostic testing for bone health.

We hope these proceedings serve as a useful guide to all health care professionals treating women with epilepsy and prescribing AED therapy, and we look forward to future advances in this important area of research.

NANCY FOLDVARY-SCHAEFER, DO  
Guest Editor  
The Cleveland Clinic  
Cleveland, Ohio

MARTHA J. MORRELL, MD  
Guest Editor  
Columbia University and The Neurological Institute  
New York, N.Y.