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INTER-OFFICE MEMORANDUM

TO: Members of Research Group

DATE: 2 March 1945

FROM: L. H. Hempelmann

SUBJECT: Future Experiments

CLASSIFICATION CANCELLED OR CHANGED TO BY AUTHORITY OF DOE DATE 8/29/96

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CLASSIFIED FILE U.S. ENGINEER OFFICE MANHATTAN DISTRICT 27270

To complete the research program in progress here and at other projec it would seem to me that there are a number of problems which must be considered. Since the clinical significance of these problems is great, the experimental methods of attack must be the most expedient as well as the most practical. Pleasethink about the following problems as well as any others which may occur to you so that they may be discussed at one of our regular meetings:

1. Clinical methods of detecting alpha active materials in the lungs.

   a. Measurement of ions in the expired air.
   b. Active material excreted by the lung into the gastro-intestinal tract; this can be measured in the feces and will appear as the amount in excess of the normal feces: urine ratio.
   c. Activity of bronchial secretions.

      1. expectoration
      2. bronchoscopy

   d. Lung biopsy.

2. The possibility of permanent deposition of polonium in the lung tissue. We have always felt that polonium mists and vapors are absorbed from the lung and are then excreted in the urine where they can be measured accurately. We have felt reasonably secure in our ability to diagnose overdosage with polonium by urine assays. It would seem probable however, that at least a fraction of the inhaled polonium will percipitate on contact with the neutral lung fluids. This is being studied by animal experimentation in Rochester but it is possible that we may obtain advance information on this subject by studying the fate of polonium in protein free body fluids (Ascitic fluid has been suggested by Captain Barnett as a readily available protein-free body fluid.)

3. The chemical form in which 49 exists in protein-free body fluid and the metabolism of this form (? complex). This would seem important since the normal mechanism of transport of 49 in the body when introduced any way except intravenously would necessarily occur as this chemical form.

4. The removal of 49 from bones (detoxification). This is being studied by Cope, Greenberg and Hamilton in Berkeley. So far as I know they are concerned primarily with "relocating" the 49 in the bone by adjusting the calcium metabolism.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
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Page two - continued.

Since 49 appears to remain in the actively metabolising portions of the bone, it might be removed from the skeletal tissue by means of complexing agents added to the blood. Some preliminary evidence about this might be gained from soaking thin slices of bone containing 49 in plasma to which complex salts have been added in amounts that might be present in the blood stream. Further metabolic studies of other complexes of 49 would appear to be indicated.

5. Clinical tests for radiation damage: The tests for abnormal phosphorus and nucleoprotein metabolism devised by Dr. Sam Schwartz should be used at this project. We might also consider undertaking certain histochemical studies of blood cells based on chemical changes which we know to be caused by the action of radiation on tissues.

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