

You are invited to take part in a research study

You have been invited because you have responded to an advertisement about our research.

Before you decide we would like you to understand why the research is being done and what it would involve for you.

Talk to others about the study if you wish. Ask us if there is anything that is not clear.

What is this study about?

This is a study about measurement of rhythms. Rhythms characterise almost all of our important body functions, including when we sleep, eat, hormone levels, and body temperature. Our cells and organs contain 'clocks' that are synchronised by hormones and external influences especially exposure to light and the timing of food.

When these rhythms are disturbed, we become unwell. Rhythms that disturb sleep are linked with a multitude of health conditions including depression and weight gain, for example.

In health, the hormones cortisol and melatonin have a circadian rhythm, one that lasts for very close to one day. Cortisol rises in the morning, preparing for us for the day's activity, while melatonin rises at night, cooling our body temperature and getting us ready for sleep.

In this study, we are interested in how different body rhythms interact together during normal daily life. For example, it is known that bright light in the evening, especially LED light, can interfere with the melatonin rhythm and disturb sleep. To measure this effect accurately usually requires many blood tests and admission to a specialised study unit. However, we have developed a system that can be used at home, during normal activities, without sampling blood. It measures hormones painlessly from just beneath the skin.

We can also measure glucose (sugar levels) in the same way. Sleep, activity, body temperature and heart rate can all be measured using a skin sensor worn on the wrist or finger. We will use mathematical algorithms and other techniques to analyse the information we collect.

To start with we will trial this technique in a group of healthy young people. We hope that in future we will be able to use this information to better understand why and how body rhythm disturbances lead to poor health.

Do I have to take part?

It is up to you to decide to join the study. We will describe what is involved and go through this information sheet. If you agree to take part, we will then ask you to sign a consent form. However, you are free to withdraw at any time, without giving a reason.

Who is organising and funding the project?

This study is sponsored by the University of Bristol.

It is being done in collaboration with researchers at the University of Exeter, the University of Groningen, in the Netherlands, and the University of California Berkeley.

Funding is provided by grants obtained through the University of Bristol.

Who has reviewed this study?

This research has been reviewed and approved by the University of Bristol Faculty of Health Sciences Research Ethics Committee.

Interested?
Want to know more?
Contact us:

Dr Thomas Upton

@ thomas.upton@bristol.ac.uk

☎ 0117 331 3167

✉ Dorothy Hodgkin Building
BS1 3NY

What will happen to me if I take part? What will I have to do?

The study requires a time commitment from you as it takes approximately 3 weeks to complete.

During this time you will need to be able to attend screening and up to 6 study visits.

Visits are at Medical and Surgical Research Unit, B501, Level 5, Zone B, Bristol Royal Infirmary BS2 8HW

The screening visit takes about 30 minutes

At this visit we check if you are eligible to take part

We answer any questions you might have and ask for informed consent. We check your health and medication history, and measure your height and weight.

You complete **four** brief questionnaires that ask about your sleep habits and sleep quality.

If we find you are not eligible to participate for any reason, we will explain to you why not, and any questions you might have.

The sampling visits

If you meet all eligibility criteria and want to participate we arrange times for the sampling visits.

We give you a sleep diary and a wearable device that measures sleep quality, duration, daytime activity and exposure to light for 7 days. We ask you not to drink alcohol, do vigorous exercise, or take any medications for 3 days prior to each setup visit, described below.

Day 1 Setup

We perform a drug screen on a sample of urine to check for illicit substance use and pregnancy (females). Afterwards we connect the microdialysis hormone sampling system. We place a small device to measure your sugar levels (continuous glucose monitoring system, CGMS) on your tummy or arm skin and give you a special ring to wear on your finger that measures temperature, heart rate, and activity. We provide you with instructions about all the devices, and activity and food diaries to complete. **We give you a set of Salivettes with instructions. Salivettes are chewable sponges that collect saliva for analysis of hormones during the evening of the microdialysis sampling days.** You are then free to leave the research facility.

Day 2 Check

About 24 hours after connection to the microdialysis system described above we check everything is working, and replace the spool that collects microdialysis samples with a new one.

Day 3 Disconnect

You return to have the microdialysis system removed and some or all of the wearable devices are collected.

Day 4-7

You continue normal activities, while wearing the CGMS and activity sensors. You complete sleep diaries each day.

Day 8-10

You return for a second 48 hour microdialysis sampling session. This follows the same procedure described above with a check visit on day 9 and disconnection visit on day 10.

