
LUMO
HOME UV TREATMENT

CONTENT

Chosen Brief and Explanation

Develop a design solution that utilises ‘advanced textiles’ (fabric that has been enhanced by new technologies) to improve well-being or the quality of people’s lives

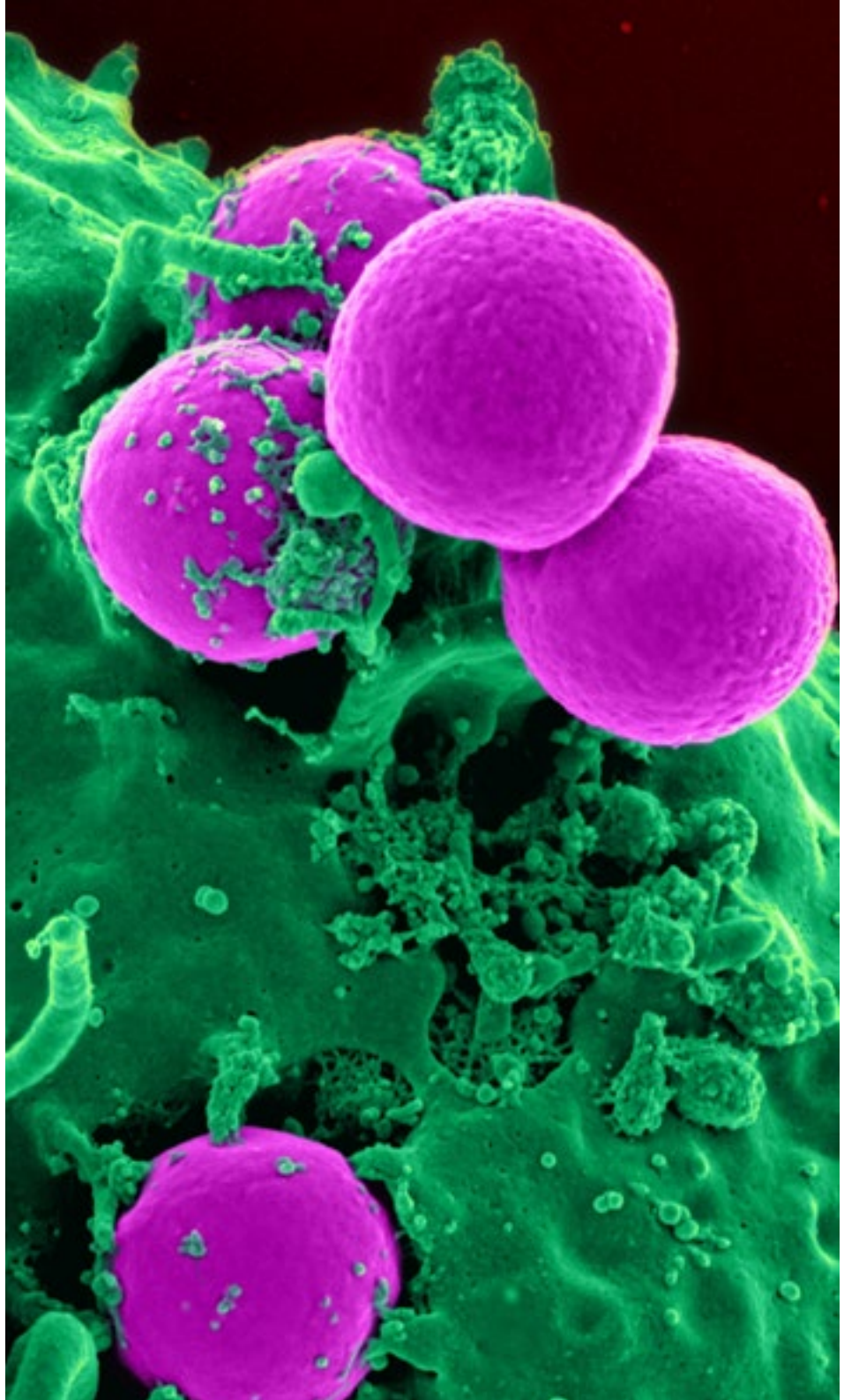
After looking at the brief and thinking about peoples well-being we started to think about peoples skin and what it goes through.

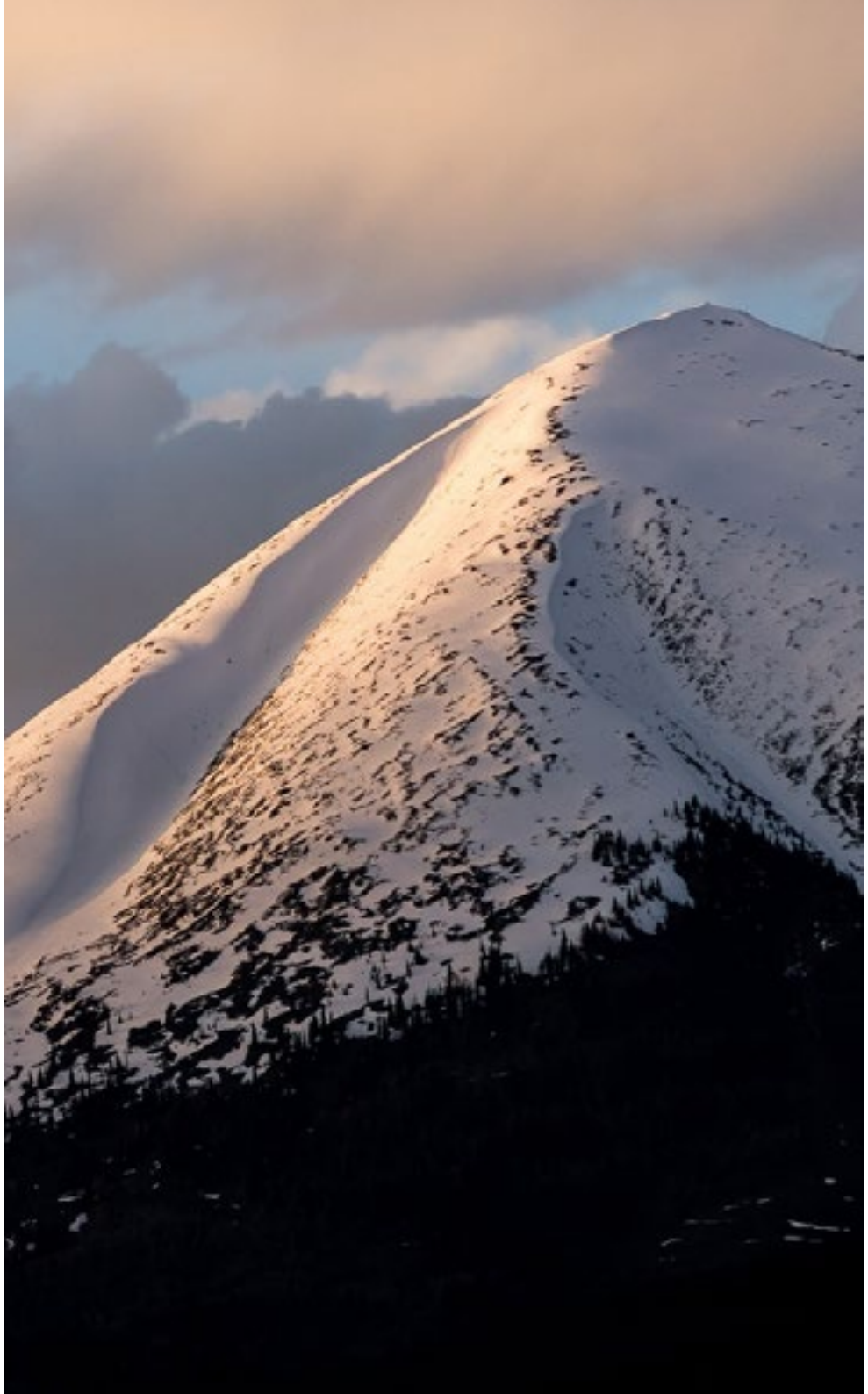
Psoriasis affects over 125 million people worldwide. It is a common skin disorder which can affect all parts of the body such as, hands, feet, elbows and legs.

Symptoms of psoriasis are usually when rashes appear on skin, these rashes can become extremely itchy and painful.

Inflammatory Skin Disease

Psoriasis is an inflammatory skin disease, which develops through the interaction of epidermal keratinocytes and immune cells, although its pathoetiology has still not been fully understood. Psoriasis is characterized by compromised barrier function, similar to atopic dermatitis (AD), in which mutation of the filaggrin gene begins to play a role.





The Two Peaks Of Psoriasis

There are two peak periods of onset: between 15 & 25 and between 50 % 60 years of age. It is more common that psoriasis effects less than 2% of the body surface area, in other cases the disease can be more severe, effecting a large percentage of the skin. When overlooking the sever psoriasis it has similar characteristics to patients who suffer with cancer, diabetes and heart disease.

Statistics

10% and 30% of people with psoriasis also develop psoriatic arthritis.

Psoriasis prevalence in African Americans is 1.3% compared to 2.5% of Caucasians.

Psoriasis can occur at any age, although there seem to be two ‘peaks’; from the late teens to early thirties, and between the ages of around 50 and 60.

Statistics

125 million people world-wide are affected

Affects up 1.8 million people in the UK

Psoriasis affects 2% and 3% of the UK population.

Initial Questions

What treatments are there?

How long do these treatments take?

How effective are there?

Are there any drawbacks/side effects?

How long to the treatments last?

Where treatments are available?

Are they expensive?

