


Outline of Proposed Study of the Metabolism of d-Lysergic Acid

Diethylamid.

✓ Studies of the metabolism of d-lysergic acid diethylamid (LSD) are complicated by the fact that the effective doses are in microgram quantities. Tagging the molecule with radioactive or with stable isotopes therefore assumes an extraordinary importance since only by this means is there any likelihood of obtaining information in a relatively short time. The over-all plan will be to incorporate into the molecule suitable atoms to serve as tags and to administer it to experimental animals in whose tissues the tagged atoms can be identified after various time periods. By combining several methods of tagging, deductions can be made as to the fate of the intact molecule or certain fragments of it. This approach requires the coordinated work of a team representing experts from a number of fields. We are fortunate enough to have such a group of trained individuals representing pharmacology, biochemistry, synthetic organic chemistry, and biophysics. The individuals will be named in the sections below in which the activities of the first year of the program are described in broad terms.

Synthesis of LSD and related compounds. The chemical nature of the compound makes it a difficult one to work with. Knowledge of the metabolism of LSD may be gained either by studies of this molecule suitably tagged or by studies of lysergic acid or various derivatives in which isotopes have been introduced at proven locations. Since the structure



of lysergic acid has not yet been completely established work will be carried forward simultaneously on the preparation of tagged molecules and on the total synthesis.

Several isotopes show promise as possible tags for use in the LSD molecule. Radiocarbon (carbon 14) and tritium (hydrogen 3) are of exceptional interest because these two elements make up a large part of the molecule. Both can be obtained with very high specific activity and therefore may be able to supply sufficient radioactivity so that microgram quantities can be traced in the body. Heavy nitrogen (nitrogen 15) has many advantages; however, as a ring element, synthesizing it into the molecule will be an exceptionally difficult feat.

The synthetic chemical program is under the direction of Dr.

[REDACTED] in Chemistry. He will be assisted by Dr. [REDACTED] in chemistry coming [REDACTED] from [REDACTED] and by a graduate student to be appointed.

The budget for the synthetic program totals \$7000 and is divided as follows: Salary for [REDACTED], \$4500; stipend for graduate student, \$1500; expenses, \$1000.

Metabolism of LSD and related compounds. The problem is to discover what the body does with LSD. The percentages of a dose of LSD retained in many other organs and tissues of the body will be measured. The pattern of excretion is important. Information as to what chemical alterations are induced by the metabolic activity of cells in the central

[REDACTED]

nervous system or in the liver or in the muscle will be sought. Because it is possible that the clinically active form is not the molecule that is administered, a search will be made for fragments of the molecule and then if possible a basic body of information will be developed about the metabolism of lysergic acid, perhaps by chemical studies of related molecules. Microtechniques such as paper chromatography may prove to be important. The use of histological radioautographs should be investigated. Because of the ability of this molecule to produce schizophrenic-like disorganization in normal humans, the concentration of LSD in the central nervous system will of course have a prime interest. One task will be to discover whether concentration differences exist in various parts of the central nervous system.

The metabolic program will be carried out by Dr. [REDACTED] [REDACTED] in pharmacology. Dr. [REDACTED] of Pharmacology, will be available [REDACTED] to bring to the problem his broad training and [REDACTED] experience in the pharmacology of the central and peripheral nervous system. Dr. [REDACTED] of Biophysics (Pharmacology), who has been active in tracer research here [REDACTED], is to assist with the biophysical parts of the investigation; this may involve special counters for tritium and for carbon 14.

The total budget for the metabolism program is \$18,500 and is allotted as follows: Salaries, [REDACTED], \$5500, [REDACTED], \$3000, [REDACTED], \$500; apparatus, \$5000; expenses, \$2000; travel, \$500; contingency, \$2000.

The over-all budget is thus \$25,500 plus the allowance for university overhead. [REDACTED]

28 July 1955

MEMORANDUM FOR: THE RECORD

SUBJECT : Addendum to Subproject 17 and 46

1. The purpose of this addendum is to set forth the mutual administrative responsibilities of the contractor and sponsor.

C - 2. The above subprojects represent the research program of Dr. [REDACTED] financed under MKULTRA, covering the period of 22 October 1953 through 31 October 1955.