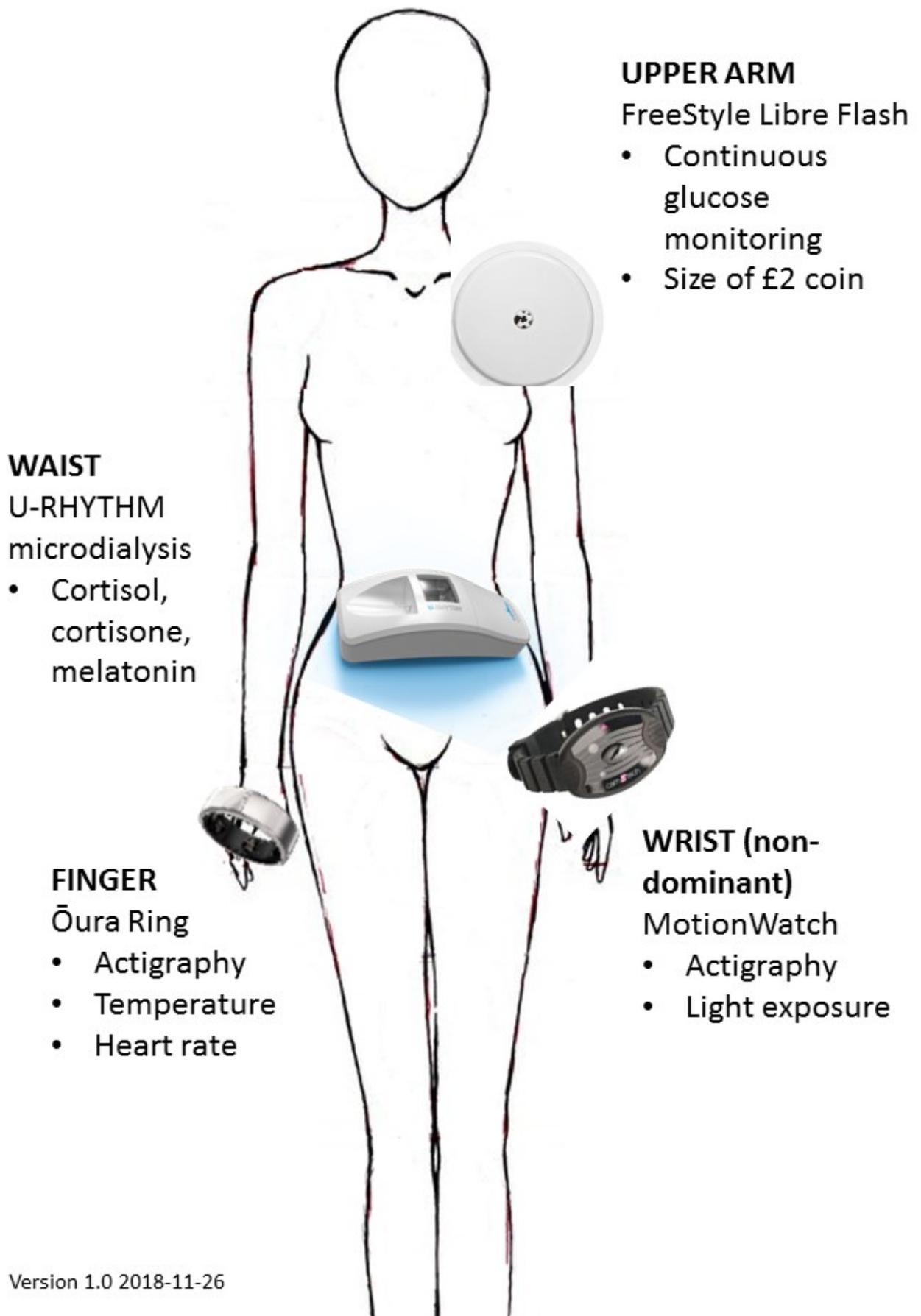
Night time light exposure

During the evenings of either day 1 or 2, AND either day 8 or 9, you will be asked to wear a special visor (Luminette) for around 45 minutes, about 1 hour before your normal bedtime. The visor is worn like a pair of glasses. It shines bright light, similar to daylight, into your eyes to temporarily suppress melatonin levels.

