UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

JUN 12 1974

Honorable Gaylord Nelson
Subcommittee on Monopoly
Select Committee on Small Business
United States Senate

Dear Senator Nelson:

This is in response to your letter of May 8, 1974, requesting information on the Atomic Energy Commission's contribution in the development of drugs during the last 15 years.

One of the principal charges to the Commission is the development of new radiopharmaceuticals for the diagnosis and treatment of disease. Ever since its inception the AEC has played a prominent role in supporting research and development, including in many cases pre-clinical and clinical testing of radiopharmaceuticals. A new medical discipline, nuclear medicine, has come into being largely as a result of advances of AEC-supported research.

Radioisotopes have been made available by AEC laboratories for use in medical research since August 1946 from AEC-operated specialized research facilities. In addition, the Commission has supported research through contracts with medical schools, universities, hospitals and other research organizations.

Almost all radiopharmaceuticals used in various diagnostic and therapeutic applications in nuclear medicine were developed in AEC-supported laboratories or by AEC-supported scientists. As an example, it is reported that out of some 30 different radioisotopes currently used, technetium-99m is administered better than 50 percent of the time. At present, technetium-99m is available in a variety of chemical forms from most radiopharmaceutical manufacturers.

A measure of the impact of nuclear medicine research is reflected in the growth of diagnostic nuclear medicine. Stanford Research Institute reported in 1959 that 400,000 doses of radioisotopes were administered to humans. In 1966 this number had grown to approximately 1,743,000 administrations. For 1974 the Society of Nuclear Medicine estimates that 10,000,000 administrations will be made.

The enclosed list of radiopharmaceuticals currently in routine use provides an indication of the broad spectrum of medical uses.

With regard to the total support of this program, it is necessary to point out that nuclear medicine research or research on the development of individual radiopharmaceuticals is not identified as a line item in the budget. Instead, the research and development of radiopharmaceuticals is part of a larger program which includes all beneficial uses of radiation and radioisotopes. In the past 15 years approximately $30,000,000 has been spent in support of radiopharmaceutical research. In 1959 about $1,500,000 was spent with increases over the years to the current level of approximately $3,000,000.

In addition to radiopharmaceutical research, AEC has supported drug research initiated in the mid-1960's by Dr. George C. Cotzias and his associates at the Brookhaven National Laboratory which has led to the use of the drug L-dopa (L-3, 4-dihydroxyphenylalanine) in the treatment of Parkinson's disease. When administered daily in large oral doses, the drug induces substantive symptomatic improvement in most Parkinsonian patients and dramatic results in some. L-Dopa has been found to be well tolerated and can generally be administered for protracted periods of time. Though not severe in most cases, undesirable side effects have been encountered.

On the basis of clinical studies involving hundreds of subjects and clinical experience with many more, as reported by a number of medical authorities, it appears that L-dopa gives beneficial results in about two out of every three Parkinsonian patients--the remainder being either unresponsive to the drug or unable to tolerate it.

L-Dopa therapy is now recognized as the best approach to the management of Parkinson's disease. However, Dr. Cotzias' main contribution has been that of a better understanding of neurologic disorders and a sounder basis for their control via drug therapy.

By now, more than 6,000 victims of Parkinson's disease have benefited from L-dopa therapy. Since there are in this country an estimated 500,000 - 1,500,000 persons afflicted with this disease, many remain to be treated. Now that L-dopa has become readily available and has been approved by the Food and Drug Administration for general medical use, the full benefit of the drug should soon be realized in this country. Many victims of manganism, in Chile and elsewhere, will likewise be helped by L-dopa. Total AEC support to date of research directly related to the development of L-dopa is $4,700,000.

I trust that the information provided has adequately answered your questions. If I may be of further assistance, please contact me.

Sincerely,

Original signed by
Dixy Lee Ray
Chairman

Enclosure:
Radiopharmaceutical List

bcc: OCR (3)
Secy Mail Facility
GM
AGMB
BERA

GM#5529
Chmn. No. 74-5344

PTP	PTP	BERA	ADRDP	ADPC	DD
LMiller	RWood	RCBrothers	CEdington	JWhitnah	WWBurr
5/ /74	5/ /74	5/ /74	5/ /74	5/ /74	5/ /74

OFFICE	PTP:DBER	DIR/AGMBERSP	EAGM	DGM	GM	OCR
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Form AEC-318 (Rev. 9-53) AECM 0240 GPO C43 16 81465-1 520-264

Approved Pharmaceuticals

Isotope	Chemical Form	Use
Chromium-51	Chromate	Spleen scans, placenta localization, red blood cell labeling and survival studies.
Chromium-51	Labeled human serum albumin	Gastrointestinal protein loss studies, placenta localization.
Chromium-51	Labeled red blood cells	Placenta localization
Cobalt-58 or Cobalt-60	Labeled cyanocobalamin	Intestinal absorption studies
Fluorine-18	Fluoride	Bone imaging
Gold-198	Colloidal	Liver scans, intracavitary treatment of pleural effusions and/or ascites, interstitial treatment of cancer.
Iodine-131	Iodide	Diagnosis of thyroid functions, thyroid scans, treatment of hyperthyroidism and/or cardiac dysfunction, treatment of thyroid carcinoma.
Iodine-131	Iodinated human serum albumin	Blood volume determinations, cisternography, brain tumor localization, cardiac scans for determination of pericardial effusions.
Iodine-131	Rose bengal	Liver function studies, liver scans.
Iodine-131	Idopyracet, sodium iodohippurate, sodium diatrizoate, diatrizoate methyglucamine, sodium diprotrizoate, sodium acetrizoate, or sodium iothalamate	Liver scans, kidney function studies and kidney scans.
Iodine-131	Labeled fats and/or fatty acids	Fat absorption studies
Iodine-131	Iodipamide	Cardiac scans for determination of pericardial effusions