Psoriasis Types

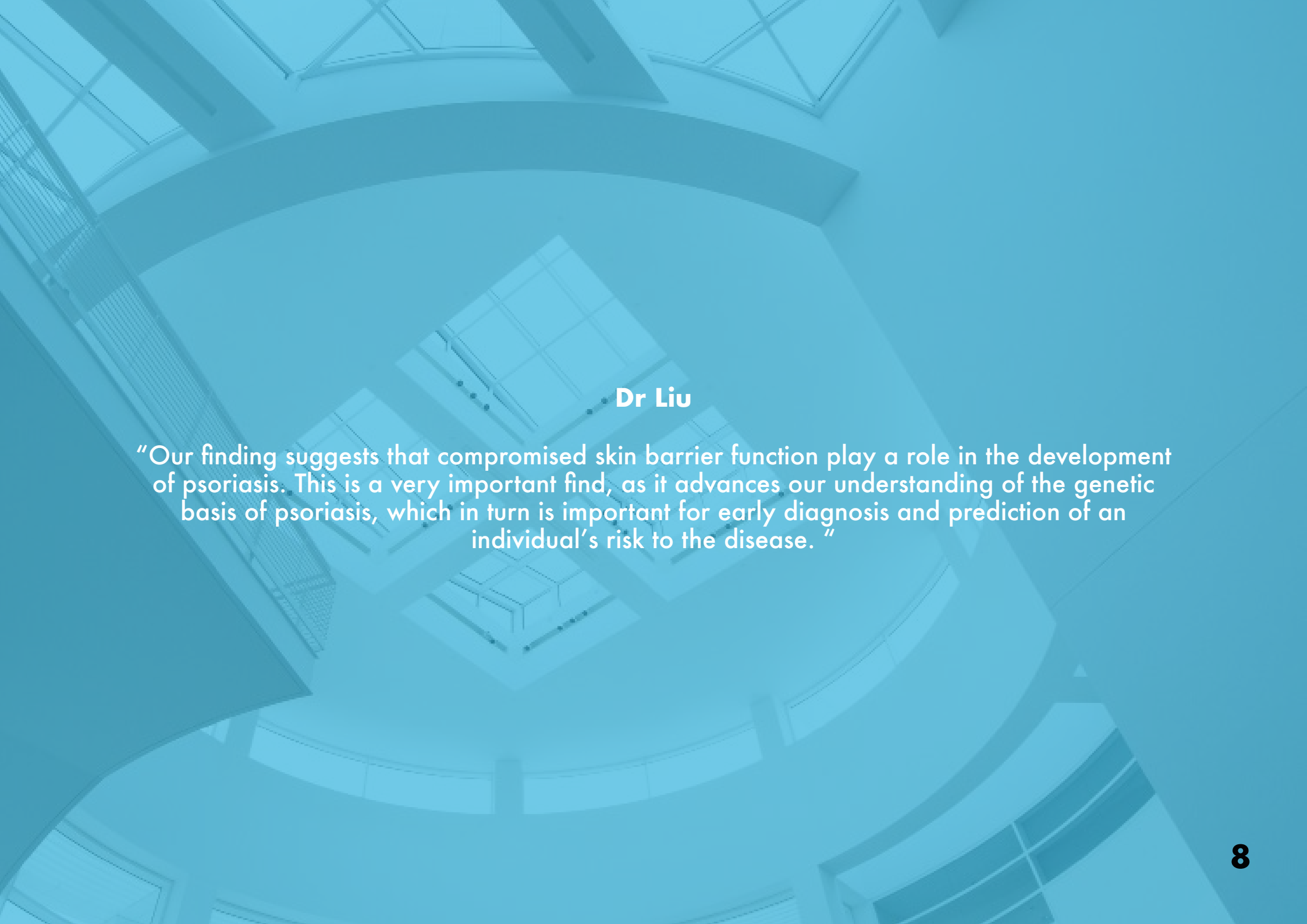
Plaque Psoriasis - Dry red skin lesions, covered in silver scabs. Develops on knees, elbows or the lower back.

Scalp psoriasis - Red Patches on the scalp can lead to hair loss.

Nail Psoriasis - Dents in your nails as well as discolouration, can lead to loosing your nails temporarily.

Guttate Psoriasis - Drop like sores on legs, arms, chest and scalp. May never come back but in some cases can develop into plaque psoriasis.

Inverse Psoriasis - Red patches that develop where your skin creases. Such as armpits, groin, between buttocks and under the breasts.



Dr Liu

"Our finding suggests that compromised skin barrier function play a role in the development of psoriasis. This is a very important find, as it advances our understanding of the genetic basis of psoriasis, which in turn is important for early diagnosis and prediction of an individual's risk to the disease. "

Existing Treatments

Self Help

How it works - A healthy diet & regular exercise

Pros - Reduces the risk of heart disease, cancer and diabetes

Cons - None

Topical Corticosteroids

How it works - Blocks the harmful effects of the immune system on the skin

Pros - Usually effective in treating mild to moderate psoriasis

Cons - Can't be used on large areas of the skin due to side effects and long-term use can cause thinning of the skin

Existing Treatments

Coal Tar

How it works - A thick oil in the form of shampoo/ointment that you add to the bath

Pros - Reduces scales, inflammation and itchiness

Cons - Not suitable if the skin is broken, can also cause acne or make existing acne worse (not suitable for children)

UVB Treatment

How it works - Using an artificial light to slow the production of the skin cells

Pros - effective treatment for guttate or plague psoriasis

Cons - Redness and itchiness on the skin, requires frequent hospital visits (3 times a week)

Existing Treatments

Psoralen Plus Ultraviolet A (PUVA)

How it works - Medication that makes the skin more sensitive to light, allowing the uva light to penetrate deeper than UVB light

Pros - This treatment is good for severe psoriasis that has not responded to any other treatment

Cons - Side effects include, feeling sick, head aches, burning skin and itchy skin. This is not suitable for long term usage as it can cause the risk of skin cancer

How Long Do Treatments Take To Show Results?

Acitretin: 2 to 4 months, but it may take up to 6 months to reach the peak effect

Biologics: 2 to 3 months or in some cases longer

Cyclosporine: 4 to 4 months

Goeckerman Treatment: 3 to 4 weeks

Methotrexate: 3 to 6 weeks, although you may not see real clearing for up to 6 months

Phototherapy: 2 ½ to 3 months

Prescribed Creams and Remedies

Garment Wraps

Friction light fabric which makes skin treatment more effective. The purpose of this is to keep as much moisture in the skin as possible.

Dead Sea Salt Baths

Bath solution, helps psoriasis by removing scales and easing itching. They are added to a bath and soaked for around 15 minutes.

Emollients

A lotion/ointment which smooths and hydrates the skin and is used for all dry skin disorders. They should be applied frequently even after improvement occurs.

Steroid Creams

These are used to reduce skin inflammation caused by psoriasis. Steroid creams are usually first-line treatment.

Aloe Vera

Flesh from aloe plant can be applied up to the skin up to 3 times a day. It can redness and scaling associated with psoriasis.

Csrex Lotion

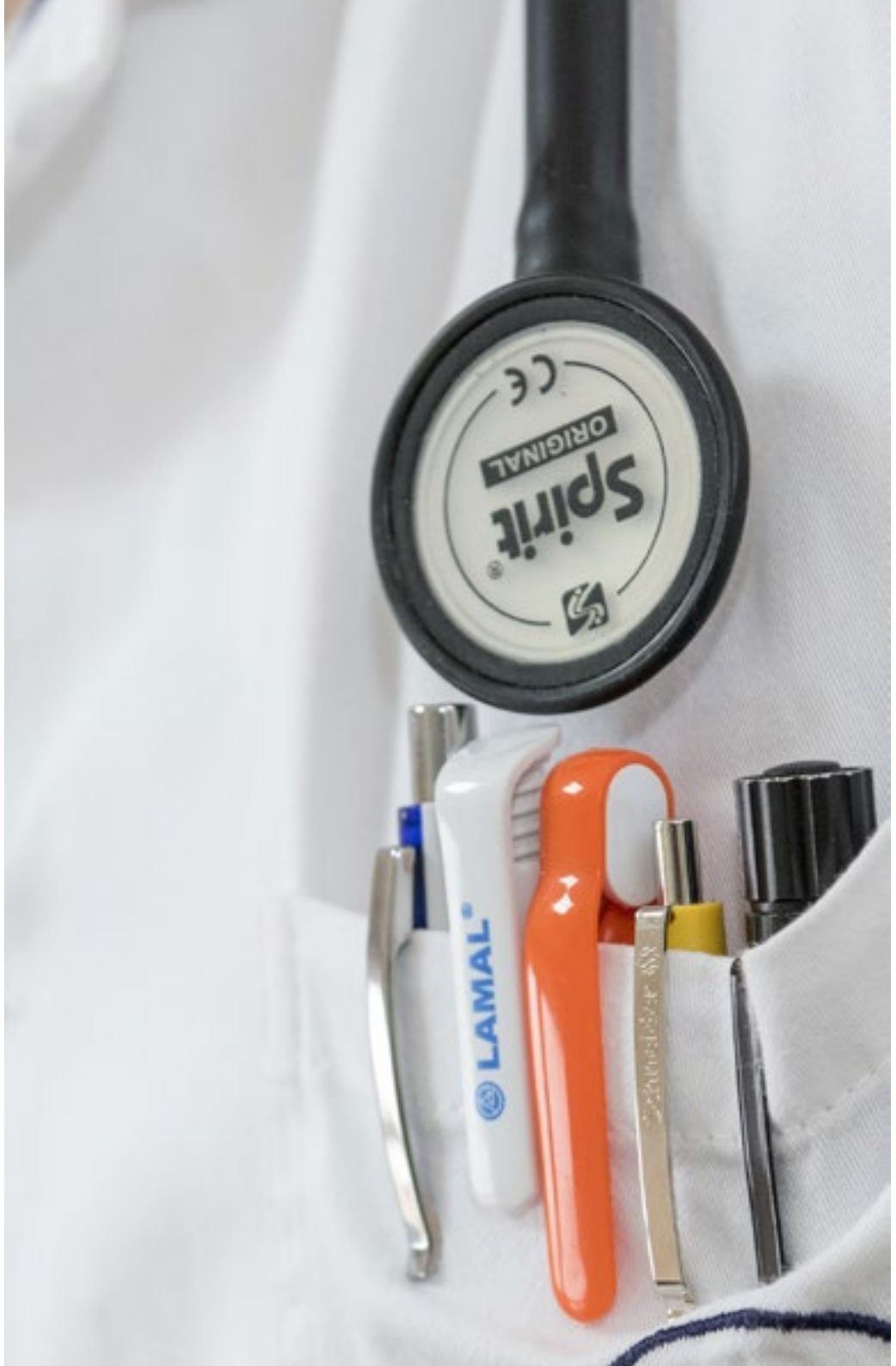
Treatment for psoriasis, it can help relieve itching and provide anti-inflammatory effects. It contains cool tar to reduce itching and restore suppleness

Current UVB Treatment Process

Patients must arrive at the place of treatment without any perfume, cream or makeup.
Nurses will then assess the current state of the patients skin.

UVB is given in a very small dose, this will then increase after each visit. Doctors can increment the dose up to 20%, but this is not always the case with every patient.

Patients will need to attend treatment 3 days a week, Mon-Wed-Fri and rest days are key.



Current UVB Treatment Process

The Dermatology Life Quality Index questionnaire is designed for use in adults, i.e. patients over the age of 16. It is self explanatory and can be simply handed to the patient who is asked to fill it in without the need for detailed explanation. It is usually completed in one or two minutes.