You can participate if you

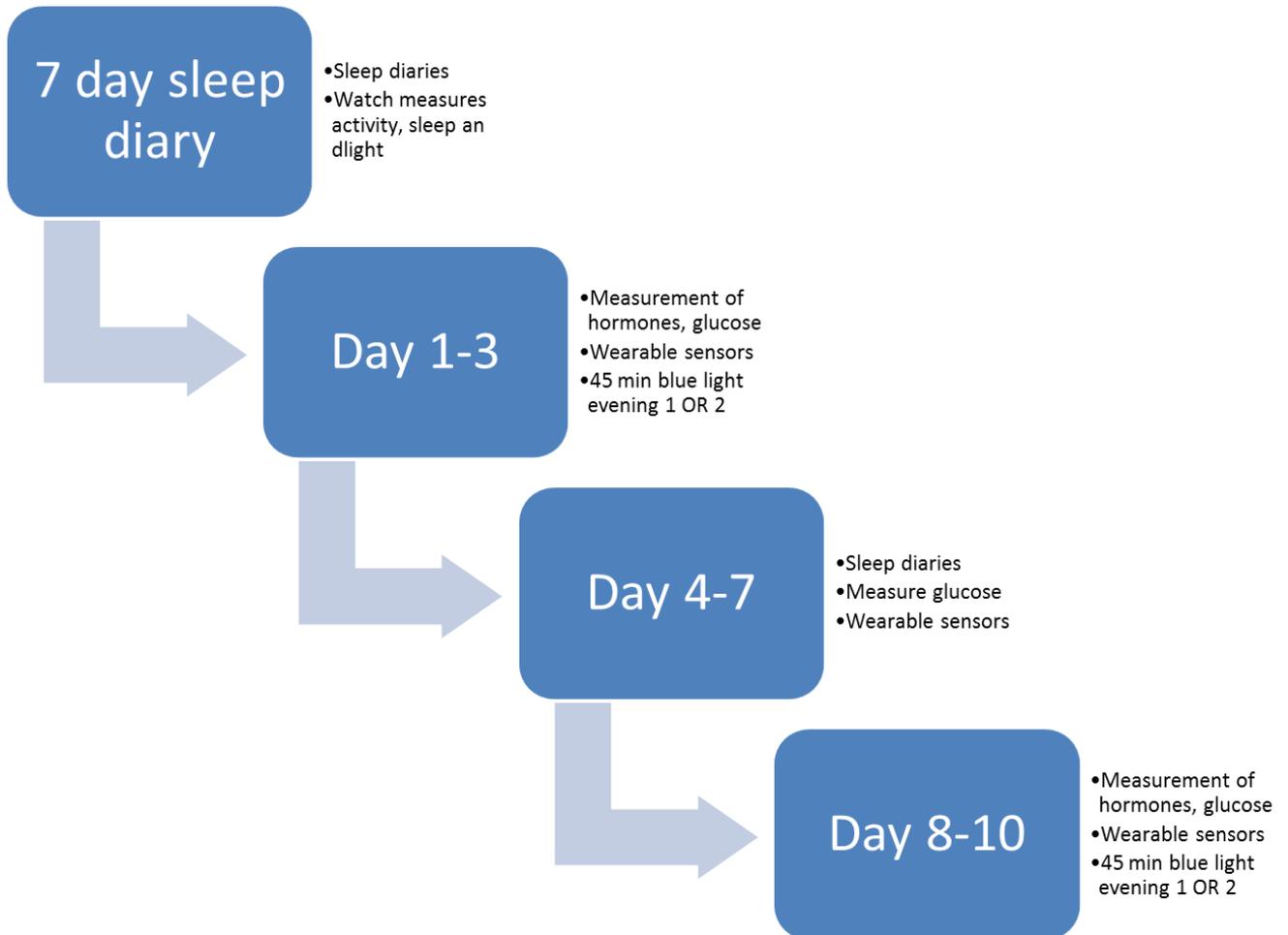
- Are aged between 18-38
- Are healthy, without active medical problems
- Take no regular medications
- Don't smoke
- Don't take illicit substances
- Meet our sleep health criteria
- Have a BMI (body mass index) between 18-25

bioRHYTHM Wearable Devices Schema



Version 1.0 2018-11-26

Study Timeline



The microdialysis system

What is microdialysis?

The microdialysis probe is a very narrow tube (less than the width of a pin head) with tiny holes ("pores") through which certain molecules can pass.

In this study the probe is placed just beneath the skin after making the area numb with local anaesthetic.

Once the probe is under the skin, it is connected to a small pump and a sample collector. These are both kept in a small bag, which is worn around the waist. Together, everything weighs less than a tin of baked beans. You can see a picture of the device on this page.

The probe and pump are fully approved for use in humans (CE marked). The sample collector is a research device developed by our team. It does not have CE marking. However it has already been successfully used in several trials of healthy volunteers and patients with no problems reported. The device stores samples of fluid only – safety valves prevent any flow of liquid back toward the body.

Will I be paid to take part?

We realise that this study requires a significant commitment on your behalf. We can provide a fee as compensation for inconvenience, travel expense, and time away from work.

