Foreword

This special issue of *Developmental Neuroscience*, 'Drug Abuse, Addiction and the Developing Brain', focuses on the effects of drugs of abuse on the brain during development. The societal impact of this issue cannot be overstated: gestational exposure to legal and illicit drugs of abuse is the single largest preventable cause of in utero developmental compromise of infants in the USA today. 800,000–1 million fetuses are born each year with exposure to a drug of abuse. One in 4 are exposed to nicotine, 1 in 7 to alcohol, and 1 in 25 to an illegal drug, although the prevalence is far greater for younger women and teenagers: up to 1 in 8 mothers aged 15–18 years expose their fetuses to illegal drugs during pregnancy. We know that maternal drug use can cause premature birth, spontaneous abortions, low birth weight, as well as abnormalities in many organ systems, most prominently the brain as evidenced by numerous neurological, emotional, and cognitive impairments. The costs to our society in terms of medical complications, disability, and special schooling are enormous.

Despite the clinical importance of gestational drug exposure, we still know relatively little about the underlying biological mechanisms involved, due in part to the relative dearth of research in animal models on this subject. Several of the articles in this special issue address this research need by defining the long-term consequences of prenatal drug exposure, and the mechanisms by which

drugs induce these deleterious effects, in animal models. The goal is to use this increasing knowledge of prenatal drug action to design new interventions to reduce injury to the fetus.

Another key line of investigation is to understand why adolescents are particularly vulnerable to drug use and addiction. While there are no doubt many social and psychological factors involved, there also appear to be neurobiological factors: there is increasing evidence from animal models that the adolescent brain is more sensitive to many of the molecular and cellular actions of drugs of abuse. Identifying these neurobiological factors, some discussed in this special issue, could lead to the development of new interventions to augment the efficacy of psychosocial efforts. For example, voucher-incentive programs have shown some effectiveness in reducing drug use among teenagers. Novel medications to counteract powerful neurobiological mechanisms could potentially enhance the utility of such behavioral programs.

This is an exciting time in the neurosciences, with uniquely powerful molecular and cellular tools now being applied to increasingly sophisticated behavioral models of drug addiction in animals. This special issue reflects the increasing extent to which science is finally being brought to bear to address one of the leading medical issues of our time.

Eric J. Nestler, New York, N.Y.