DLQI Test (Not checked all the time)

http://www.bad.org.uk/shared/get-file.ashx?id=1653&itemtype=document

Current UVB Treatment Process

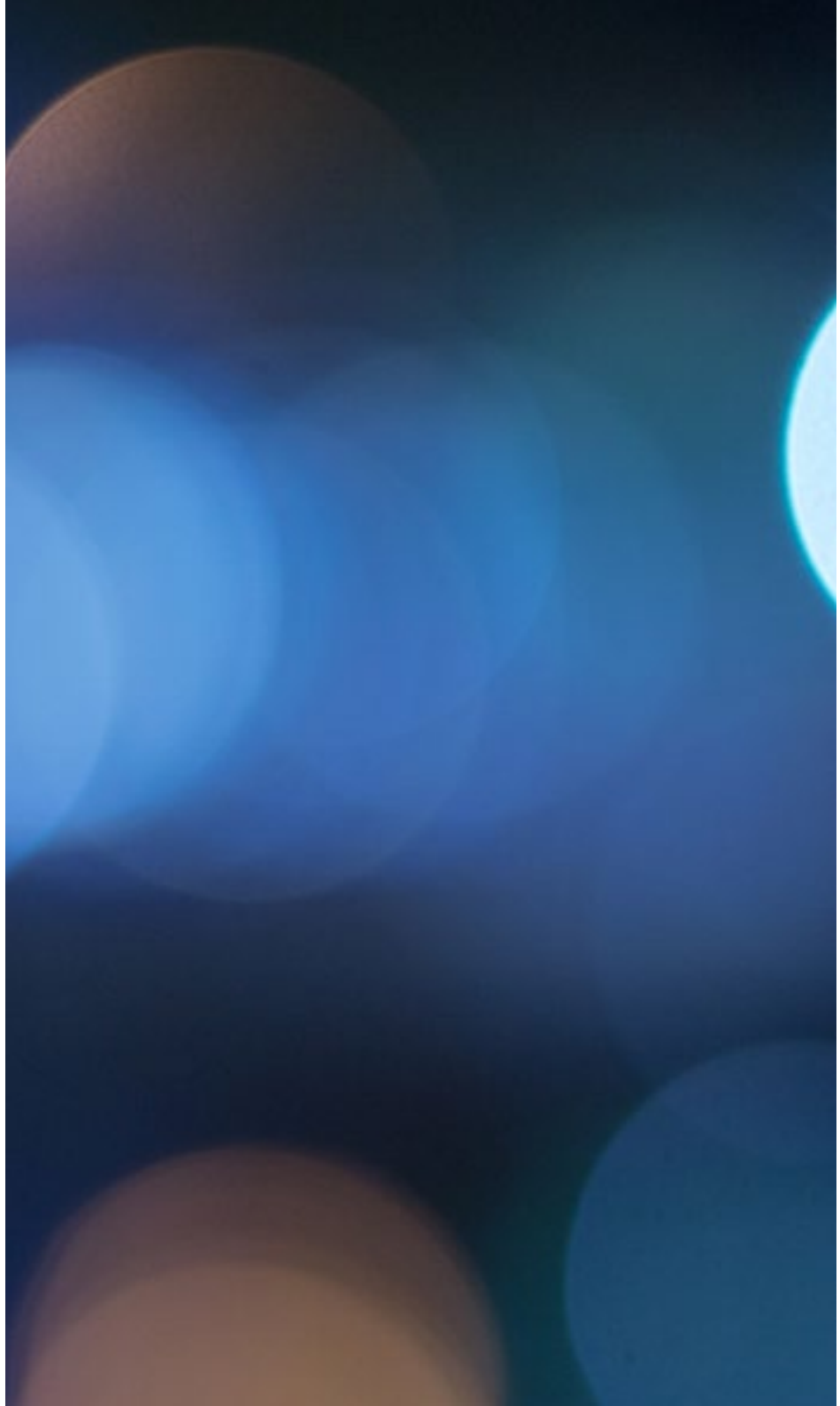
Nurses will input a dose for the patient into the UVB machine.

The patient is instructed to wear goggles and a visor to protect face and eyes.

For smaller patients, there is a step in the machine which will boost the height and ensure the patient's body gets equal light treatment.

Inside the machine there are colour coordinated hand placements for the patient to rest their hands on. This is to ensure the patients are in the right position to get equal amount of UV treatment.

A few weeks after treatment, patients should notice flattening of the skin.



UVB Treatment Benefits

- Reduces how severe psoriasis will be
- Not painful
- First treatments only last seconds and gradually increase over time
- More effective than the UVA, as the UVB rays penetrate deeper
- Slows the rapid rate of skin growth and shedding

UVB Treatment Drawbacks

Requires a lot of effort to accommodate, such as clearing the scaly skin before the UV can penetrate the skin.

Requires frequent visits or else the psoriasis will return as usual.

It can cause some people's skin to burn after the treatment. The face can react differently to the rest of the body which will require different doses and multiple visits to the hospital.

There is a chance that UVB treatment can cause skin cancer.

Visual Inspiration

UVB Patient Feedback

I had UVB treatment years ago when my psoriasis first appeared and flared up pretty badly. I have to say it's the best treatment I've had for it, it cleared it right up.

Psoriasis Association: Pam_06 : Wed 1st 2012

My hands before and after narrowband UV Light therapy using the Solarc Systems 550 hand and foot machine. These results are after a mere 7 weeks of treatment.

Rick, AB, Canada: Psoriasis patient

UVB Patient Feedback

We now own two of your eight bulb therapy lights. My daughter and I are still in the clearing stages but we are both really happy with the results we are getting. I use mine just about every day for six minutes a side. Your lights are a great product so much so that when my daughter moved out and took hers with her I had to buy another one.

Dean, BC, Canada: UVB Psoriasis patient

Interview With Sister Vicky Armstrong at The RVI

As part of our research we interviewed Vicky Armstrong who is a sister in the light therapy department at the Royal Victory Infirmary Newcastle. We asked her a variety of question about treatment for psoriasis and the UVB treatment.

UVB Process Interview

Sister Vicky Armstrong

What age is the average age range of patients who come in for treatment?

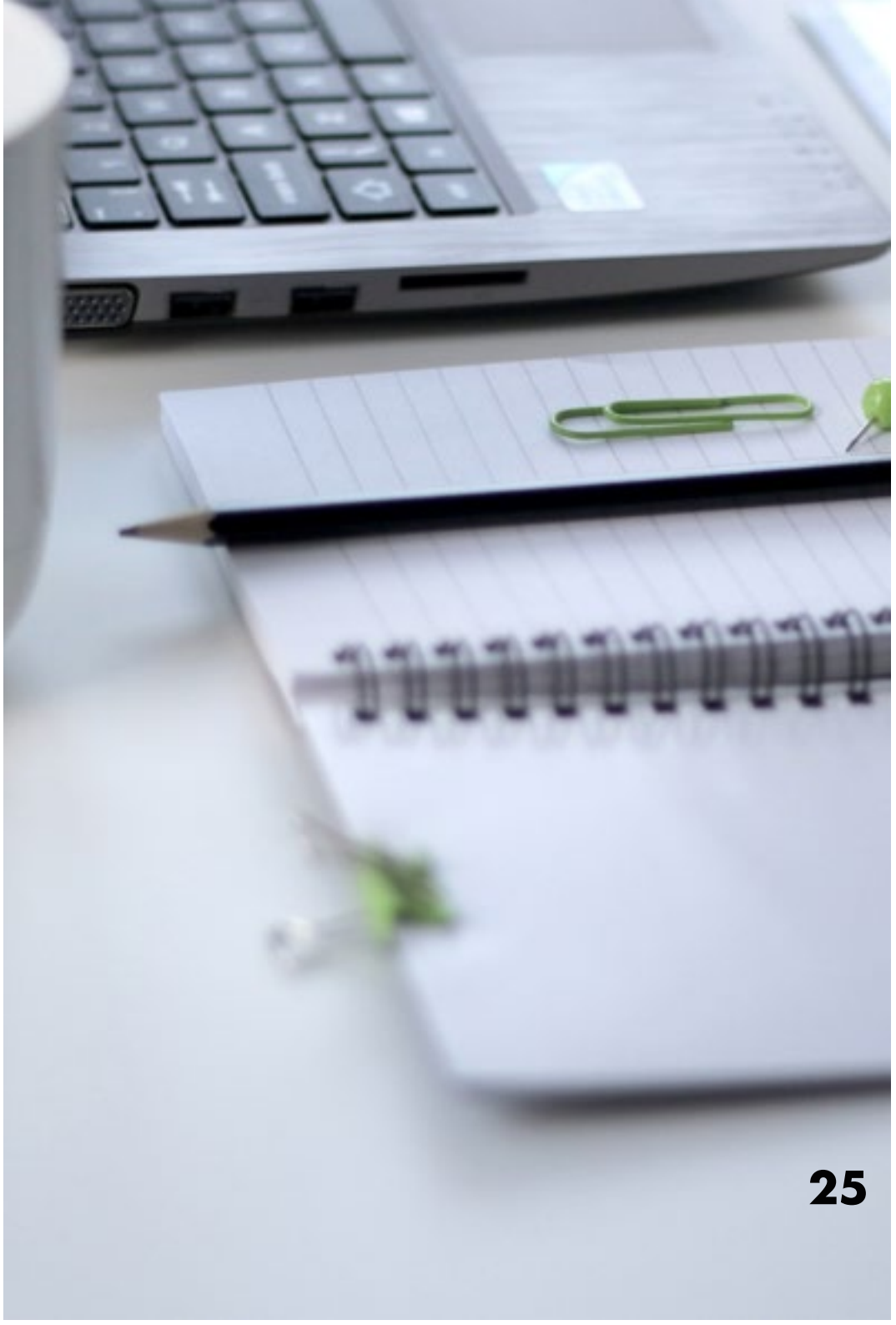
The age of patients who come in are usually around 18 - 50 years old.

What is the process a patient has to go through when they come in for light treatment?

When the patients first come in, they are given verbal information as well as written information. When they arrive at the hospital they are also given a short tour of the department.

How long does it take to see visible results?

We asses the patients at the beginning of the process, as well as the mid point in the process, this is where we would expect to see some visible results, and the end assessment if no improvements can be seen, we would stop the treatments.



Is there any sort of medication that patients need to take before they receive treatment?

It depends on how severe the psoriasis is on the patient, if they require a specific type of treatment they will need medication but if its just general UVB treatment then no.

On average how many times do patients need treatment in a week?

Patients need treatment 3 times a week.

On average how long do patients spend in the UVB machine?

The machines are calibrated depending on the height ratio of the patient, the doctor then inputs a dose after their height is calculated.

What do you think about home treatments for people to use?

People in Scotland in remote areas use a treatment called Photonet due to the distance they have to cover from their home to a hospital. So I would say if you live in a larger more populated area which is near to a hospital, the hospital would be the best option as you physically get seen to and can get the help and advice you need.

What creams do you advise patients to use after they've received treatment?

We give patients education and advice at the begging and the end of the treatment, we recommend patients use a good moisturiser even when the treatment has worked.

Photonet

Photonet is a NHS service which is available for people who live in remote areas who are unable to travel the distance to a hospital. Photonet currently have 36 treatment centres in remote areas who cannot get to a hospital. In the Photonet treatment centres, patients will receive the same treatment as they would in a normal hospital.

Blue Control

Psoriasis patients can benefit from clinically proven Blue LED Light Therapy while continuing with their daily routine. BlueControl is easy to use, the user will attach BlueControl to their arm or leg with the textile fixation strap. Press the button to start treatment. They will treat the affected area daily for 30 minutes. BlueControl will reduce symptoms such as redness, scaling and thickness without the use of chemical substances or the potential risk of UV radiation.

Gentle. Be kind to your skin while treating plaque psoriasis

Effective. Experience the change in psoriasis therapy.

Practical. Get great results without disrupting your day to day life.

TARGET AUDIENCE

We have decided to focus our idea on patients who currently have mild to medium cases of psoriasis. We have looked into a range of research and statistics, but we need to decide on who will benefit from UVB treatment the most.

What is skin?

The skin consists of two layers, the epidermis and the dermis. Underneath the dermis lies the hypodermis and subcutaneous fatty tissue. The three main functions of the skin is protection, regulation and sensation.