The payment will be up to £450 if you complete the entire study.

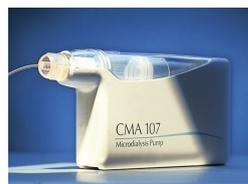
What are the potential side effects and risks of taking part?

The microdialysis system is safe and we do not think there will be any significant side effects or risks to you as a participant. Minor bruising at the site of the microdialysis probe insertion might occur.

Like any other procedure there is a small risk of discomfort during insertion or at the site of the probe. There is theoretically a small risk of infection and localized allergic reaction at the site of the probe. This risk is considered to be extremely low as we use an aseptic (clean) method and the probe is made from low allergy material. If infection or allergy is suspected we will immediately remove the probe and stop the study.

The continuous glucose monitoring system (CGMS) is extremely safe and we do not believe it will cause anything other than possible very minor discomfort at the time that the sensor is placed on the skin. CGMS systems are fully CE marked and used extensively as part of routine care for people with diabetes. The sensor is placed superficially into the skin of the abdomen or arm following the manufacturers recommended procedure.

The Luminette visor is a consumer available, CE marked device marketed for treatment of seasonal affective disorder. It shines light similar to bright daylight into the eye and should not cause any discomfort.



Pump



U-RHYTHM sampler



The sample collector (top right) and pump (top left) are carried in a stretchy belt around the waist. The probe is a very small plastic tube placed just below the skin, usually on the lower part of the abdomen (stomach).

Are there any benefits to me if I take part?

You will not benefit directly from taking part in this research study.

However, we hope that the information we get from this study will help us to understand body rhythms. **We will give you a summary of the data we collect from you at the end of the study.**

What will happen to my samples?

Microdialysis **and saliva** samples taken during the study will first be stored in a freezer within the University of Bristol and then sent away to The University of Groningen for analysis. All your samples will be totally anonymous and cannot be linked to you in any way.

After initial analysis any leftover microdialysis sample may be stored for up to 5 years after the last person is recruited. Samples are kept in case analyses need to be repeated or if additional results are required to successfully complete the study. After this date anything remaining of your samples will be destroyed.

If you decide to withdraw from the study, you can ask for your samples to be destroyed even if they have not been analysed. You can also request that any information obtained from analysing your samples to be destroyed.

Will my taking part in this study be kept confidential?

Yes. All information about you will be kept strictly confidential.

Any information we collect will be made anonymous so you can't be identified personally. Your information may only be viewed by research staff involved in this study, and/or by representatives of government bodies which regulate medical studies such as this one to make sure they are performed in a proper manner.

What happens to the data collected during the study?

We will collect information in both paper and electronic form

Information about your participation will be recorded on paper Clinical Record Forms (CRFs). These do not contain any personal identifying information. CRFs forms are stored securely in a locked office within the University of Bristol.

Results and other data collected from these forms may be transferred to password-protected electronic forms hosted on secure servers by the University of Bristol.

Data from all wearable devices will be stored securely

Information about your sleep and activity during the week prior to sampling is stored within the activity watch internal memory. This data will be downloaded from the watch via a USB cable and stored in anonymised form in a secure location on a password protected computer, hosted by the University of Bristol. No personal identifying information will be stored on the watch or within the data stored on the computer.

Anonymised information about your sugar levels, heart rate, temperature and other parameters are recorded within the device memory. During and after the sampling sessions are complete, this information will be downloaded from the device and stored anonymously and securely on an internet server. Information is encrypted at the time of transfer from the device.

Information collected during the study may be used to support other research in the future, and may be shared anonymously with other researchers, with your consent.

What if I don't want to carry on with the study?

You can leave the study at any time.

Participation is entirely voluntary and you can withdraw at any time without having to give a reason.

What will happen to the results of the research?

The results of the study may be published in a peer reviewed journal or presented at a scientific meeting.

Once the study is completed, we will offer you a summary of the data we have collected from you, and from the study as a whole.

What do I do now?

If you are interested in this study please make contact. Otherwise you don't have to do anything.

You can find the contact details for our study investigators on page 1 of this information sheet. You can contact us to ask any questions about the study or to tell us that you are interested in taking part.

If you are interested we will get back to you to discuss a suitable time to come in for the screening visit.

What if I have concerns about this study?

The Research Governance team is an independent contact if you wish to make a complaint or voice any concerns about this study.

Email: research-governance@bristol.ac.uk

Call: +44 (0)117 928 8676

Write to: Research and Enterprise Development,
3rd Floor, Senate House,
Tyndall Ave,
Bristol,
BS8 1TH

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<https://www.endocrinology.org/grants-and-awards/grants/early-career-grant/>

