UNITED STATES DEPARTMENT OF JUSTICE

DRUG ENFORCEMENT ADMINISTRATION

In the Matter of	)	
	)	Docket No. 84-48
MDMA SCHEDULING	)	

DIRECT TESTIMONY OF RICHARD A. GLENNON, Ph.D.

I, Richard A. Glennon, make the following statement:

I am a Professor in the Department of Medicinal Chemistry, School of Pharmacy, Medical College of Virginia, Virginia Commonwealth University, Richmond, Virginia. I have been a member of the teaching staff at the Medical College of Virginia since 1975. I received my B.S. degree in Pharmacy, my M.S. in Medicinal Chemistry, and my Ph.D. in Medicinal Chemistry from the State University of New York at Buffalo in 1973. I was in a post-doctoral program in psychopharmacology at the State University of New York at Buffalo from 1973 to 1975. A copy of my curriculum vitae is attached as exhibit 1.

I have been involved in investigations of centrally-active drugs using a drug discrimination paradigm. The paradigm, or research model, involves training animals, in this case rats, to distinguish drugs based upon recognizing the presence or absence of certain effects produced by a particular dose of a drug. The animals are trained over a period of time to press a lever when they recognize that substance or one that produces similar stimulus effects. This paradigm is especially suitable for the study of psychotomimetic agents. After the animals have been

trained to discriminate between a particular drug and saline, their responses to dosages of other substances are measured. For example, rats are trained to discriminate amphetamine from saline. This is evidenced by rats pressing a specific lever more than 80% of the time when they receive amphetamine. When they are given substances that do not produce effects similar to amphetamine they will press a different lever.

I have looked at a large series of compounds in rats trained to discriminate amphetamine-like substances and DOM-like (hallucinogenic) substances. The rats trained to discriminate amphetamine-like substances were trained with the (+) isomer of amphetamine sulfate and rats trained to discriminate DOM-like substances were trained with (±)-1-(2,5-dimethoxy-4-methylphenyl)-2-aminopropane (DOM). Various substituted amphetamine analogs were tested in the amphetamine trained and the DOM trained rats. Substances which generalized to the discriminative stimulus effects of DOM include known hallucinogens such as LSD and DOB. Substances which generalized to the discriminative stimulus effects of amphetamine include methamphetamine, cocaine and para-methoxyamphetamine. Only one compound was recognized both as an amphetamine by the amphetamine trained rats and as a hallucinogen by the DOM trained rats. This substance is the racemic mixture of 3,4-methylenedioxyamphetamine (MDA). When MDA was separated into the (+) and (-) isomers and tested in rats trained to discriminate amphetamine, only the (+) isomer of MDA was recognized by the rats. When the (+) and (-) isomers of MDA were tested in rats trained to discriminate DOM, the rats recognized only the (-) MDA isomer. This

suggests the stimulus effects of (+) MDA are predominately amphetamine-like and those of (-) MDA are more DOM-like.

In another study rats were also trained to discriminate between MDA and saline. N-methyl MDA also known as 3,4-methylenedioxymethamphetamine or MDMA was given in varying doses to rats trained to recognize amphetamine, to those trained to recognize DOM, and to those trained to recognize MDA. The rats did recognize N-methyl MDA to be amphetamine-like. They also recognized N-methyl MDA to be MDA-like. They did not recognize N-methyl-MDA to be DOM-like. These studies also showed that N-methyl-MDA was slightly more potent than MDA. This finding is consistent with the structure-activity relationship which indicates that adding and N-methyl group to an amphetamine-like compound does not decrease potency.

The studies I have conducted are directed toward showing the mechanism of action of hallucinogenic agents. They have been funded by the National Institute on Drug Abuse (NIDA) and the drugs used in the studies came from NIDA or were synthesized in our laboratory.

There is an excellent correlation between the results of our drug discrimination studies in rats and data concerning the effects of the subject compounds in humans. ("The Use of the Drug Discrimination Paradigm for Studying Hallucinogenic Agents. A Review", R. Glennon, J. A. Rosecrans, R. Young, in Drug Discrimination: Applications in CNS Pharmacology. Francis C. Colpaert and J. L. Slangen, Editors). The document is attached as Exhibit 2. Most of the compounds which have been tested in our paradigm show the same activity and similar relative potencies in humans as in animals where human data are available. I would therefore expect that a substance recognized in this paradigm as

having amphetamine-like, DOM-like, or MDA-like properties, could have those same properties in humans.

Based on the results of the studies I have conducted in rats, I conclude that N-methyl-MDA has amphetamine-like properties which are very similar to those shown by MDA. Although my studies did not show that MDMA has DOM-like properties, this type of activity cannot be ruled out due to the limitations of the paradigm.

I declare under penalty of perjury that the foregoing statement is true and correct.

Executed on April 22, 1985

Richard A. Glennon

Richard A. Glennon, Ph.D.

EXHIBIT 1

RICHARD A. GLENNON

PERSONAL INFORMATION

Date and Place of Birth:	July 2, 1945 - Lawrence, Massachusetts
Home Address:	349 Janlar Drive; Richmond, Virginia 23235
Office Address:	115 McGuire Hall; MCV/VCU
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EDUCATION

Ph.D. 1973,	Medicinal Chemistry;	State University of New York; Buffalo, NY
M. S. 1969,	Medicinal Chemistry;	Northeastern University; Boston, MA
B. S. 1967,	Pharmacy;	Northeastern University; Boston, MA

POSTDOCTORAL TRAINING

Postdoctoral Fellow (Psychopharmacology); Department of Pharmacology and Experimental Therapeutics, School of Medicine; State University of New York. August, 1973 - January, 1975.

RESEARCH AND OTHER WORK EXPERIENCE

Professor	Department of Medicinal Chemistry School of Pharmacy, MCV/VCU; 1983-to date.
Associate Professor	Department of Pharmaceutical Chemistry School of Pharmacy, MCV/VCU; 1980-1983
Assistant Professor	Department of Pharmaceutical Chemistry School of Pharmacy, MCV/VCU; 1975-1980
Research Chemist	Warner-Lambert Research Institute Morris Plains, NJ; 1967-1968
Staff Pharmacist	Bon Secours Hospital Methuen, Massachusetts; 1969
Pharmacy Intern and Staff Pharmacist	Childrens Hospital - Medical Center Boston, Massachusetts; part time basis 1963 through 1967

PUBLICATIONS

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2. Coburn, R. A.; Glennon, R. A., Synthesis and Properties of Mesoionic Thiazolo [3,2-a] thiazolopyrimidin-5,7-diones; J. Heterocyclic Chem. 1973, 10, 487.

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