Protection – The primary function of the skin is to act as a barrier to provide protection from: mechanical impacts and pressure, variations in temperature, micro-organisms, radiation and chemicals.

Regulation – The skin regulates several aspects of physiology, including: body temperature through sweat and hair, and change in peripheral circulation and fluid balance via sweat. The regulation also acts as a reservoir for the synthesis of vitamin D.

Sensation – The skin contains an extensive network of nerve cells that detect and relay changes in the environment. There are separate receptors for heat, cold, touch and pain. If there is any damage to these nerve cells it is known as neuropathy, which will result in loss of sensation in the affected areas.

How does skin adapt in different environments?

Different types of weather conditions have a massive effect on our skin. When the weather is too hot or dry outside, our skin will let us know with different signs such as sweating. The colder weather can irritate the delicate skin on our face and hands. Winter conditions can also strip the natural moisture off our skin. This dryness can cause red patches and excess dead skin cells that block our pores causing acne.

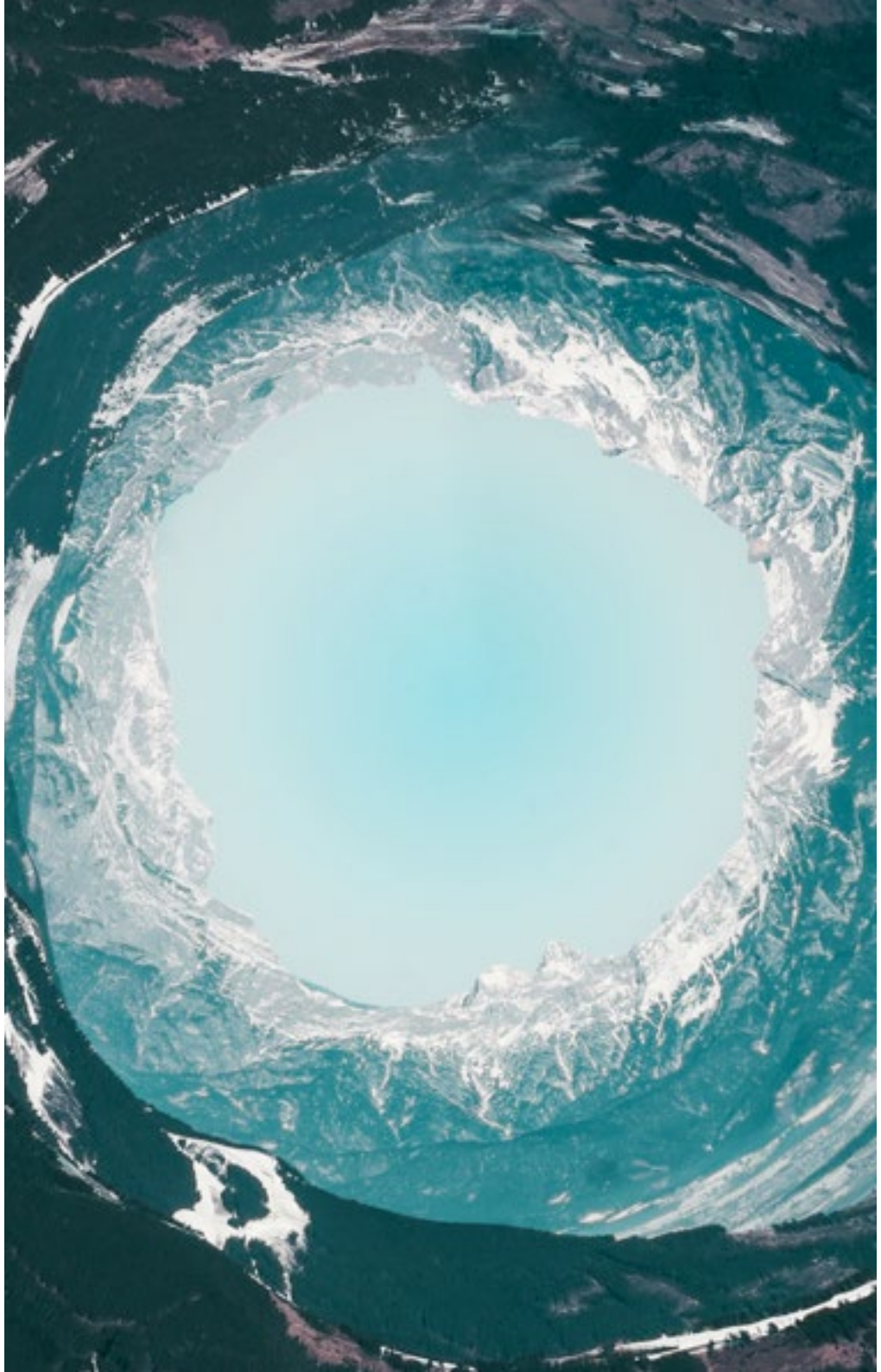
Cold Weather

When skin temperature dips below 50 degrees, the blood vessels cycle through periods of dilation and construction. During dilation, rushes of blood go straight to the skin causing the nose and cheeks to obtain the red “winter glow”

Cold weather means that there is less moisture in the environment. The lack of moisture is compounded by the wind, which then blows the moisture away from the skin. In a cold dry environment, water is lost from the keratinocytes (skin cells), which can sometimes leave the skin feeling dry, sore or chapped. Even in cold environments, applying moisturiser straight away wont re-hydrate the skin.

Cold Weather

Moisturises such as humectants are made to draw water from the lower layers of the skin. This water comes from liquids we drink. This then rehydrates the upper levels of skin.
Another type of moisturiser is Occlusives, this moisturiser has a barrier function which helps lock in moisture.
In cold and dry environments, moisturisers need to be heavy than the average to lock in any moisture.



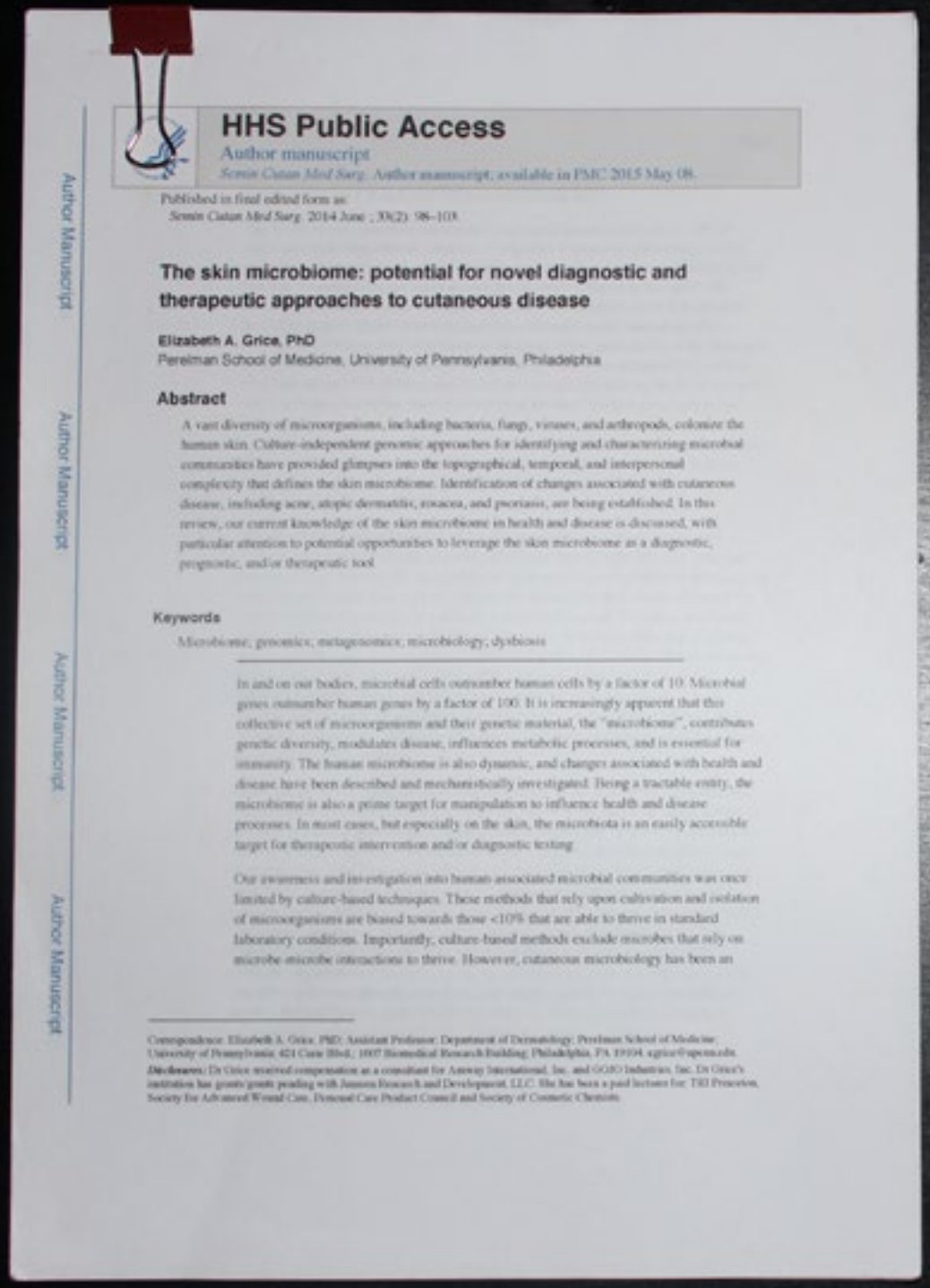
Hot Weather

Perspiration is also known as sweating or diaphoresis, which is the production of fluids secreted by the sweat glands in the skin.

Sweat comes from tiny holes in the skin called pores. Sweat is mostly made up of water, but also contains salts. Sweating is a very important part in regulating our body's temperature.

Summer and hot weather is thought to clear the skin and make it easier to manage. The humidity softens the skin and brings back the moisture lost in the winter.

However, some say acne can get worse in the heat. Excess heat and humidity will increase the production of sweat. Which means more oil is available to clog the pores in the skin.
The skin can become very itchy and sore in hot conditions. Skin can flare up in rashes and become very dry.



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The skin microbiome: potential for novel diagnostic and therapeutic approaches to cutaneous disease

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Abstract

A vast diversity of microorganisms, including bacteria, fungi, viruses, and arthropods, colonize the human skin. Culture-independent genomic approaches for identifying and characterizing microbial communities have provided glimpses into the topographical, temporal, and interpersonal complexity that defines the skin microbiome. Identification of changes associated with cutaneous disease, including acne, atopic dermatitis, rosacea, and psoriasis, are being established. In this review, our current knowledge of the skin microbiome in health and disease is discussed, with particular attention to potential opportunities to leverage the skin microbiome as a diagnostic, prognostic, and/or therapeutic tool.

