

Preface

The fact that tobacco ingestion can affect how people feel and think has been known for millennia, placing the plant among those used spiritually, honorifically, and habitually (Corti 1931; Wilbert 1987). However, the conclusion that nicotine accounted for many of these psychopharmacological effects did not emerge until the nineteenth century (Langley 1905). This was elegantly described by Lewin in 1931 as follows: “The decisive factor in the effects of tobacco, desired or undesired, is nicotine...” (Lewin 1998). The use of nicotine as a pharmacological probe to understand physiological functioning at the dawn of the twentieth century was a landmark in the birth of modern neuropharmacology (Limbird 2004; Halliwell 2007), and led the pioneering researcher John Langley to conclude that there must exist some “receptive substance” to explain the diverse actions of various substances, including nicotine, when applied to muscle tissue (Langley 1905).

Research on tobacco and nicotine progressed throughout the twentieth century, but much of this was from a general pharmacological and toxicological rather than a psychopharmacological perspective (Larson et al. 1961). There was some attention to the effects related to addiction, such as euphoria (Johnston 1941), tolerance (Lewin 1931), and withdrawal (Finnegan et al. 1945), but outside of research supported by the tobacco industry, addiction and psychopharmacology were not major foci for research (Slade et al. 1995; Hurt and Robertson 1998; Henningfield et al. 2006; Henningfield and Hartel 1999; Larson et al. 1961). This situation changed rapidly in the 1970s and 1980s with a virtual explosion of research focused on nicotine psychopharmacology and potential addictive effects (US DHHS 1979, 1988; National Institute on Drug Abuse 1984, 1987 (Henningfield and Goldberg 1983).

The expansion of nicotine-related research was driven largely by the growing recognition of the emerging tobacco epidemic. It was facilitated by advances in research methodology and technology that enabled scientists to examine the cellular and even molecular basis of nicotine action. Such developments contributed to a rapidly increasing understanding of the effects of nicotine on brain structure and

function, as well as to identifying and characterizing the effects of the multitude of subtypes of nicotinic receptors, laying the foundation for advances that might lead to therapeutic uses of nicotine and related molecules beyond their use for the treatment of tobacco dependence and withdrawal (Henningfield et al. 2006; Buchhalter et al. 2008).

An update on the remarkable progress in research related to nicotine psychopharmacology was presented in a special issue of the journal *Psychopharmacology* in 2006. The volume clearly struck a chord with many in basic science, public health, and policy, who learned that this area of pharmacological science was not only strong, but also highly relevant to potential public health policy and regulatory efforts aimed at controlling tobacco use, addiction, and resultant deadly disease. This was anticipated in the mid 1990s when the Commissioner of the United States Food and Drug Administration (FDA) proposed that the agency regulate tobacco products (Kessler 2001; Kessler et al. 1997; FDA 1995, 1996). The Commissioner's testimony and recommendations were based in part on basic science findings, including the actions of nicotine on nicotinic receptors in the brain, advances in understanding the mechanisms of action of nicotine through neuroimaging, and discriminative and reinforcing actions of nicotine. Subsequently, the World Health Organization came to rely in part on psychopharmacological research findings as part of the science base for development and implementation of its international treaty, proposed in the late 1990s, which entered into force in 2005 (WHO 2005). The Treaty's articles that include attention to nicotine dosing capacity and effect, in particular, will continue to rely on psychopharmacology research as they are implemented.

The European Commission has also taken a strong science-based approach to tobacco disease control and product regulation and has made tobacco control a priority since the mid 1980s. For examples, reports by the Analysis of Science Policy in Europe for Control of Tobacco (ASPECT) Consortium financed by and prepared for the use of the European Commission, Directorate-General for Health and Consumer Protection emphasize the need for a strong science base for tobacco-control policy and interventions (European Commission 2004, 2007). There are many other national and regional efforts as well, but these illustrate the global public health and regulatory importance of nicotine and tobacco science that has included psychopharmacological research.

The fact that psychopharmacological research on nicotine and related compounds was progressing at a rapid pace, with broad and substantial interest, indicated that an update, in the form of a systematically planned and edited special volume, could serve the field and facilitate scientific progress. It was challenging to represent the many promising areas of research, from molecular to clinical to epidemiological, within a single volume. We asked leading researchers to write relatively focused reviews on their areas of recent interest. Each article was reviewed by experts, including other authors whose articles are published in this volume, producing what we believe is a reference that will be useful to researchers, students, health professionals, and to the growing number of people involved in efforts to regulate tobacco product contents and designs nationally and internationally. This work was intended

as a contribution to the reversal of the current tobacco epidemic and thereby to preventing many of the approximately one-half billion tobacco attributable deaths predicted in the first half of the twentieth century (Koop 2004; Doll 1994).

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