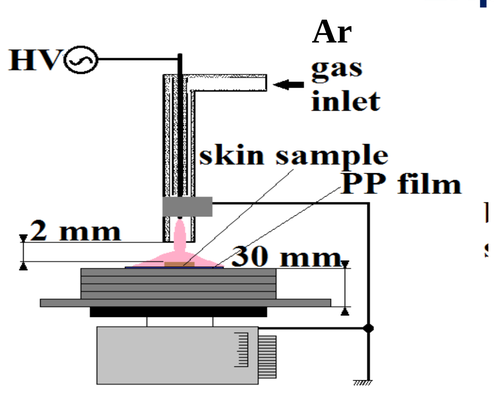
Study of interaction between plasma and stratum corneum for transdermal drug delivery

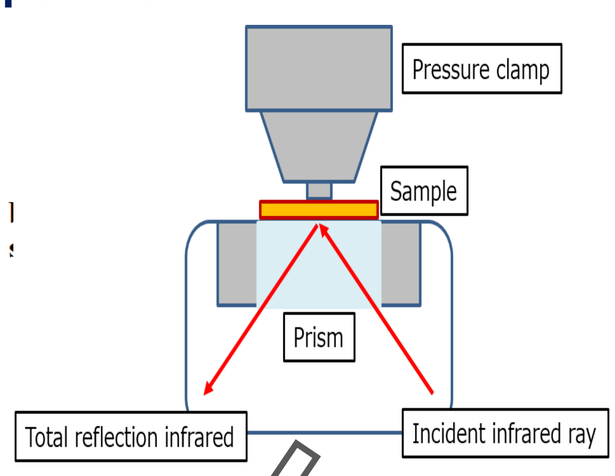
J. Kristof , An N. Tran, M. G. Blajan and K. Shimizu

Shizuoka University, Nakaku, Johoku, Hamamatsu, 432-8561, Japan

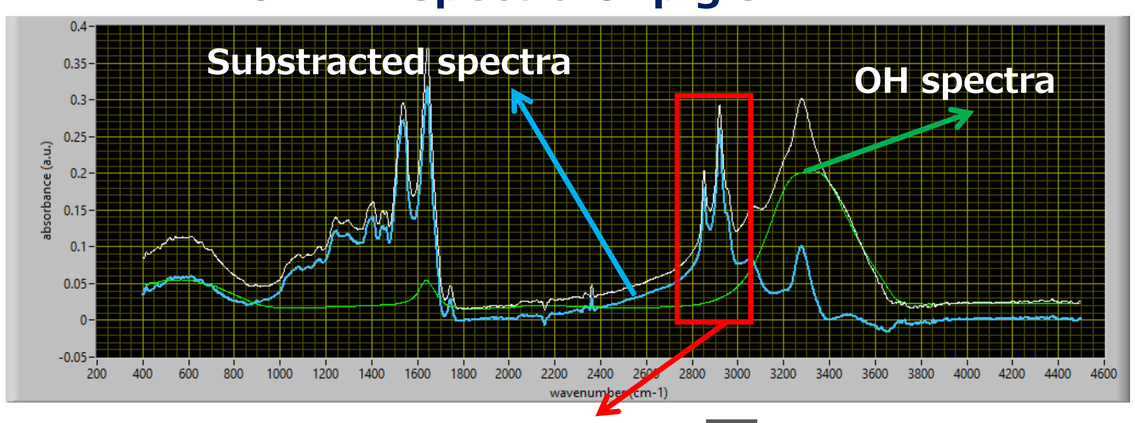
e-mail: jaroslav.kristof@gmail.com, shimizu@cjr.shizuoka.ac.jp