Keywords

Microbiome; genomics; metagenomics; microbiology; dysbiosis

In and on our bodies, microbial cells outnumber human cells by a factor of 10. Microbial genes outnumber human genes by a factor of 100. It is increasingly apparent that this collective set of microorganisms and their genetic material, the "microbiome", contributes genetic diversity, modulates disease, influences metabolic processes, and is essential for immunity. The human microbiome is also dynamic, and changes associated with health and disease have been described and mechanistically investigated. Being a tractable entity, the microbiome is also a prime target for manipulation to influence health and disease processes. In most cases, but especially on the skin, the microbiota is an easily accessible target for therapeutic intervention and/or diagnostic testing.

Our awareness and investigation into human-associated microbial communities was once limited by culture-based techniques. These methods that rely upon cultivation and isolation of microorganisms are biased towards those <10% that are able to thrive in standard laboratory conditions. Importantly, culture-based methods exclude microbes that rely on microbe-microbe interactions to thrive. However, cutaneous microbiology has been an

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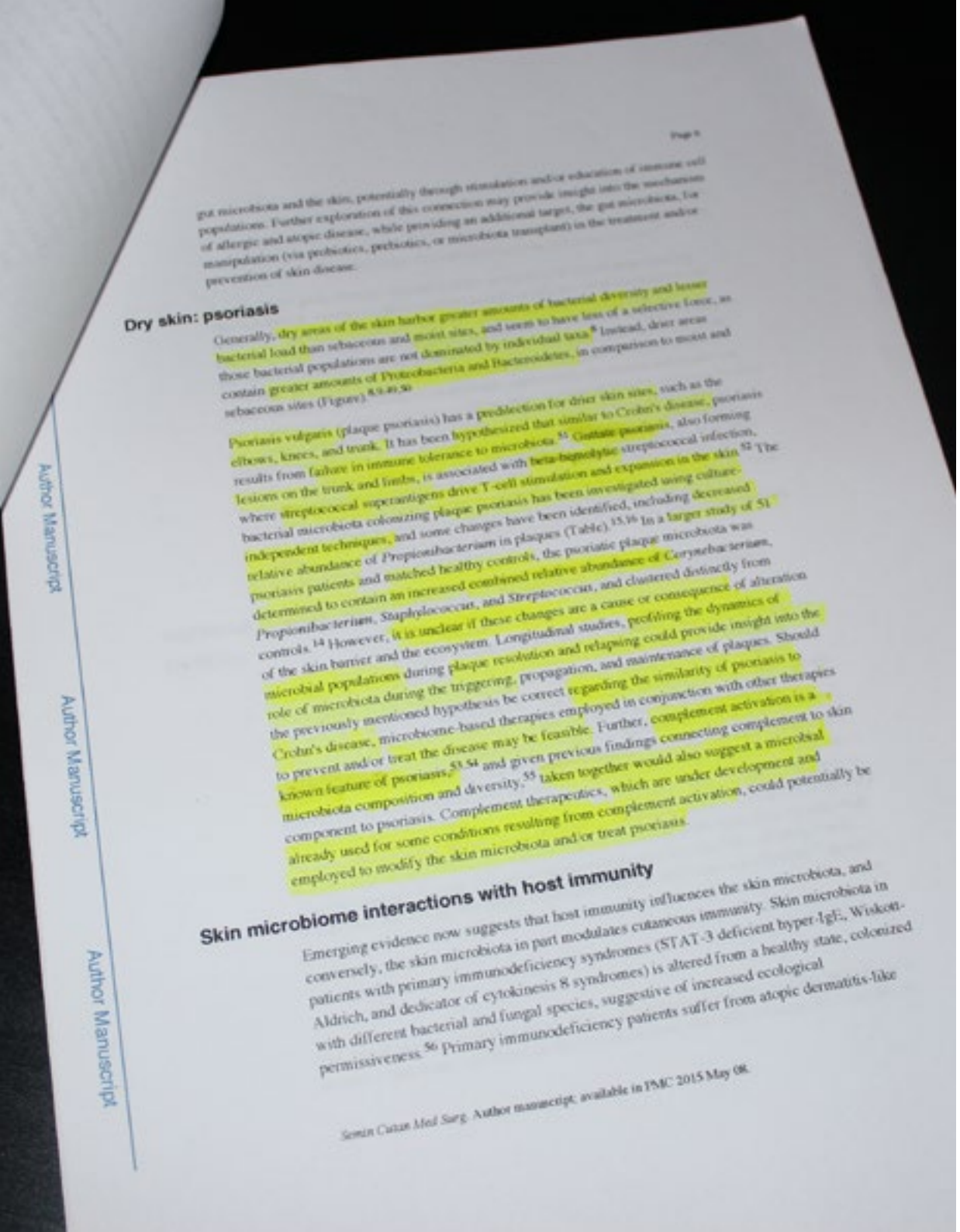
The Skin Microbiome: Research Paper

Elizabeth A. Grice, PHD



Dry Skin: Psoriasis

We were provided with a research paper ‘The skin microbiome’ which gave us more in-depth research into dry skin psoriasis. It explained the science behind psoriasis and skin and went into a lot of detail about the different types of psoriasis.

It was also unclear about the changes in skin due to consequence of alterations in the skin barrier and it went into a lot of detail about the drier areas of skin and how it contains greater amounts of Proteobacteria and Bacteroidetes, in comparison to the moist and sebaceous sites.


How does lifestyle affect the skin?

Diet

Sweets and fizzy drinks cause insulin levels to rise which creates a wave inflammatory throughout the body. This inflammation causes a breakdown in collagen and elastin. These two things are fibres that give skin elasticity and strength.

Sugar also attaches to proteins in the body and then produces a harmful by-product called “advanced glycation end product” which causes sagging skin and skin breakouts.

Foods that contain Zinc help reduce inflammation and bacteria production in the skin. Foods with a high zinc content are, Cashews, Avocados, blackberries and raspberries. Fresh fruit and vegetables contain antioxidants which can help reduce wrinkles.

Dairy products can increase blood levels of androgen, which leads to excess oil production in the skin.

Allergies

Sometimes when something touches your skin, your immune systems thinks it's under attack by a harmful substance. It would then over react and sends antibodies to help fight the invader which is called the allergen. The result is a red or itchy rash.

Spray On Materials

Burnshield Hydroshield

This spray is used for treating burns. Burns need to be treated quickly as the skin can go on to split or form blisters which will increase the patients suffering.

When skin is burnt it is vital to stop the burning process and return the skin to a much more comfortable temperature. The quicker the skin can be cooled, the less time the heat has to penetrate further into the skin.

USES

Applied liberally to burns, scalds and sunburn. Safe to use on children.
Cools the burn and helps prevent infection and pain relief.
Rehydrates burn dressings.

BENEFITS

Gives immediate pain relief.
Reduces the scarring effect.
Provides continual moistening action which encourages the body's natural healing response and also flushes away tissue that is beyond repair.

Emollin Emollient Spray

Is used to soothe and protect tender, scaly or damaged skin. Irritated skin needs to be soothed to prevent itching. The spray is hygienic and easy to use. It is non-greasy and made with no preservatives or cold propellants.

USES

Applied to damaged or sensitive skin as often as needed. Spray onto affected areas as directed for relief from dry, itching and irritated skin.

BENEFITS

Soothes itchy skin.

Hansaplast Wound Plaster

The spray is a layer of immediate protection for minor wounds, cuts and scrapes.

USES

Sprayed onto a small wound to prevent infection.

BENEFITS

Transparent wound protection.
Waterproof and provides overnight protection.
Works directly against bacteria.

Hospital Visit

To get more information about the current treatment and equipment, we visited the phototherapy treatment unit at a local hospital.

We spoke to the nurses working on that ward and we asked them questions about the UVB machines. They showed us a range of different machines, all different sizes and explained what the purpose of each one was.

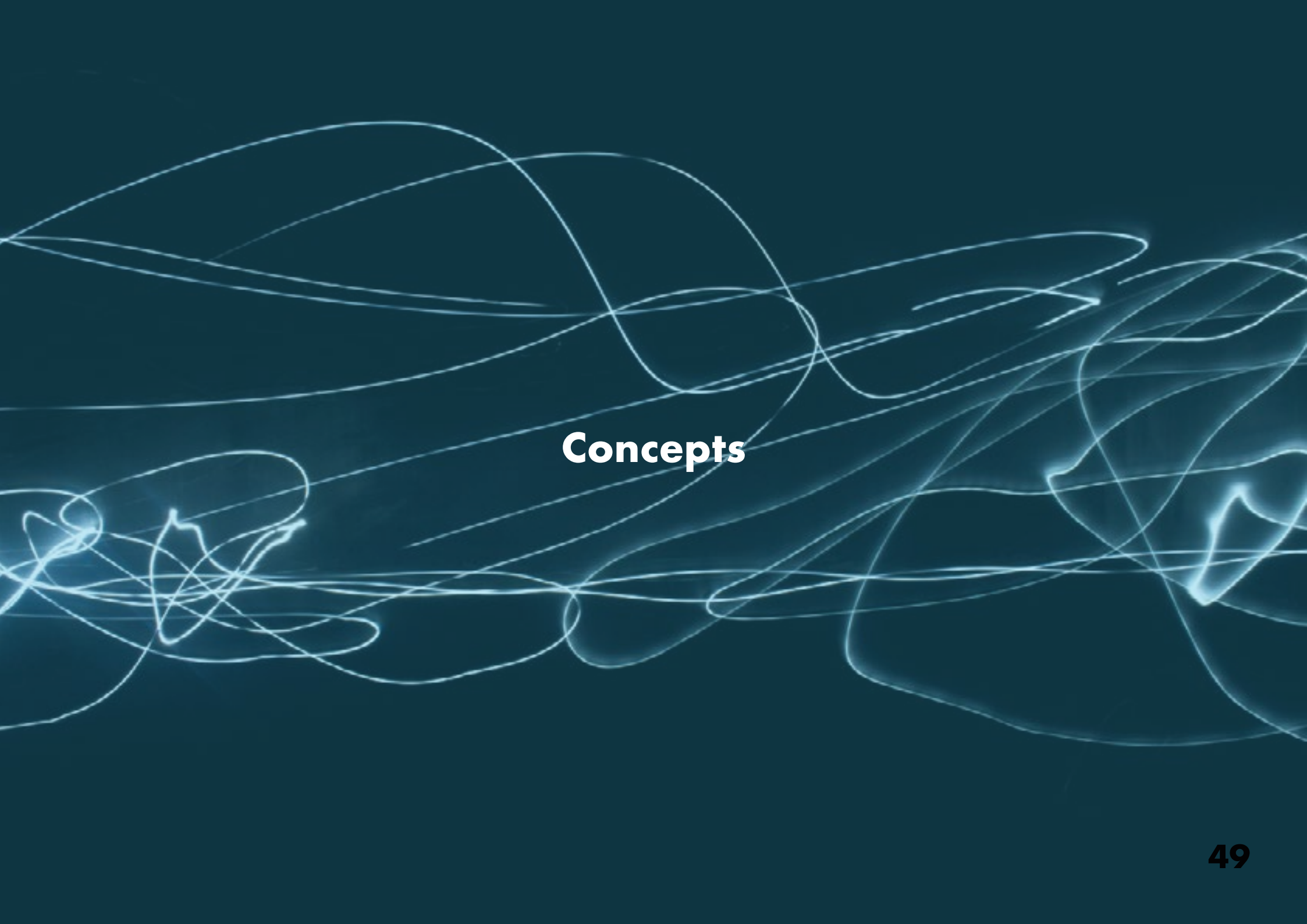
We were shown the UVB machines and were talked through the process that is taken to start the UVB machine.