B - 3. [REDACTED] has requested the University to submit to them a summary accounting of monies received from the Fund. Also, they requested the return of any unexpended funds received under a grant from the Fund.

4. Title to any permanent equipment purchased by funds granted the University shall be retained by the University in lieu of higher overhead rates.

5. It was mutually agreed that documentation and accounting for travel expenses which are reimbursable by the University shall conform with the accepted practices of that Institution.

6. It was agreed that technical reports reflecting the progress of the research program shall be submitted at mutually acceptable intervals.

SIDNEY GOTTLIEB

Chief

TSS/Chemical Division

APPROVED:

A - [REDACTED]

A - [REDACTED], Chief, TSS

Distribution:
Orig & 2 - TSS/CD

[REDACTED] - A

[REDACTED]

DRAFT


31 October 1954

MEMORANDUM FOR: THE RECORD

SUBJECT : Extension of Time for Project
MKULTRA, Subproject 17

Subproject 17 expires on 31 October 1954. As the work has not yet been completed, an extension of one year is hereby authorized. At the present time no additional funds are required.

APPROVED:


Chief, TSS/Chemical Division

A

Original Only



CERTIFICATE

March 31, 1954

This is to certify that I have today received
Cashier's check No. M139447 [REDACTED] - E
[REDACTED] in the amount of \$748.00.

C →

[REDACTED]
M.D.

March 31, 1954

This is to certify that I have today received
Cashier's check No. M139442 [REDACTED] - E
[REDACTED] in the amount of \$18,700.00.

C →

[REDACTED]
M.D.

MEMORANDUM RECEIPT

17-6

MAR 31 1954

TO:

DATE

FROM:

SUBJECT:

*Sumner &
helped 17*

I hereby acknowledge receipt of the following:

CHECK # ⁴¹³⁹⁴⁴⁷ ~~4132472~~ IN THE AMOUNT OF \$ ^{246.00} ~~1120.00~~
RECEIVED.

- A

Please return _____ signed copy(ies) of this receipt

SIGNATURE OF RECIPIENT

To _____
FORM NO. 36-66
MAR 194931 March
DATE RECEIVED

17-7

19 March 1954

MEMORANDUM FOR: CHIEF, FINANCE DIVISION

VIA: TSS/Budget Officer

SUBJECT: Subproject 17, Project MULLINA,
Invoice # 2, Allotment 4-2502-10

1. Invoice # 2 for Subproject 17 of Project MULLINA is attached. This invoice is the final one to be submitted under Subproject 17 and when paid, constitutes complete payment of this project. It is requested that payment be made by two cashier's checks made out to the order of [redacted] in the amounts of \$13,700.00 and \$743.00. The checks should be sent to Chief, TSS/CD through TSS/Budget Officer by 1 April 1954.

2. The two invoices covering this Subproject aggregate \$29,172.00 and represent the total expenditure to be made under this Subproject. It is requested, therefore, that files on this Subproject be closed.

SIDNEY GOTTLIEB
Chief
Chemical Division, TSS

Attachments:
Invoice # 2 - Subproject 17
Certifications

A - TSS/CD (19 March 1954)

Distribution:
Addressee - Orig. & 2 w/attachments
Comptroller - 1
→ TSS/Budget - 1
TSS/CD - 2

CHECK # 41347 IN THE AMOUNT OF \$ 1422.00
RECEIVED.

A - [redacted] MAR 31 1954

Invoice

For services rendered in connection with MKULTRA
Subproject 17. Detailed breakdown and receipts
on file in TSS/CD.

.....\$19,448.00

~~XXXXXXXXXX~~ - C

CERTIFICATIONS

(1) It is hereby certified that this is Invoice No. 2 applying to Subproject 17 of Project MKULTRA, that technical performance by [redacted] is satisfactory, that the work is being accomplished in accordance with the mutual agreement reached with [redacted], that this bill is just and correct and that payment thereof has not yet been made.

Date: _____

SIDNEY GOTTLIEB
Chief, TSS/GD

(2) It is hereby certified that this invoice applies to Subproject 17 under Project MKULTRA which was duly approved and that the project is being carried out in accordance with the DD/P memorandum to DCI dated 3 April 1953, the DCI memorandum to DD/A dated 13 April 1953, and the DCI memorandum to the DD/A dated 19 June 1953.

