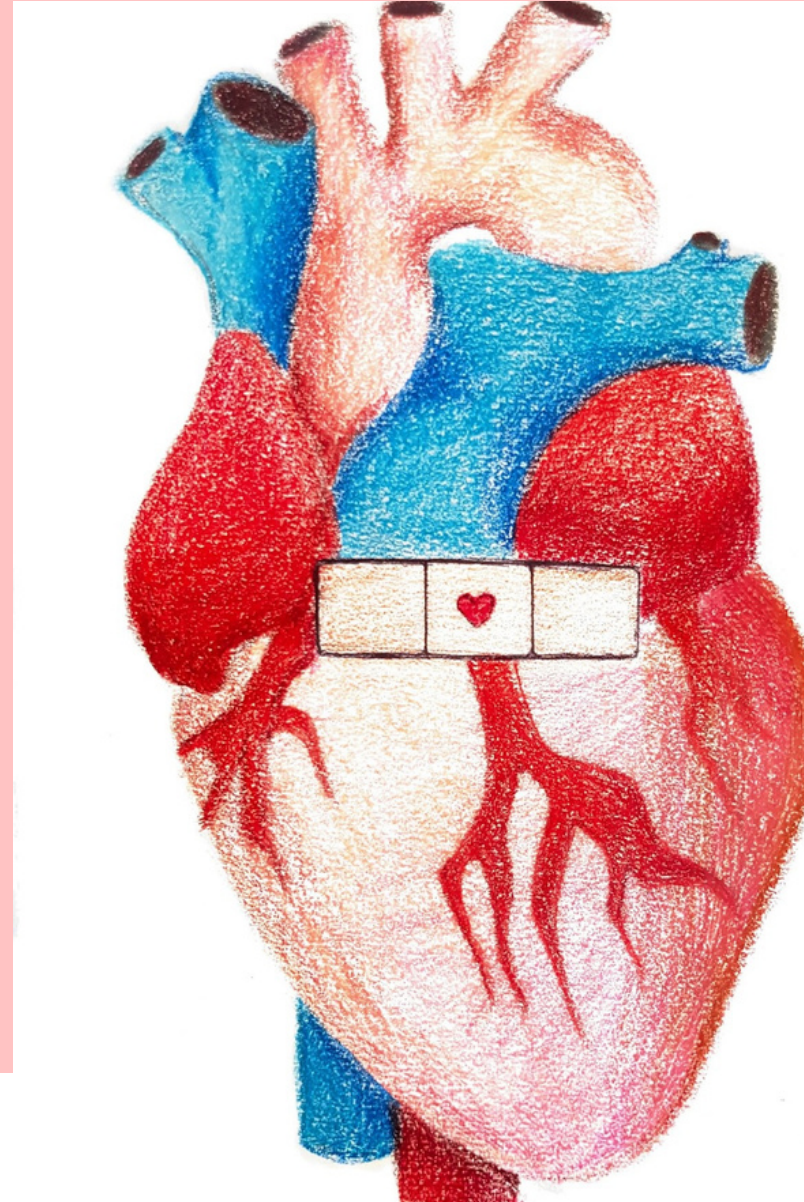


# STATIN PATCH

“A GREAT SUCCESS STORY” – THE BRITISH HEART FOUNDATION



## INTRODUCTION

This poster is designed to give you an insight into our research and our innovative idea, statin patch, to try and prevent cardiovascular disease. this poster is designed to give you an insight into our research and our idea

Coronary heart disease is a disease in which there is a narrowing or blockage of the coronary arteries (blood vessels that carry blood and oxygen to the heart).

Statins are the most common drug used to treat this disease.

## FUNCTION

- Statins reduce your cholesterol levels and lower your risk of heart attack and stroke.

- Cholesterol is essential for the body to work, but too much ‘bad cholesterol’ (low-density lipoprotein or LDL) can start to deposit in the arteries, blocking it.

- Statins can help prevent heart attacks and strokes by stopping further build of this bad cholesterol.

- Transdermal application requires the statins to be hydrophobic so we will be using the hydrophobic statins: **atorvastatin, simvastatin, fluvastatin**. This is because they have to pass through the membrane which is composed of lipid bilayers.

- There are a few side effects of taking statins with the most common being headaches, diarrhoea, feeling sick and tired

## WHY PATCH?

Patches are more convenient than having to take statins orally every day at a regular time.

A study from the school of pharmacy University Otago found that patients 75 and older "dislike having to take oral prescription Medicine".

