

The tolerance of man for hexavalent uranium - Samuel Basset,
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and Katherine Cusson.

Tracer studies employing an enriched mixture of the isotopes of U^{234} , U^{235} had been carried out in six human subjects, four males and two females at the University of Rochester under Contract W-7401-ENG-49. The uranium was given intravenously in the hexavalent state as uranyl nitrate in amounts ranging from 6 micrograms to 70 micrograms per kilogram of body weight.

This study was initiated with the rationale that the metal was considered mainly as a chemical hazard, and it was possible that long continued exposure to the dust of concentrates of U^{234} , U^{235} may be cause of more intensive alpha emission constitute a radiological hazard for lung and bone. The studies were designed to find the dose of a soluble uranium salt when introduced intravenously would produce a just detectable renal injury and to measure the rate at which soluble uranium compounds are eliminated, as well as to determine factors that may increase or decrease excretion rate of these.

Each individual of the series received a single injection of the metal except for subject #6 who was given two widely spaced doses. The first of these was when his condition was normal and the second after an acidosis had been produced by ingestion of ammonium chloride. Renal function tests including urinary catalase, protein, amino N to creatinine N ratio and clearances of mannitol, and p-aminohyppurate were done before and after administration of uranium. Only at the 70 microgram per kilogram level in subject #6 was there a slight rise in urinary catalase and protein suggesting that tolerance had been reached. All other tests were negative.

The excretion of uranium was mainly in the urine where from 70 to 85 per cent appeared in 24 hours. The production of an acidosis with ammonium chloride (subject #6) decreased the rate of excretion.

Traces of uranium continued to be eliminated for at least two weeks after it had been administered. It is surmized that this represented metal retained in the bones. Attempts at mobilization of the fraction retained by injection of citrate and by the use of a low calcium diet plus dehydrotachysterol were ineffective.

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Hexavalent Uranium Studies
 Rochester - Human
 Table I

<u>Subject and dose</u>	<u>Reason for hospitalization</u>	<u>Date Injected</u>
1. Male w 32 385 micrograms U234, U235, IV.	rhematoid arthritis and urethral stricture	8/9/46
2. Female w 40 476.7 micrograms, U234, U235, I.V.	acute alcoholism, hallucinatory state, cirrhosis of liver	9/18/46
3. Female w 24 584 micrograms, U234, U235, I.V.	mild chronic under nutrition, secondary to emotional maladjustment	10/1/46
4. Male w 42 1918 micrograms or 29.9 micrograms per Kg, U234, U235, I.V.	chronic alcoholism and bleeding from gastrointestinal tract	10/23/46
5. Male N 51 2746 micrograms, I.V.	chronic cough - sputum streaked with blood, recovered and left hospital	12/17/46
6. Male w 61 3910 micrograms U234, U235, I.V. as 1st dose and 3170 micrograms U6 metal as 2nd dose, IV.	symptoms of gastric lesions diagnosed as benign ulcer	1/10/47
		1/27/47

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