We were shown NBUVB (Narrow Band UVB) and BBUVB (Broad Band UVB)

We were then showed machines that are used for less severe treatments, and also for patients with psoriasis in more accessible locations such as hands or feet.

The bath pictured above is used to soak paitents in Psoralen before they receive UVB treatment as this enhances the light.

We were then showed a hand held UVB device , we were told that they have only used this once and it costs £40,000 for one unit.



Concepts

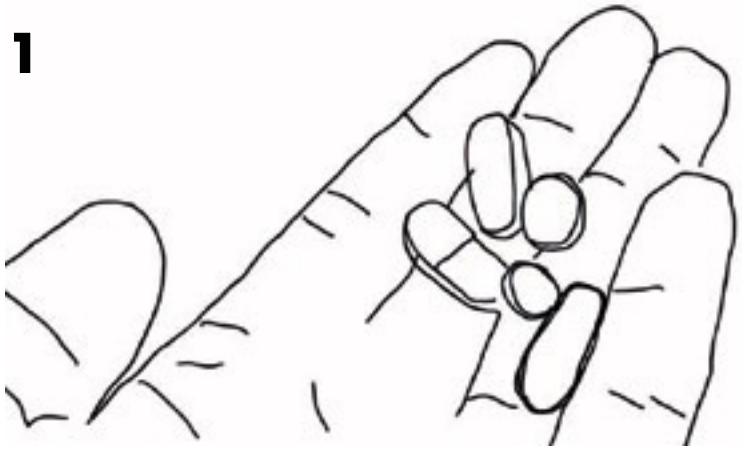
Concept 1

For this concept we decided this treatment would be ideal for extreme cases of psoriasis.

- To begin the patient will take the prescribed medication before the treatment.

- The patient will then pull up the elastane material on the affected part, this will have UVB LEDs embedded into the material for the treatment of psoriasis.
The patient will have a maximum of 30 minutes as this is the limit that hospitals have so we will not exceed this.

- After the treatment has completed, the user will then moisturise the safected area as this needs to be done to see improvements on the skin.



Concept 2

For this concept we decided this treatment would be good for mild cases of psoriasis.

- The user will identify the affected area on the skin and will clean the area to get rid of bacteria.

- The user will the spray the product and allow to set in for around 30 minutes. To see full effects this will control the hydration of the skin and also the moisture. By doing this twice a day users will begin to see improvements to their skin, a healthy lifestyle is also key when looking after the skin so maintaining the right balance is important with this treatment to maximise results

- After the spray has been applied, the patient will leave the affected area as the spray will be absorbed into the skin after 30 minutes.

1

2

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Material Idea

In the first stages of development, we decided to sketch ideas of how the UV lights would be embed into the material.

USP

Being in control and monitoring progress throughout your treatment

VISUALISE

VISUALISING IDEAS

Estimated Costs

1

2

3

4

1	50 - 60 hz lights 50 m LED strips 220 V AC, SMD 5050, 60 LED/M	£141.99
2	(Inside) Tubigrip	£4.99 (Per Meter)
3	(Middle) Soft Fleece/Lambs Wool	£12.99 - £32.99 (Per Meter)
4	(Outside) Nylon	£3.99 (Per Meter)
5	USB Microscope (Monitor Progress)	£200
		Total Average Cost
		£398.96

5

After speaking to Professor Raymond, he advised us that an option to check the progress of the skin would be a very viable part of our project. He recommended a USB microscope that we could use for our project.

It would allow the user to see improvements in the skin before and after the treatment. This is a good factor for us to use as a unique selling point when comparing to other treatments.

In order to use the microscope, a certain software needed to be downloaded onto the mac. Once downloaded, the USB microscope was plugged in and worked instantly. To see results, the microscope has to be placed directly onto a surface. There is a built in light in the microscope which allowed to see in dark areas.

We were particularly impressed with the quality and the detail of the images that the microscope produced. For such a small device we were impressed with how magnified it could be. We were able to see skin in much greater detail which was very interesting.

PROTOTYPE

MATERIALS

After ordering samples of different materials. We decided to order grey canvas, lambs wool, and tubigrip bandages.

We cut the canvas, wool and bandage to the same size and sewed them on top of each other.

The canvas was the outer-layer, on top of that was the lambswool for padding. On top of this was the bandage.

We then went ahead and cut and stuck some velcro to each side of the wearable.

We decided to use velcro to fasten the wearable together. We thought this would be the best option because it can be tailored to different sized arms.

Our next step was to secure the LEDS onto the tubigrib. We stuck the LEDS onto the bandage using the sticky surface that was provided.

The LEDS were all in one strip so we had to figure out a solution to get two strips running down either side.

We looped the strip around at the top and made two small incisions in the bandage and slotted the strip underneath and out the other side.

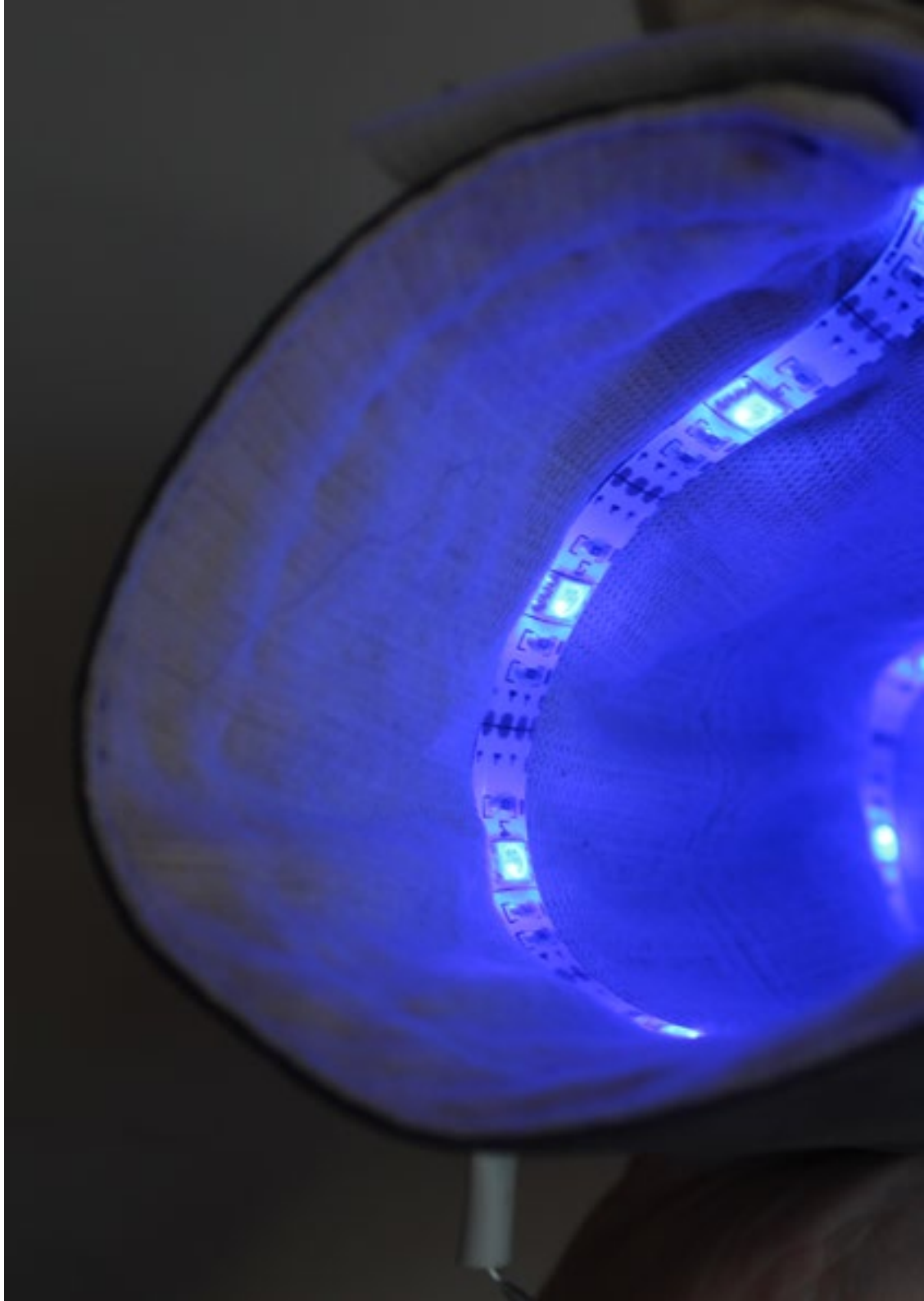
USER TESTING

We tested our product ‘LUMO’ on people who suffer with Psoriasis and also we got feedback from Dermatologists and Nurses.

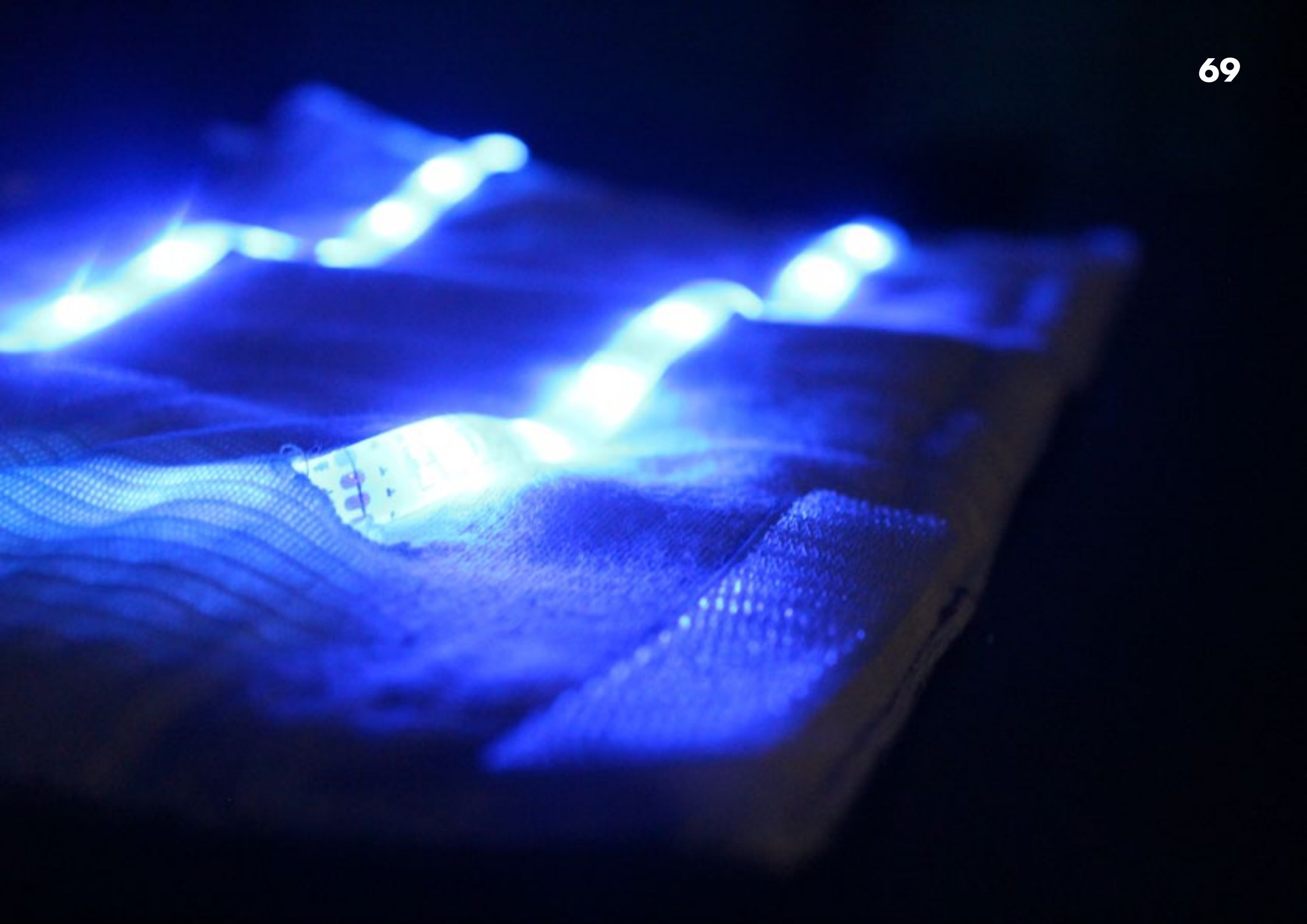
The feedback that we received was mainly positive as people were impressed with the microscope which was provided offering them a new learning experience viewing skin up close and see the infected area. They were also happy with the design of our product stating that it was “comfortable” and looked very “durable”.