As a country with an ageing population with an increased risk of developing heart diseases. These protein patches make the intake of medicine simple convenient and affective

## PROS AND CONS

Pros:

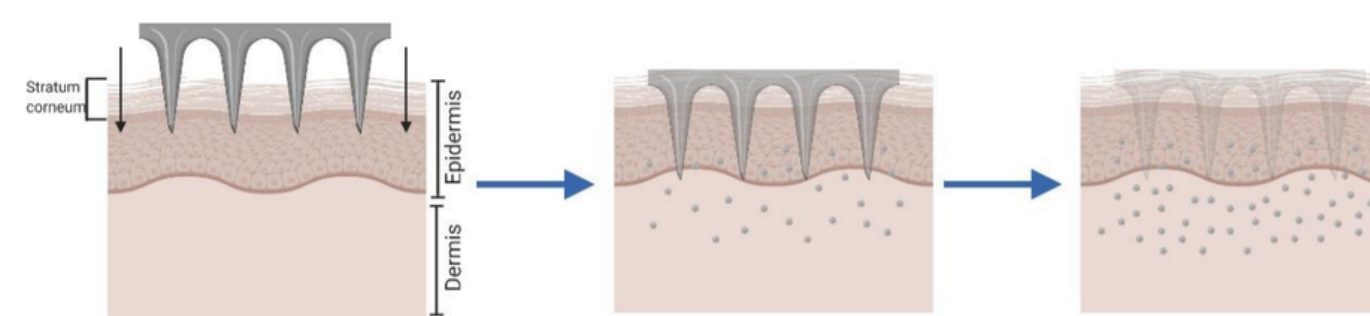
- Easier and more convenient to use, especially those with busy lifestyles or those who experience forgetfulness (will be hugely beneficial for those who have diseases like Alzheimer's)
- Avoid the first-pass metabolism effects associated with taking medication orally
- Reduces the likelihood of overdoses
- Improves patient compliance

Cons:

- May be visible - patients would be advised to place the patch somewhere where it is less visible such as the inner arm
- Can cause skin irritation - patients would be told to remove the patch and place another elsewhere on the body, if irritation continues, they should continue to take their medication orally
- Need to remember to change every week - for this we suggest that the patient's GP sends them weekly reminders via text message or call

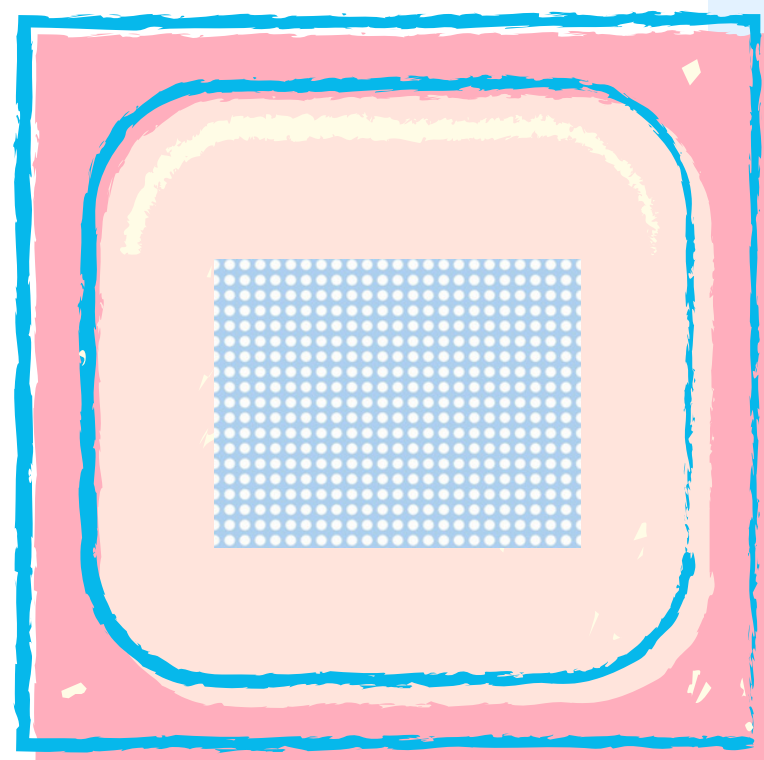
## METHODOLOGY

- A transdermal patch containing dissolving microneedles on the underside to pierce through the skin and secrete statins into the systemic circulation.
- Dissolving microneedles are the least invasive and can store larger amounts of drugs than other non-invasive microneedles.
- We compared it to hypodermic needles, coated microneedles, and hollow microneedles,
- Once dissolved it inhibits LDL production in the liver and prevents LDL from breaking off and blocking the bloodstream.

