UNIVERSITY OF Minnesota

DEPARTMENT OF VETERINARY PHYSIOLOGY AND PHARMACOLOGY
205 TEMPORARY EAST OF HAECKER • ST. PAUL, MINNESOTA 55101

October 4, 1971

Dr. R. A. Kehoe
Kettering Laboratory
College of Medicine
University of Cincinnati
Cincinnati, Ohio 45219

Dear Doctor Kehoe,

I have considered the issues you raise concerning an apparent difference in lead metabolism, depending upon the magnitude of intake by inhalation. As you point out, your studies indicated an essentially constant rate of accumulation of lead as a result of daily oral administration. I do not feel, however, that the evidence you cite regarding what happens with the inhalation of high concentrations of lead leads to the conclusion that the rate of accumulation in the total body tapers off in this case. I think your argument rests on the assumption that accumulation does not occur if the blood level and rate of urinary excretion plateaus. This would of course be true if one could treat the whole body as one kinetic compartment with reference to lead.

I think you would agree that there is good reason to believe that the body cannot be treated in this manner. First, I would cite your own data on human experimental subjects receiving lead orally. M. R. is illustrative. Your graphs show him to be accumulating lead at a more or less constant rate over 38 periods of 28 days. Yet, after 3-7 periods of 28 days his blood lead level seems to have reached a near - plateau. The same appears to be true of his urinary lead excretion after seven 28 day periods. It seems to me that this individual and others receiving lead orally behave in essentially the same manner as your subjects receiving rather large amounts of lead by inhalation. In both cases the data suggest to me attainment of a virtual equilibrium of input and output of lead in erythrocytes and a corresponding plateau of urinary lead excretion. I suspect that if a total lead balance could have been measured in your subjects breathing high concentrations of lead, you would have observed accumulation, as you did in the subjects receiving lead orally.

ERSITY OF Minnesota

DEPARTMENT OF VETERINARY PHYSIOLOGY AND PHARMACOLOGY
205 TEMPORARY EAST OF HAECKER • ST. PAUL, MINNESOTA 55101

As you point out, the important point is that there is no evidence of long-term increase of lead in the blood under conditions of constant rate of exposure and assimilation. The presumption that the concentration of lead in the blood reflects in a general way the magnitude of the toxicologically significant pool of lead in the body could stand some further examination. It is, however, the best index of hazard we have for both man and animals.

I am currently trying to assess the precision with which blood lead and chelatable lead reflect quantifiable parameters of toxicity. It seems to me that this is one of the areas in need of some attention.

I guess that the only point on which we seem to differ is with reference to whether or not your subjects inhaling lead at 150 $\mu g/m^3$ experienced a continuing accumulation of lead in the body after blood lead and urinary lead excretion had essentially leveled off.

I do enjoy an exchange of views on matters of this sort when both parties are only seeking the truth, as is the case in this instance. In this era of inflamed sensibilities, exchanges on environmental matters are not always so rational.

Sincerely,

P. B. Hammond

P. B. Hammond
Professor

PBH/vlk