

# A programme to develop a skin patch containing two medicines (physostigmine and hyoscine), Study 1: Assessment of blood levels of the two medicines and any associated symptoms in healthy male participants wearing prototype skin patches

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<b>Registration date</b> 30/07/2019	<b>Overall study status</b> Completed	<input type="checkbox"/> Protocol <input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 26/07/2019	<b>Condition category</b> Injury, Occupational Diseases, Poisoning	<input type="checkbox"/> Individual participant data <input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

Three different versions of a skin patch containing two medicines (physostigmine and hyoscine) have been developed. The patch allows these medicines to cross the skin into the bloodstream. The aim of this study is to measure the amount of physostigmine and hyoscine in the blood at different times over a 72 hour period and assess any associated symptoms.

### Who can participate?

Healthy male volunteers aged 18 to 40

### What does the study involve?

Each participant wears each formulation of the patch in turn for 72 hours occasions separated by a period of 4 days between removal and new application. On each occasion blood samples are taken before and after patch application to measure the amounts of the two medicines (physostigmine and hyoscine). In addition, the activity of the enzyme acetylcholinesterase (AChE) is measured in these blood samples. The effects of the patch are assessed by recording the condition of the skin under the patch at set times and any symptoms that are experienced. Heart rate, blood pressure, electrical activity of the heart (ECG), tests of vision and cognitive function are also recorded at set times.

### What are the possible benefits and risks of participating?

There are no direct individual benefits for the participants. However, the information collected from these individuals adds to the scientific knowledge about the physostigmine and hyoscine

patch. All medicinal products have a risk of causing side effects. The most common side effects known about the medicines in the patch are nausea and vomiting due to physostigmine, and blurred vision and dry mouth due to hyoscine.

Where is the study run from?  
PPD Development Clinic (UK)

When is the study starting and how long is it expected to run for?  
July 2003 to December 2004

Who is funding the study?  
Ministry of Defence (UK)

## Contact information

**Type(s)**  
Public

**Contact name**  
Dr Medical Advisor

**Contact details**  
Dstl  
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## Additional identifiers

**Clinical Trials Information System (CTIS)**  
2004-000146-20

**Protocol serial number**  
1700171

## Study information

### Scientific Title

A randomised, double-blind, three-way crossover study to investigate the pharmacokinetics, pharmacodynamics, safety and tolerability after single applications of three transdermal patch formulations of physostigmine and hyoscine in healthy males

### Study objectives

The aim of this study was to investigate the safety, tolerability, pharmacokinetics and pharmacodynamics of single applications of three formulations of a transdermal patch containing hyoscine and physostigmine when administered to healthy male subjects.

### Ethics approval required

Old ethics approval format

## **Ethics approval(s)**

Approved 06/04/2004, PPD Development Clinical Independent Ethics Committee (72 Hospital Close, Evington, Leicester, LE5 4WW, UK; Tel: +44(0) 1162733553), ref: PPD 1700171

## **Study design**

Randomised double-blind three-way crossover study

## **Primary study design**

Interventional

## **Study type(s)**

Other

## **Health condition(s) or problem(s) studied**

Potential risk of poisoning by nerve agent

## **Interventions**

1. Generic drug name: physostigmine and hyoscine (transdermal patch)
2. Dosage: study planned as single dose (72-hour application) three-way crossover
3. Method and frequency of administration: design was a randomised, single-centre, double-blind, single-dose (72-hour application), three-way crossover study
4. Follow up: safety monitoring, blood sampling for pharmacokinetics and pharmacodynamics, patch adhesion and irritancy assessments, ECG, ocular function assessments and cognitive function assessments were performed for 72 hours after the application of the patch (this included 24 hours after patch removal)

The PHP formulations tested were F1, F2 and F3. The patches were identical in size (37 cm<sup>2</sup>) and shape and only differed in the adhesive used for each group. The plan was for each subject to wear each formulation of the patch in turn for 72 hours occasions separated by a washout period of 4 days between removal and new application. On each occasion, blood samples were taken before and after patch application to measure the amounts of the two medicines (physostigmine and hyoscine). In addition, the activity of the enzyme acetylcholinesterase (AChE) was measured in these blood samples. The effects of the patch were assessed by recording the condition of the skin under the patch at set times and any symptoms that were experienced. Heart rate, blood pressure, electrical activity of the heart (ECG), tests of vision and cognitive function were also recorded at set times.