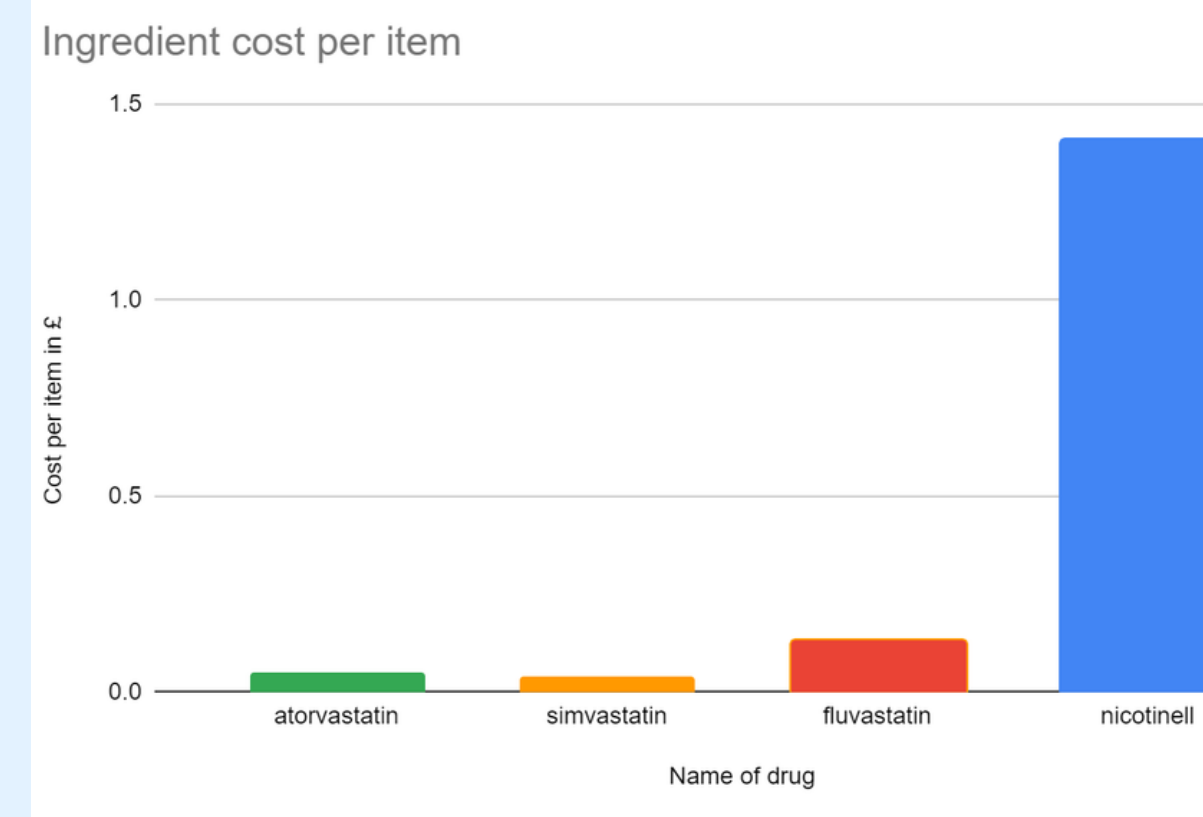


## APPLICATION

- Wash and sanitise your hands and the area where the patch will be applied.
- The plastic back of the patch should be facing you
- Peel of the patch, avoid touching the exposed patch.
- Apply the patch to



## STATISTICAL ANALYSIS



The price of a transdermal patch is estimated to be £1.41- this price may be less or more depending on the drug you take.

This price is only an indication for 20mg of medicine, therefore, is subject to change.

Affordability: at this time the patch is expected to be affordable for 20mg of medicine. We eventually expect a price drop for the patch, following the trend for a buprenorphine patch as shown by Wave data. Thus the patch will more affordable in the upcoming years

## TESTING OUR PRODUCT

Currently, there are ongoing clinical trials on ibuprofen patches. We plan on replicating this trial with our Statin patch. In the clinical trial, we will be investigating dosage on each transdermal patch and efficiency. we would carry out tests of the patch for different statins, different amounts of statins, different skin types, genders and ethnicity, we can begin to understand which variables affect our patch and for which of these factors the patch is safe to use. These trials would occur over a long period of time so we and the public can be confident in our investigations

Consideration: the public has already been introduced to these statins and transdermal patches and so we can expect the public to react positively to the two ingredients individually. By carrying out tests and trials, we can further assure the public of the safety of this patch

## CONCLUSION

Overall we focused our attention on prevention over cure. We aimed to use drugs and treatments that already exist because they have been proved time and time again that they are effective. The public is also already familiar with the use of statins so our idea significantly decreases public scepticism making those who would benefit from our patch more open to using them.

## RELATED STUDIES AND EVIDENCE

- Oral vs patch clinical study; [https://journals.lww.com/cosupportiveandpalliativecare/Abstract/2011/03000/Transdermal\\_opioids\\_for\\_cancer\\_pain.4.aspx](https://journals.lww.com/cosupportiveandpalliativecare/Abstract/2011/03000/Transdermal_opioids_for_cancer_pain.4.aspx)
- Dissolving microneedle case study; <https://www.sciencedirect.com/science/article/abs/pii/S01429612730128X>
- Safety of statins; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3743363/>
- Statins side effects; <https://www.jacc.org/doi/full/10.1016/j.jacc.2016.02.071>
- What statin does and how it works; <https://www.bhf.org.uk/informationsupport/heart-matters-magazine/medical/statins-fact-or-fictionhttps://core.ac.uk/download/pdf/26690335.pdf>