Date: _____

[redacted] - A
Research Director

(3) It is hereby certified that the scope of the program of Subproject 17 of Project MKULTRA has been approved.

Date: _____

12/ [redacted]] A
Exec. Sec'y., [redacted] - G

I CERTIFY THAT FUNDS ARE AVAILABLE

OBIGATION NO. 02581

CHARGE TO ACCOUNT NO. 4-2502-10-001

MAR 22 1953

AUTHORIZING OFFICER

A - [redacted]

MEMORANDUM RECEIPT

2 November 1953
DATE

TO: TSS/CD

FROM: Budget/TSS

SUBJECT: Two Checks

17-9

I hereby acknowledge receipt of the following:

Check #M135382 in the amount of \$9,350.00 and check #M135383 in the amount of \$374.00 made payable to ██████████ as payment for Invoice # 1 Subproject 17, Project MKULTRA.

↓
C

Please return _____ signed copy(ies) of this receipt

██████████

→ A

SIGNATURE OF RECIPIENT

To _____
FORM NO. 34-66
MAR 1949

DATE RECEIVED

CERTIFICATE

November 2, 1953

This is to certify that I have today received
Cashier's check No. M135383 of [REDACTED] - E
E - [REDACTED] in the amount of \$374.00.

[REDACTED]
[REDACTED]
[REDACTED] M.D.

November 2, 1953

This is to certify that I have today received
Cashier's check No. M135382 of [REDACTED] - E
E - [REDACTED] in the amount of \$9,350.00.

[REDACTED]
[REDACTED]
[REDACTED] M.D.

26 October 1953

MEMORANDUM FOR: CHIEF, FINANCE DIVISION

C - VIAL TSS/Budget Officer

SUBJECT: Invoice No. 1, Subproject 17, Project MKULTRA

Invoice No. 1 for Subproject 17 of Project MKULTRA is attached. It is requested that payment be made by two cashier's checks in the amounts of \$9,350.00 and \$374.00 made out to ~~XXXXXXXXXX~~. The checks should be sent to Chief, CR/TSS through TSS/Budget Officer not later than 30 October 1953.

ATDREY GOTTLIER

MEMORANDUM RECEIPT

2 November 1953
DATE

TO: TSS/CD

FROM: Budget/TSS

SUBJECT: Two Checks

I hereby acknowledge receipt of the following:

1: Check #ML35382 in the amount of \$9,350.00 and check #ML35383 in the amount of \$374.00 made payable to ~~XXXXXXXXXX~~ as payment for Invoice # 1 Subproject 17, Project MKULTRA.

Please return _____ signed copy(ies) of this receipt.

A
I

SIGNATURE OF RECIPIENT

26 October 1953

MEMORANDUM FOR: CHIEF, FINANCE DIVISION

VIA: TSS/Budget Officer

SUBJECT: Invoice No. 1, Subproject 17, Project MKULTRA

Invoice No. 1 for Subproject 17 of Project MKULTRA is attached. It is requested that payment be made by two cashier's checks in the amounts of \$9,350.00 and \$374.00 made out to [REDACTED]. The checks should be sent to Chief, CD/TSS through TSS/Budget Officer not later than 30 October 1953.

SIDNEY GOTTLIEB
Chief [REDACTED]
Chemical Division, TSS

Attachments:
Invoice
Certifications

Distributions:
Addressee - Orig. & 1
Comptroller - 1
TSS/Budget - 1 ✓
TSS/Registry - 1
Exec. Sec'y., Res. Bldg. - 1
TSS/CD - 2

[REDACTED] - A

CERTIFICATIONS

(1) "It is hereby certified that this is Invoice No. 1 applying to subproject 17 of Project MKULTRA, that technical performance by [redacted] is satisfactory, that the work is being accomplished in accordance with the mutual agreement reached with [redacted], that this bill is just and correct and that payment thereof has not yet been made. - C

Date: _____

[redacted]
SIDNEY GOTTESB
Chief, CD/ISS - C

(2) "It is hereby certified that this invoice applies to subproject 17 under Project MKULTRA which was duly approved and that the project is being carried out in accordance with the DD/P memorandum to DCI dated 3 April 1953, the DCI memorandum to DD/A dated 13 April 1953, and the DCI memorandum to the DD/A dated 19 June 1953. - C

Date: _____

[redacted] → A
Research Director"

(3) "It is hereby certified that the scope of the program of subproject 17 of Project MKULTRA has been approved.

