

US Army Edgewood Arsenal
 CHEMICAL RESEARCH & DEVELOPMENT LABORATORIES
 Edgewood Arsenal, Maryland

RESEARCH PLAN
 NO.

1. RESEARCH PLAN: Date of Initiation - **1 April 1965**

Title - **Measurement and Facilitation or
 Retardation of Skin Penetration and Irritation in Human Volunteers.**

2. AUTHORITY:

a. PROJECT: Number - *PROJECT: Number -

Title - Title -

b. SUBPROJECT: Number - *SUBPROJECT: Number -

Title - Title -

c. TASK (15A PROGRAM) *TASK (15A PROGRAM)

3. PARTICIPATION AND/OR COORDINATION:

4. RESPONSIBILITY: Name of individual having overall responsibility.

5. OBJECT: This should point out how the research will contribute to the mission of the Directorate of Medical Research as defined in the project, subproject, and task (15A Program).

1. Provide methods and data for evaluation of candidate agent penetration with variations of agent, additives, skin or environmental conditions.
2. Provide methods for quantitating skin irritation.
3. Elucidate features of skin properties and mechanisms of cutaneous response which may have applications in development of agents or retardants and prophylactic or therapeutic methods.

* If a joint task program.

6. JUSTIFICATION:

The desired information is needed for assessment of efficacy of various agents of mixtures as penetrants of human skin; it will be of value in both defensive and non-defensive aspects of the mission of these laboratories.

7. ESTIMATED TIME REQUIRED:

on-going program

8. EXPECTED RESULTS OF WORK:

a. Technical reports incorporating:

(1) Pertinent information and/or recommendations, regarding relative rates and degrees of penetration of human skin under various conditions.

(2) Procedures and/or techniques of measuring penetration and/or irritation of human skin.

b. Other: furnish cantharidin blister and abdominal corneum tissues for use in other programs of these laboratories.

9. APPROACH; to include aspects of the following outline, with specific efforts subject to approval by the contract project officer.

1. Measurement of Sweat Suppression* as Index of Penetration,
 - a. after application of a mixture of agent (1%) plus additive (99%) in a blotter or confining wall on skin of the subject. Variables include: additives, skin (injury, irritants, protectives), environmental conditions, physiological differences.
 - b. after application of agent (100%) or mixtures (90% agent) as droplets of known volume, with removal and decontamination after various time intervals and measurement of protection afforded by various decontamination procedures.
2. Measurement of Behavior and Signs as Index of Penetration,
 - a. after application of agent (100% or 90%) as droplets of known volume. Variables include: additives (10% of mixture), skin, environment, decontamination, protective coatings of treatment.
 - b. comparison of peripheral measurements* with systemic responses.
3. Study and Measurement of Skin Irritation, including:
 - a. methods of quantitation, such as - in vivo assessment, exfoliative cytology, histological and histochemical studies, electrical surface conductivity or impedance, skin temperature, etc.
 - b. comparisons of irritants and mechanisms of irritation, with regard to - degree and type of effect, enzyme effects or changes, histopathology, variations of temperature or humidity, previous irritation, skin lipid variance, diet, rate of sweating, washing, physiological responses, etc.
 - c. protection against irritants by: physiological or adaptive mech-

9. Approach (continued)

anisms, retardants of penetration, retardants of irritation.

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- * methods of Papa, use of skin vapor hygrometer, use of starch-iodine test, etc.
 - ** chemical, mechanical, hydrative, result of ultraviolet, infrared or ionizing radiation, etc.
 - † diet, dermatitis, previous pathology or sensitization, etc.

10. SUPPORT:

a. Personnel: Civilian (including rating) and military (including rank) with estimated percentage of time for each.

b. Human Subjects: Requirements, with dates and duration.

c. Animals: Species and numbers required.

d. Additional Equipment and Supplies Needed: Give cost estimate where possible. Include items to be made or modified by Maintenance Branch, Directorate of Technical Services.

Micrometer syringe assembly	1 ea.	\$ 50.00 ea.
Hamilton microliter syringes	5 ea.	\$ 20.00 ea.
Skin vapor hygrometer	1 or 2	\$2500.00 ea.

e. Facilities Required: (Other than those available in Branch). Include work order, internal and external, with cost estimates where possible.

f. Travel:

11. SAFETY PRECAUTIONS:

Briefing on toxic hazards and decontamination procedures.

12. DISTRIBUTION:

Per contract distribution plus copies ~~to~~ to personnel with interest in skin research.

13. RESPONSIBILITY: Signatures signify approval of task plan as submitted. When human subjects are required the signature of the Director signifies approval of the Medical Board.

Investigator

Investigator

Investigator

Branch Chief

*Branch Chief

Division Chief

*Division Chief

Deputy Director

Director

*If a joint program