## **Intervention Type**

Drug

## **Phase**

Phase I

## **Drug/device/biological/vaccine name(s)**

Physostigmine, hyoscine

## **Primary outcome(s)**

1. Plasma concentrations of hyoscine and physostigmine measured by liquid chromatography-tandem mass spectrometry (LC-MS-MS): blood samples collected at the following times: 0 hours (pre-dose) and 2, 4, 6, 8, 10, 12, 24, 36 and 48 hours after patch application on Day 1, 2, 4, 6, 8, 10,

12 and 24 hours after patch removal

2. Acetylcholinesterase activity measured by spectrophotometry: blood samples collected at the following times: Day -1, 0 hours (pre-dose) and 2, 4, 6, 8, 10, 12, 24, 36 and 48 hours after patch application on Day 1; 2, 4, 6, 8, 10, 12 and 24 hours after patch removal

### **Key secondary outcome(s)**

Adhesion score measured by visual inspection of degree of patch adhesion to skin at 24 and 48 hours after application

### **Completion date**

13/12/2004

## **Eligibility**

### **Key inclusion criteria**

1. Healthy male participants
2. Aged between 18 and 40 years inclusive
3. Body Mass Index (BMI)  $\geq 18$  and  $\leq 31$  kg/m<sup>2</sup>, and body weight  $\geq 60$  and  $\leq 110$  kg
4. Able to understand the informed consent discussion, which included information about potential risks and effects of the test materials, and signed the informed consent form
5. Medical history without major pathology (e.g. cardiac, immunological, endocrine or neurological disorders, cancer or other wasting diseases)
6. Human immunodeficiency virus (HIV), hepatitis B and hepatitis C negative
7. No clinically significant abnormalities at the pre-study screening, and subject's GP had not advised against inclusion
8. Computerised 12-lead ECG recording without clinically relevant signs of pathology and conductance disturbances as judged by the investigator

### **Participant type(s)**

Healthy volunteer

### **Healthy volunteers allowed**

No

### **Age group**

Adult

### **Lower age limit**

18 years

### **Sex**

Male

### **Key exclusion criteria**

1. Presence of any clinically significant medical condition as determined by the investigator
2. Known or suspected hypersensitivity or idiosyncratic reaction related to any of the test materials
3. Homozygous or heterozygous for the atypical (dibucaine resistant) allele of butyrylcholinesterase
4. Any skin disorder, broken skin, scars, tattoos at the site of application

5. Glaucoma or a history of glaucoma in first degree relatives (i.e. parents, siblings and offspring)
6. Presence of Anterior Chamber Narrow Angle (Van Herrick Grade 1 and 2)
7. Intra-ocular pressure exceeding 20 mm Hg
8. Uncorrected vision (or contact lens corrected vision) in either eye worse than 6/9 on the Snellen scale
9. History or evidence of drug abuse (including opiates, methadone, cocaine, amphetamines, cannabinoids, barbiturates)
10. History or evidence of alcohol abuse defined as intake of more than 21 units per week (3 units per day), where 1 unit corresponds to 250 mL beer, 20 mL spirits/liqueur or one glass (100 mL) of wine
11. Participation in another clinical trial within three months prior to the start of the study
12. Use of any prescription medication within two weeks, or non-prescription medication (e.g. acetylsalicylic acid/paracetamol) within 48 hours, prior to dosing
13. Regular drug intake during the month prior to the start of the study
14. History or suspicion of inability to co-operate adequately
15. Donation of blood or blood products for a period of four weeks prior to and four weeks after completion of the study
16. History of asthma (or history of asthma within the previous 10 to 15 years, at investigator's discretion)
17. History of exercise-induced bronchospasm, or relevant seasonal bronchospasm
18. Lung function (FEV1) less than 80% of predicted spirometry criteria

**Date of first enrolment**

28/04/2004

**Date of final enrolment**

02/06/2004

## **Locations**

**Countries of recruitment**

United Kingdom

England

**Study participating centre**

**PPD Development Clinic**

72 Hospital Close

Evington

Leicester

United Kingdom

LE5 4WW

## **Sponsor information**

**Organisation**

Dstl

**ROR**

<https://ror.org/04jswqb94>

## **Funder(s)**

**Funder type**

Government

**Funder Name**

Ministry of Defence

**Alternative Name(s)**

MOD

**Funding Body Type**

Government organisation

**Funding Body Subtype**

National government

**Location**

United Kingdom

## **Results and Publications**

**Individual participant data (IPD) sharing plan**

The datasets generated during and/or analysed during the current study are not expected to be made available as subject consent for their release was not obtained.

**IPD sharing plan summary**

Not expected to be made available