

Levin  
JR

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY  
HARVARD UNIVERSITY



7 Divinity Avenue  
Cambridge, Massachusetts 02138

July 15, 1983

Dr. Peter J. Levin  
Dean, College of Public Health  
University of Oklahoma  
P. O. Box 26901  
01 Northeast 13th  
Oklahoma City, OK 73190

Dear Dr. Levin:

I apologize for my delay in responding to your letter of May 4. I share your concern that there may be a serious danger to public health from trichothecene mycotoxins. I am definitely not convinced, however, that such agents are involved in the chemical warfare reported from Southeast Asia or Afghanistan. I know of no adequate controls to tell us whether the trichothecenes in environmental and biomedical samples from alleged attack sites and victims are of natural origin. Indeed, there are indications in the biomedical samples that the origin of the toxins is natural. There is the very long persistence time one would have to assume for blood levels of the intact T2 molecule and also a remarkable tissue distribution of T2 at autopsy in which more than a month after the alleged attack the highest levels are found in organs of the digestive system.

I enclose for your interest a tabulation made by my colleague Dr. Julian Perry Robinson. It lists all of the environmental and biomedical samples analyzed for trichothecenes which have been referred to in the open literature, except, I believe, four blood serum samples collected by Canadian investigators from alleged victims in which trichothecenes were not detected by GC/MS. The lack of adequate controls and the peculiarities of persistence and tissue distribution mentioned above appear in the tables. Note also the tissue distribution of aflatoxin B1 in the autopsy samples (sample FS731, sheet 2, Table 2). Almost certainly this individual had ingested contaminated food or drink within the previous 48 hours. Otherwise one would expect the highest toxin level to occur in the liver, not in the digestive organs.

Continued.....

Note also in Tables 1 and 2 the striking clustering of collection times of environmental and biomedical samples contaminated with trichothecenes at the end of the dry season, in late February, March and early April. Out of approximately 100 alleged attacks in Laos, fewer than half are reported to occur in the three-month period February-April. Yet almost all the samples reported to contain trichothecenes were collected in that period. Does this mean that toxin attacks, in contrast to other attacks, occur mainly in the hot season or that investigators are mainly active then or does it reflect some seasonal factor in the natural occurrence of toxin in the diet and in the natural occurrence of environmental samples?

Another puzzle is the role of bees in the origin of the numerous pollen-rich spots and powders that have been thought to be the yellow rain itself. The numerous and diverse plant families represented are common in Southeast Asia and their pollen is gathered by bees. I do not accept the explanation put forward by State Department and Army investigators that bee-gathered pollen is added to the agent to aid in its dispersal, inhalation or ingestion. The collection of so much pollen from the Southeast Asian bee colonies and the claimed utility of adding it to a chemical warfare agent seem quite implausible. Also, dispersing the agent as sticky droplets, as reported by alleged victims, negates the claimed utility of the pollen particle size distribution. After deposition, redispersal as aerosol would be negligible. More likely, the samples are the actual excreta of bees. This can be tested by analysis for the chemical waste products of bees. If the samples are bee excrement, how can we account for so many apparently independent collections of such material, all interpreted by the collectors as yellow rain? When exposed to chemical or other attacks, do bees fly out of their colonies and defecate or are these the normal cleansing or migratory flights of bees, misinterpreted as chemical attacks?

My skepticism that trichothecenes are being used as agents of chemical warfare is reinforced by my inability to see how the concentrations of toxin and the delivery modes allegedly used could account for the severity of reported symptoms. I am also puzzled by the lack of any spent or unspent munitions, considering the many reports of chemical artillery and rocket attack.

From the point of view of public health the presence of high levels of trichothecenes could pose a grave danger whether their origin is natural or military. I would only suggest that we not exclude at this stage the possibility that the exposure we are dealing with here is natural. For your interest I also enclose a list of reports of natural occurrences of high levels of trichothecenes, including some occurrences under conditions of warm tropical weather in India. The list includes all reports of 2ppm or

Continued.....

Page 3

higher which I found from a computer based literature search. I see no reliable basis for the claim that high levels of trichothecenes cannot occur naturally in Southeast Asia. It is true, however, that the particular combination of toxins reported in the samples differs from what usually has been found in nature. I am looking into this point.

If you become involved with the problem, I hope you will share with me whatever findings you may make. Feel free to telephone if you would like to discuss the matter further. (617 495-2264).

Sincerely,

*Matthew Meselson*

Matthew Meselson  
Professor of Biochemistry and  
Molecular Biology

MM/db

Enclosures

cc: Dr. Albert Carnesale