



### **Quaranskin: a Human Practices project**

The product of this collaborative work should lead to the production of data about the skin microbiome and factors associated with its variations of great interest for many research teams working on the microbiomes but not only, as these data could also interest many other microbiology, immunology, physiology, cellular biology teams. This large scale collaborative project influenced our topic fully. It is through this angle that we came to look at a human skin commensal bacteria, *S. Epidermidis*, that we intend on using as a synthetic biology frame. This work could in the future lead to a *S. Epidermidis* design that could be used in clinic to cure dermatologic infections.

### **How did Quaranskin come to see the light ?**

Our thinking started with the will to study a phenomenon in direct link with the exceptional situation we're experiencing, not the COVID-19 itself, already studied extensively across the world, but its massive collateral effects. The brutality, the abruptness, the sudden total disruption of our lives is truly unique. In the rush that comes with such a decision, all of its consequences could not be considered, whether in terms of mental health, social impact, environmental impact, biological impact. These collateral effects are so many and so profound that each would warrant large studies. In reaction to this societal issue, the SynDerma team decided to take on the challenge. We thus raised the question : what biological entity would be affected by this brutal isolation ? And from there we arrived at the microbiome.

Through a worldwide collaborative effort, we will bring our stone to the building of knowledge in this field that still doesn't receive the scrutiny it deserves. Even though the research carried out by Quaranskin is on the short term aimed at the current situation, we believe that it harbors something more. With an exceptional situation comes an exceptional opportunity, to study the behavior of the human skin microbiome in a context where humans, in an unprecedented scale, are restraining from contact with one another and are drastically reducing their usual interactions with their environment.

### **Setting up Human Practices during lockdown**

During the lockdown, one and only rule prevailed: everyone in his home, as few contacts as possible, trying to avoid at all costs to transmit the virus. But continue to find ways to exchange, to interact, to reinvent the way we build and share knowledge to spike the Human Practices. Visio conference, and the use of numeric tools has skyrocketed since early 2020, but how can we continue to perform and carry a science that relies not only on modelisations, but on concrete experiences ? How can we practice a true experimental science in 2020 ? We thus looked for experiences that could be performed at home, but found out the most relevant ones when it came to skin microbiomes were too complex. Then how can we involve the participants ?

Two ideas then emerged, a system of material deliverable by post mail, and the delegation of the technical manipulations to sequencing companies. And on these two pillars we built a new "Citizen Science" Project.

### **Involving the people in a large scale science project**

Citizen Science infuses the whole project through many different ways. First of all, through the handbook every participant receives, they can learn about the protocole, and the online platform to know more about the skin microbiome. Theoretical information is associated with practice through the sampling protocol. Respecting this protocol and its condition of execution (no body or hand washing respectively 24h and 1h before sampling) contributes to sensitizing the participants to the rigour of the experimental endeavour. Then, filling out the questionnaire, participants must describe the potential symptoms on their skin, pushing them to perform concise self critical awareness, using a clear vocabulary. In our endeavour, involving the people does not solely mean collecting input from the people in the form of data about their microbiome, but also providing output, giving each participant feedback about its microbiome profile.

On the legal side, the protection and anonymization of the data introduce to the French and EU legislation, and to rights guaranteed to everyone regarding its data.

Finally, through Open Humans, a scientific platform we invite them to join to receive their data, , participants can learn about new projects and choose to participate.

### **Challenges posed by Quaranskin**

Thrilled by the many promising aspects that Quaranskin seemed to harbor, we only learned later on that seemed trivial at first, was indeed essential.

To start with, Quaranskin is a research project that involves the Human Person. In France and Europe, such research immediately summons the person's rights, especially if they are subjected to harvesting of samples that will be thoroughly analyzed. First there is the need to justify such research, it must present a valid scientific interest and lack any harm to human communities. Then the research work, if it intends on using data of human origin, must demonstrate its ability to assure a solid protection of the human participants. First the safety of the sampling protocol, then a law abiding processing of the samples (no analysis of human DNA), no statistic with any relation to ethnicity, religion, social origin, etc. and finally a robust protection of the privacy of the participants. This step might be the hardest one, requiring anonymization of the data collected, a parallel treatment of data that might contain sensitive information must be done by identifiable physical persons that will be held accountable of any failure to respect all of these rules set up by French and European law, as well as the necessary resources to store the data.

### **The future of Quaranskin**

The anonymization of data has been a very long journey. First, meeting a lot of people to gather expertise; knowledge, and be able to gain enough perspective to envision solutions (see the legal part of the Human Practices Silver criteria). From that, emerged the need to convoque a CPP (Comité de Protection des Personnes) and ask for his opinion. For sure we did underestimate largely the length of this procedure, and it did cost us a lot of time. We now think that Quaranskin might live after iGEM. The ambition that it carries requires more time, especially in the actual context hamstrung by so much uncertainty and limitations, and so we decided to carry on with Quaranskin, with the aim of one day publishing the results.

