Environmental pollution and its effects on our health are of increasing concern to consumers. In addition, the movement of people to cities is increasing the relative size of urban populations, putting more people in contact with poor quality air. We are beginning to understand that environmental pollutants not only affect lung function and physical health, they also affect skin health.

Recent work at TRI Princeton by Dr. Gourion-Arsiquaud and his team has shown that pollutant gases, such as ozone, interact chemically with the lipids in the stratum corneum (SC), affecting their biophysical properties and the skin’s overall barrier function. We believe that this may be one key reason why people living in polluted cities have more sensitive skin and a higher incidence of skin disease.

The ultimate goal of this project will be to develop a new assay which could be used in vivo, during a clinical trial, to simulate environmental pollution and to evaluate cosmetic anti-pollution technologies, for example occlusive agents, antioxidants, SC lipid barrier enhancers etc. The test will use Fourier Transform Infra-Red Spectroscopy (FTIR) to assess the effects of pollutant gases on SC lipids. It will build on the observations already made by the team at TRI using ex vivo human SC and full-thickness skin.

Key deliverables for the project will be:

1. Assay equipment and protocol that allows precise, calibrated and reproducible measurement of SC lipid damage on ex vivo human skin, using ozone as the example pollutant gas and FTIR as well as Confocal Raman spectroscopy to investigate skin damages. If there is enough interest and extra funding from sponsors, this deliverable could be expanded to include other environmental factors and pollutants (e.g. UV light, PM2.5 pollutant particles, nitrous oxides etc), and other skin substrates (e.g. living skin equivalent cultures)

2. Proof-of-principle studies showing the effects of commonly used cosmetic treatments on pollution damage using ex-vivo human skin and spectroscopic methods (FTIR and Confocal Raman). The cosmetic treatments will be agreed amongst the sponsors and should be widely used ingredients, not specific to any particular business. This deliverable could also be extended for other environmental factors and substrates, if there is enough interest and extra funding.

3. Small, preliminary clinical study (N=10-20 people) to validate that the new equipment can work in vivo, using RemSpec (FTIR with optical probe).

Sponsors will get exclusive access to the assay details and the validation data for one year, before it is made available to all TRI clients. Sponsors wanting to test their products at TRI, will also have one year of exclusive access to the assay and 25% sponsors’ discount.

This study will cost each sponsor approximately $45,000 (or more, if more environmental factors and skin substrates are added) and is planned to start in Q1 2020. Consortium projects are only available to TRI Member companies.

For further information please contact

Dr. Samuel Gourion-Arsiquaud,
Director for Skin & Bio-substrates
sgourion@triprinceton.org; +1 609 430-4846

Dr. Paul Cornwell,
TRI Princeton, TRI UK & Europe Contact
pcornwell@triprinceton.org; +44 1244 336118