Date: _____

1a [redacted] → A
Exec. Sec'y., Res. B1.

- A

INVOICE

October 24, 1953

For Services \$9,724.00

~~XXXXXXXXXX~~ - C

22 October 1953

MEMORANDUM FOR: COMPTROLLER
ATTENTION: Finance Division
SUBJECT: Project MCLTRA, Subproject 17

Under the authority granted in the memorandum dated 13 April 1953 from the DCI to the DD/A, and the further authority granted in the memorandum dated 17 April 1953 from the DD/A to the Comptroller on the subject, "DD/P-TSS Project MCLTRA", and the memorandum dated 19 June 1953, from the DCI to the DD/A extending the authority to cover Fiscal Year 1954, Subproject 17 has been approved, and \$29,172.00 of the over-all Project MCLTRA funds have been obligated to cover the subproject's expenses.

SIDNEY GOTTLES
Chief
Chemical Division, TSS

PROGRAM APPROVED AND
RECOMMENDED:

APPROVED FOR OBLIGATION
OF FUNDS:

Research Chairman

~~XXXXXXXXXX~~ - A

Research Director

Date: _____

Date: _____

Distribution:

Addressee - Orig. & 2
Exec. Sec'y., Res. M. - 1
TSS/Budget - 1 (4-2502-10) ✓
TSS/Registry - 1
TSS/CD - 2

~~XXXXXXXXXX~~ - A

OCT 28 1953

[REDACTED]

DRAFT [REDACTED] - A
22 October 1953

MEMORANDUM FOR THE RECORD

SUBJECT: Project MKULTRA, Subproject 17

1. The scope of this research program is intended to cover work to be done with LSD and related compounds by [REDACTED] - C
[REDACTED] at [REDACTED] for the period ending 31 October 1954. The project will be handled through [REDACTED] for - B
cut-out and cover purposes. The proposal from [REDACTED] to [REDACTED] - C
[REDACTED] is attached to this memorandum. - B

2. The general object of this project is aimed at elucidation of the site and mechanism of action of LSD by the use of isotopically tagged molecules. At least three major advantages will accrue from such knowledge. First, such data should greatly facilitate the development of a suitable antidote for LSD; in addition, they should make it possible to design new compounds having like but even more bizarre activities; and finally, fundamental knowledge of the psychotherapeutic action of drugs will be made available for future development.

C → 3. [REDACTED] has available to him at [REDACTED] a highly competent group of scientists of international reputation encompassing the fields of physical and organic chemistry in addition to those of medicine and psychology. He plans to use these people as informal consultants in the work.

4. The funds for this project include \$7,000.00 for the synthetic work on tagged LSD, \$18,500.00 for the metabolic studies on such compounds, \$2,550.00 for the 10% University overhead charge, and \$1,122.00 for a 4% service charge by [REDACTED] - B
Therefore, the total cost of this investigation will not exceed \$29,172.00 for the period ending 31 October 1954.

5. This project will be completely unclassified after it leaves [REDACTED] - B

[REDACTED]

[REDACTED] - A
Chemical Division, TSS

[REDACTED]

DRAFT [REDACTED] - A

APPROVED:

A - [REDACTED]

Chief, Chemical Division, TSS

PROGRAM APPROVED AND
RECOMMENDED:

APPROVED FOR OBLIGATION
OF FUNDS:

[REDACTED] - A
Research Chairman

A - [REDACTED]
Research Director

Date: _____

Date: 28 October 1953

Original Only - Project MKULTRA, Subproject 17

September 30, 1953

[REDACTED], M. D., [REDACTED]

- C
] B

Dear Dr. [REDACTED]

- C

Enclosed please find an outline of a proposed study of the metabolism of d-Lysergic Acid Diethylamid. This outline is couched in general terms because all of us feel that as we open the investigation we would like to have our objectives in general terms rather than in specific ones. If it is important to you, Dr. [REDACTED] can write out a detailed statement of the first steps that he is going to take with the aid of Dr. [REDACTED] and I can give you a detailed description of the first experiment we would like to do in the metabolic program.