Isotope	Chemical Form	Use
Iodine-131	Macroaggregated iodinated human serum albumin	Lung scans
Iodine-131	Colloidal microaggregated human serum albumin	Liver scans
Iodine-125	Iodide	Diagnosis of thyroid function
Iodine-125	Iodinated human serum albumin	Blood volume determinations
Iodine-125	Rose bengal	Liver function studies
Iodine-125	Iodopyracet, sodium iodohippurate, sodium diatrizoate, diatrizoate methylglucamine, sodium diprotrizoate, sodium acetrizoate, or sodium iothalamate	Kidney function studies
Iodine-125	Labeled fats and/or fatty acids	Fat absorption studies
Iron-59	Chloride, citrate and/or sulfate	Iron turnover studies
Krypton-85	Gas	Diagnosis of cardiac abnormalities
Mercury-197	Chlomerodrin	Kidney scans, brain scans
Mercury-203	Chlomerodrin	Kidney scans, brain scans
Phosphorus-32	Soluble phosphate	Treatment of polycythemia vera, treatment of leukemia and bone metastasis
Phosphorus-32	Colloidal chronic phosphate	Intracavity treatment of pleural effusions and/or ascites, interstitial treatment of cancer
Potassium-42	Chloride	Potassium space studies
Selenium-75	Labeled methionine	Pancreas scans

Isotope	Chemical Form	Use
Strontium-85	Nitrate or chloride	Bone scans on patients with diagnosed cancer
Technetium-99m	Aggregated albumin (Human)	Lung imaging
Technetium-99m	DTPA (iron-ascorbate)	Kidney imaging
Technetium-99m	DTPA (tin)	Brain imaging
Technetium-99m	Human serum albumin microspheres	Lung imaging
Technetium-99m	Pertechnetate	Brain scans, thyroid scans, placenta localization, blood pool scans, salivary gland scans
Technetium-99m	Sodium etridonate	Bone imaging
Technetium-99m	Stannous polyphosphate	Bone imaging
Technetium-99m	Sulfur colloid	Liver and spleen imaging
Xenon-133	Gas	Diagnosis of cardiac abnormalities, cerebral blood-flow studies, pulmonary function studies, muscle blood-flow studies

MEMO ROUTE SLIP
Form AEC-93 (Rev. May 14, 1947) AECM 0240

☐ See me about this. ☐ Note and return. ☐ For concurrence. ☐ For signature. ☐ For action. ☐ For information.

Secretariat

Record Copy

TO (Name and unit)	INITIALS / DATE	REMARKS
John Erlewine George Gardes John Griffin Roger Mattson		Attached is a response to inquiry on the study of cancer incidence among former
TO (Name and unit)	INITIALS / DATE	REMARKS
Alan Rothenberg Mike Hawkins L. Manning Muntzing James Liverman		Hanford employees by Dr. Samual Milham of the Washington State Health Services Division. We have no press inquiries at
TO (Name and unit)	INITIALS / DATE	REMARKS
Robert O'Neill Paul Bender		this time but as I mentioned in my note to the Commissioners yesterday, Dr. Milham apparently has made some distribution among
FROM (Name and unit)		REMARKS
John A. Harris Director OIS		medical authorities in Washington.
PHONE NO.	DATE	
	6/7/74	

USE OTHER SIDE FOR ADDITIONAL REMARKS

GPO : 1971 O - 445-469

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OFFICE OF THE SECRETARY

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We have been informed of Dr. Milham's paper. While we appreciate his efforts to assess possible health risks for workers at Hanford, his conclusion--that there have been an excessive number of cancer deaths among Hanford workers--is contrary to a wealth of information which has been collected and analyzed over many years. Reports on this work are available for anyone to examine.

Apparently unknown to Dr. Milham when he did his work, AEC has, for about 10 years, funded a carefully structured study of health effects among nuclear workers, principally at Hanford, Washington, and Oak Ridge, Tennessee, by Dr. Thomas Mancuso of the University of Pittsburgh. Findings thus far include 32,000 Hanford employees; their records are compared to some 20,000 siblings of the same sex who did not work at Hanford.

The Hanford information indicates that (1) there is no apparent significant difference in radiation-related health effects between Hanford employees and their siblings; and (2) based on scrutiny of some 4,000 death certificates, there is no evidence of cancer, or other deaths attributable to ionizing radiation, occurring more often among Hanford workers than among their non-Hanford brothers and/or sisters.

We understand that a copy of Dr. Milham's paper has been sent to Dr. Mancuso for review.

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WASHINGTON, D.C. 20545

JUN 3 1974

Assistant to the Chairman

REPLY TO SENATOR NELSON'S LETTER CONCERNING THE COMMISSION'S CONTRIBUTION TO THE DEVELOPMENT OF NEW DRUGS

The reply states the Commission's role in research and development of radiopharmaceuticals and L-dopa, the significance of these drugs for improved health care to the general public, and estimates of funding for this research.

James L. Liverman, Director
Division of Biomedical and
Environmental Research

Good letter — Thanks!