The feedback we got to change was the outer material as they recommended something that would be more durable and also allowing LUMO to lock in more moisture. Which is a big part of our project as we need to maintain the skins moisture and make sure that certain parts of the skin aren’t drying out.

We then changed the material so that it would allow more moisture control, which also made our product look and feel better.



FINAL PROTOTYPE



Guidelines

Main Typeface: Biko
Secondary Typeface: Montserrat
Colour: #1FA4BF (Blue)
White: #FFFFFF (White)

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz
1234567890

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
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LUMO
HOME UV TREATMENT

VIDEO ANAMATIC

The user begins by assessing and observing the effected area on their body.

The user then looks at the condition of their skin and then selects the correct treatment time.

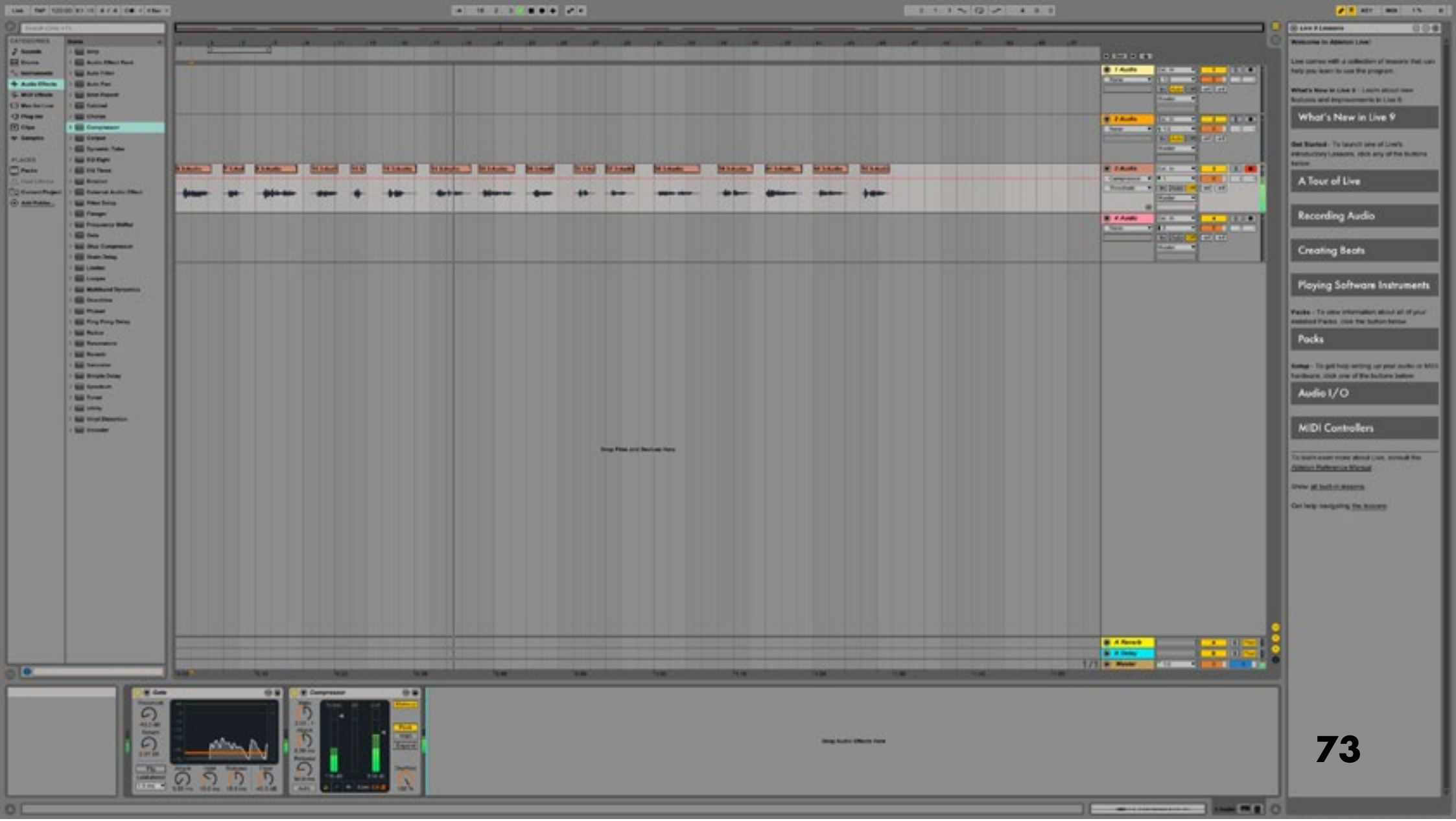
Set a timer for the treatment.

Place LUMO on the effected area of the skin and treatment will begin after powering on.

Begin treatment process.

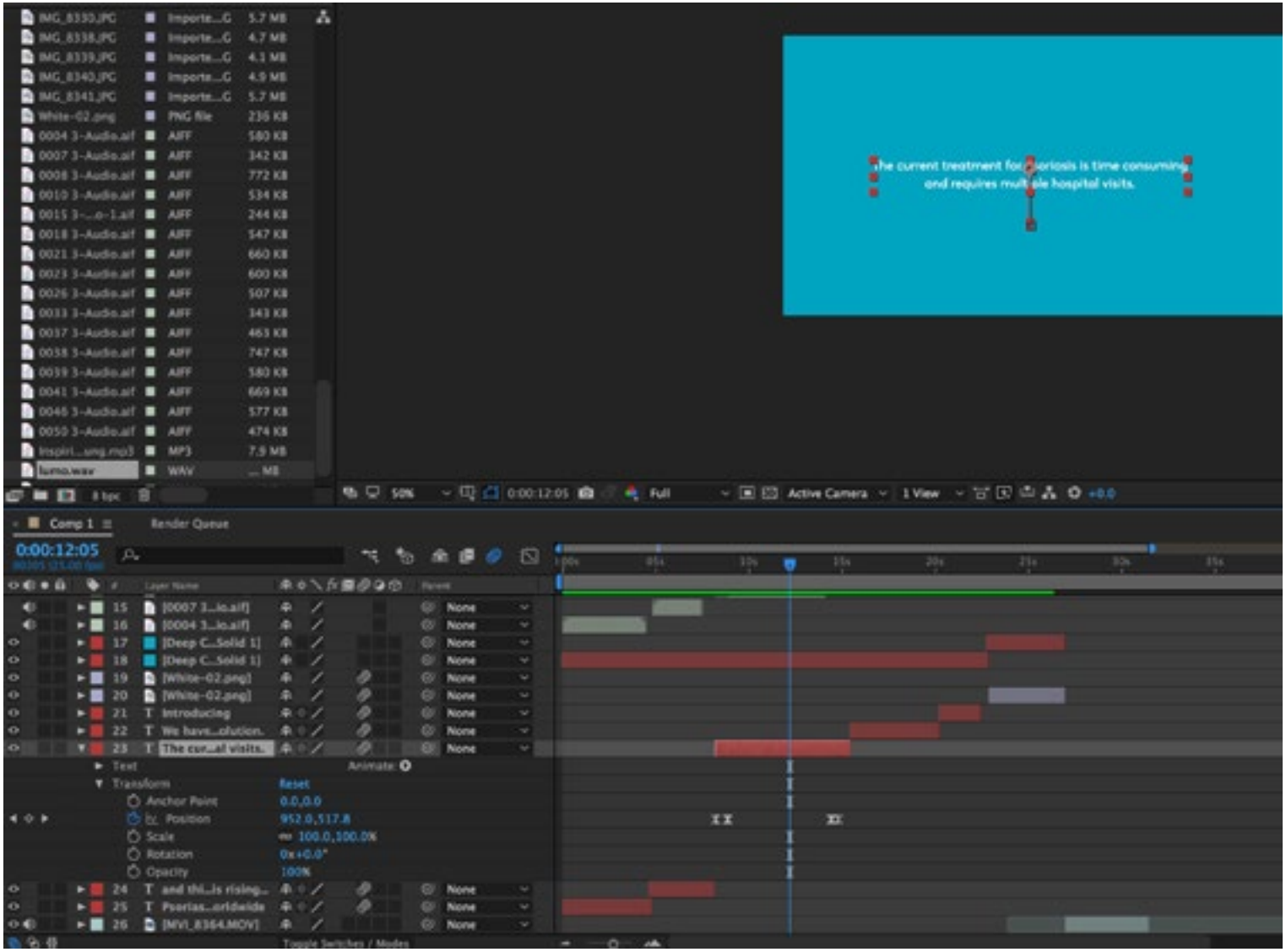
Notification when the treatment is complete.