One important question is the source of lysergic acid and derivatives. Do you have any suggestions as to people we might write to or companies that would be interested in collaborating with us, at least to the extent of providing compounds?

Another problem has to do with the report system. Our first preference would be to submit an annual report. It seems to us that such a study as we are proposing should not be undertaken for a period of less than three years. Is it possible that you or someone from your office could visit us so that we would have a better idea of how we are expected to furnish information.

One man is not mentioned in the outline. This is Dr. [REDACTED]. He has a lively interest in the possibilities that may grow out of this study as far as clinical applications go. He wishes to sit in on our conferences as the program develops.

Another matter has to do with University overhead. Do you have a policy already formulated? [REDACTED] has given me the following statement to send you:

"The overhead cost of sponsored research at the University is computed each year for both the College of Arts and Science (organic chemistry) and the Medical School (pharmacology). On cost-reimbursement contracts, the overhead is expressed as a percentage of salaries and wages and the rates for the calendar year 1953 are [REDACTED] in the Arts College and [REDACTED] in the Medical School. On grants-in-aid from foundations, national societies and organizations, it is the policy of the University to accept the established overhead policy of the granting agency. When such policy provides less than the University's overhead cost a direct charge is made to the grant for the University's cost of social security, group insurance and retirement benefits. These costs are determined each year and expressed as a percentage of salaries and wages for the calendar year 1953 the rate in the Arts College is [REDACTED] and in the Medical School [REDACTED]."

Oct. 31

Pusher

3 yr program
from beginning
chemical portion

17-14

PROPOSED BUDGETS

Synthetic Program

Dr. [redacted] *Smith*

\$7,000 With advice
& consultation
with [redacted]

Salary for Dr. [redacted]

Graduate student
Expenses

\$4,500
1,500
1,000

Metabolism Program

\$18,500

Salaries

Dr. [redacted] (director of program) \$5,500
Dr. [redacted] (part-time) 3,000
Dr. [redacted] (biophysical parts
of investigation) 500

Apparatus 5,000
Expenses 2,000
Travel 500
Contingency 2,000

\$25,500 plus
allowance for university overhead

25500.00 grant
2550.00 10% Univ. O.H.
1122.00 4% service charge
29172.00 total for 1st yr

1070

9 December 1953

MEMORANDUM FOR: IASO DD/P/TSS

SUBJECT: Request for Services of [REDACTED] → G

1. As indicated in the writer's conversation with [REDACTED] ← A
it is requested that the [REDACTED] be asked to put a ← G
P.H.S form in the hands of [REDACTED] } C

C → 2. [REDACTED] is at present under contract with an Agency
"cut-out" and is doing unclassified work for this contractor for CD/
TSS projects.

3. Other possible means of initiating clearance of [REDACTED] } C
[REDACTED] have been reviewed and discarded mainly because they would jeo-
pardize the security of "cut-outs" and cover stories used in the past
with this subject.

4. It is requested that action be taken in this matter as soon
as possible and that the completed form be returned to CD/TSS.

[REDACTED] - A
Chemical Division, TSS

APPROVED:

Chief, Chemical Division, TSS

Distribution:
Addressee - Orig. & 1
CD - 1 ✓
CD Chrono

[REDACTED] - A

17-16

STATE OF CALIFORNIA

AGENDA SUBJECT: 17

Date of Original Authorization	Fiscal Calendar	Time Re-Allocated to	Allotment Fund	Amount of Allocation
28 Oct 53	40054	300855	1-2502-10-001	2917200

Additional Authorization	Fiscal Calendar	Time Re-Allocated to	Allotment Fund	Amount of Allocation

Invoice No.	Date	Amount	Balance
1	10/24/53	972400	1944800
2	3/1/54	1944800	0

Project Closed - See MKUJ.TCA 46