VOICE OVER



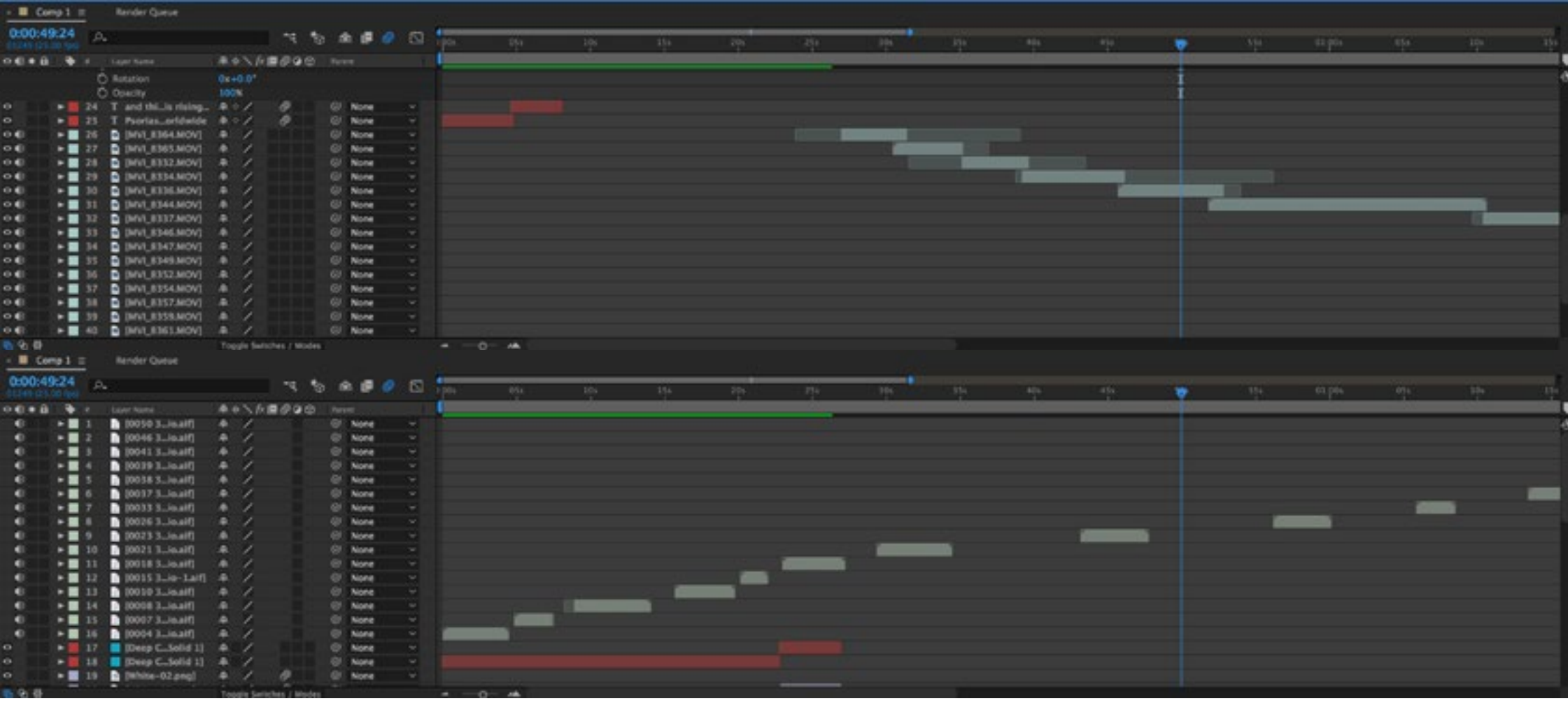
We wrote out our script, then we went into ableton and began to record. As we were going over our scrip we altered bits to make it fit with the backing track we choose and the overall video. We broke each bit of voice over up allowing us to fit them together and this also helped when we imported them into After Effects. We also added a sound gate and a compressor to control the sound levels making sure that everything was at the same level.

EDITING INTRO



When animating the intro the position was changed so that we could get the effect we were after.

We had text anamatics pop up on screen with facts related to psoriasis, we made sure that the viewers had time to read this information.



After importing all the video clips into After Effects we matched the voice over to the video so that each clip had an explanation giving the video more depth and understanding. After this was done we began to trim down the clips so that the video was a lot smoother and this allowed the clips to fade together.

PRODUCT MOCK UP

PERSONAL EVALUATIONS - NATHAN CHAN

Overall I have thoroughly enjoyed working on this project. It has been a much different project compared to what I'm used to doing. The topic we chose 'Psoriasis' was a really interesting topic to dig deeper into.

Throughout this project I believe that i've broadened my knowledge on the topic as well as other things such as how skin is formed on the human body and so on.
The way the project was lay out was very helpful. The mini drop-in sessions with Profession Raymond were really interesting and I think that he was a massive help towards the research of our project. It just so happened that Raymond was working on a project with skin so he had a lot of useful information that benefit our work.

We conducted extensive research for our product which is why I believe we both gained significant knowledge on our chosen subject. We visited a hospital for part of our research and this was a very important part of our research as we were able to talk to nurses who treat psoriasis patients. They showed us all the treatments they use to treat patients and also explained what their function was etc. As well as this, we showed the nurses our prototype and the idea for our project. We received good feedback from this and took on board other comments to influence our prototype.

As well as visiting a hospital, we spoke to a sister at the hospital and we conducted a interview over the phone. This was at the start of our research so our questions were based around how the current treatment process runs and so on. The sister also told us about other psoriasis treatments that are available on the market as well.

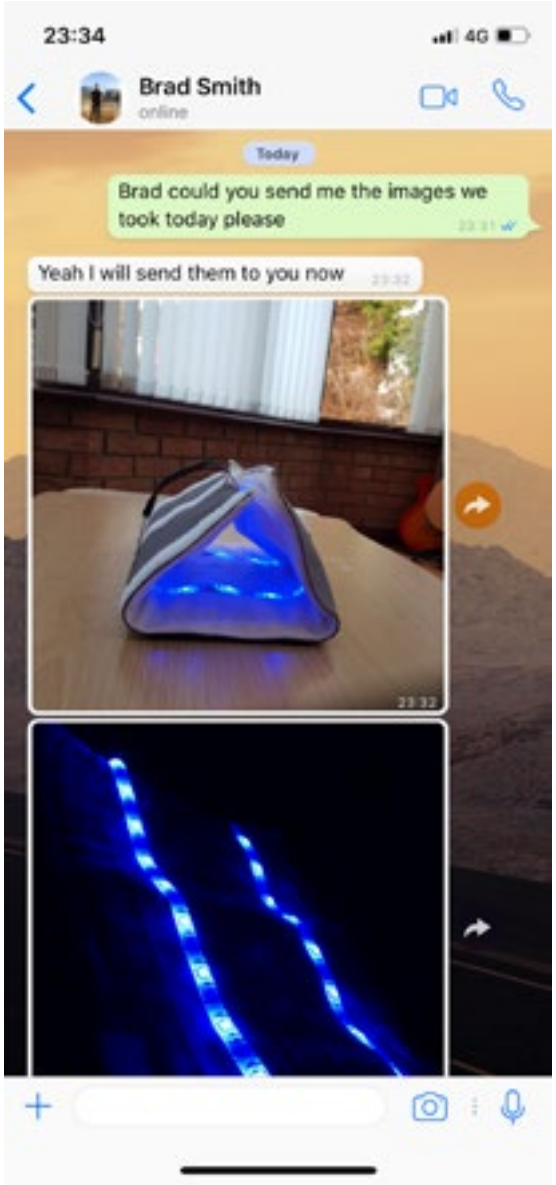
As my mum works in phototherapy and treats patients everyday, I was able to set up visits to the hospital and talk to nurses and dermatologists which was very helpful for the research. The rest of the work load such as the design document and other hand ins has been 50/50. We have sat down together and completed each task from a checklist.

Throughout this project, the workload has been split 50/50 and we have always been working on the project together. For the first prototype, we designed and built it together but for the final prototype Brad built it himself while being at home due to the holidays and myself not being the best sewer. As we live together we have been able to work with each other most of the time, however when we've been away we have communicated using different apps such as Snapchat and WhatsApp.

For the video, we decided that it needed to be filmed in a home environment. As I live local, I organised us to film at my home so that we had the right set to film in. For the video aspect of our project. We decided that Brad would demonstrate how LUMO works and that I would film. We shot multiple videos to allow us to choose the best quality ones. While being at my home we also decided to take some photos of our finished prototype which we would then go on to use as our hero image.

Lastly I would like to say that, I think this project has been a success, and I didn't expect it to turn out so well. Not only that but we both have gained knowledge on what is a very interesting and common subject. Researching into the different treatment and remedies has been very helpful and maybe it could be useful to know in the coming future.

If we were to do this project again, I would maybe like try something different, something opposite to the medical side. I would definitely recommend this project to upcoming students as you gain a lot of knowledge as well as meeting people who work in that field everyday.



PERSONAL EVALUATIONS - BRADLEY SMITH

Overall I am pleased with the outcome of the project and what I have learned about psoriasis and the skin.

We both began researching and developing different ideas that interests us, which then lead us to look into skin and psoriasis. Finding out the over 180 million people around the world are currently suffering with psoriasis. We wanted to design something that as comfortable for people to wear who had mild to medium cases of psoriasis. The UVB treatment would help treat/prevent psoriasis in the comfort of people homes cutting out daily hospital visits and long waiting times.

I would say that understanding the science of skin was my biggest challenge as it is not something I have looked into in much detail. The repairing process is something that we both needed to understand so that we could design the perfect solution, this is why we took moisture control and effects into consideration. Also having the opportunity to have small group sessions with Raymond also helped Nathan and I to develop our idea. Understanding what materials worked well with skin and how not to irritate it while having your treatment was another key aspect.

We split work equally working to each others strengths, as well as communicating with each other that our designs were linking back to our goals of maintaining moisture, comfort and monitoring progress. After purchasing everything we needed for the prototype we began to develop LUMO. We both made the first prototype which allowed us to get user feedback and feedback from the dermatologists and nurses. Then I constructed the second prototype with feedback in mind about what comfortable materials to use and materials to help lock in moisture. When it came to branding our product we both designed logos of what we thought would look good, after this we choose a selection of logos that we thought worked well and asked a variety of people what they thought.

The visit to the hospital was very interesting as it allowed Nathan and I to ask professionals about what they face when dealing with patients who have psoriasis. We then asked questions related to our project and got some useful feedback which helped improve our design. Getting shown the different types of machines/equipment they use to treat psoriasis was also very interesting to learn about as it lead us in the right direction for the aims of our project. This was to create an innovative psoriasis treatment in the comfort of the users home. We were also informed about the long waiting times in the hospital and that patients have to go a minimum of 3 times per week which helped us understand the lengthy process of UVB treatment.

When testing the Dino USB microscope we found it hard to set up as our laptops didn't meet the lower software version which was needed. So it was a case of finding someone who had the right criteria of software which would allow us to use and test the microscope. After we solved this issue it was really interesting to view materials and skin up close as it is not something I have explored before and it was a new learning experience for me.

In terms of future development if there was anything that I would change it would be to incorporate an App that would link up with the Dino-lite. This would allow users to save images of their treatments and improvements of their skin to a private library. I would also add a chart showing the different skin stages of psoriasis (mild, medium and extreme) so that users could compare and see if the treatment is working or not. Another feature would be allowing users to upload a pictures of their skin and the app would tell them the type of psoriasis and what stage they are at, as well as what treatment is right for them and how long they should treat it for.

Communication was key throughout this project as we both needed to understand how skin worked and what was the best treatment for psoriasis. As Nathan and I both live together it was easy to communicate ideas, go over research, address any issues with the project and finalise ideas. I would say that fitting everything to a time scale was more challenging was research took up a lot more time than we both anticipated. But after we had done it, it gave us a better understanding of what we were focusing our product on and also helped Nathan and I learn something new and interesting.