Experiment

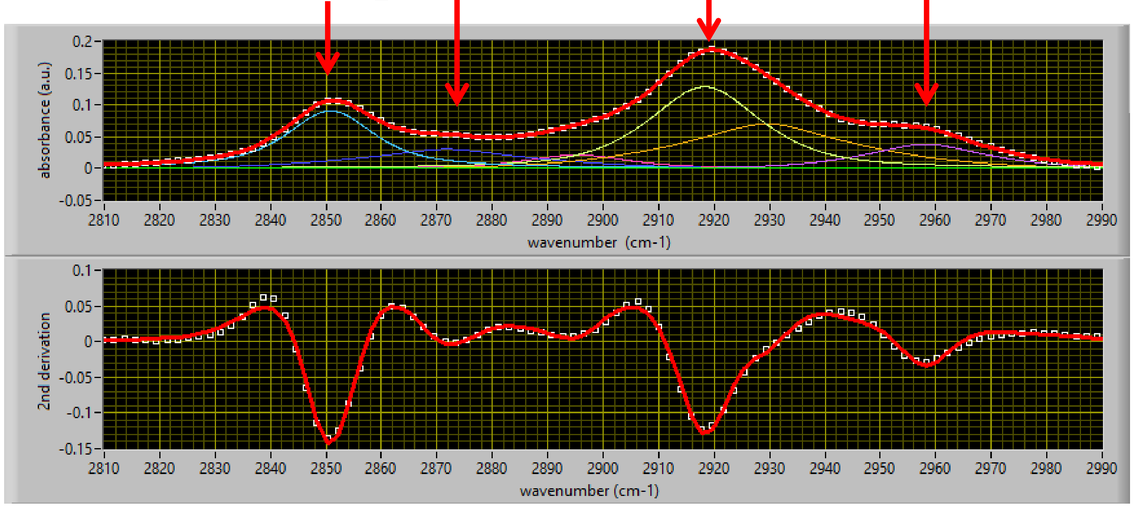




Data processing of ATR spectra of pig skin

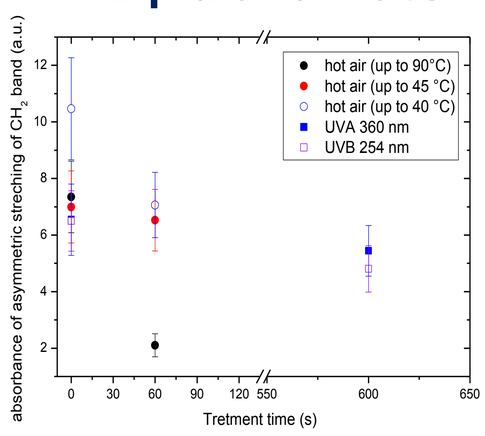


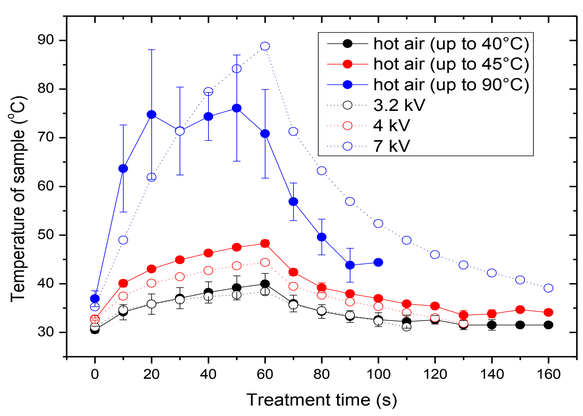
Lipid bands

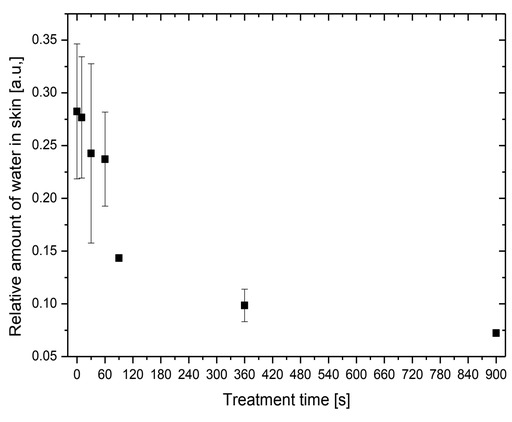


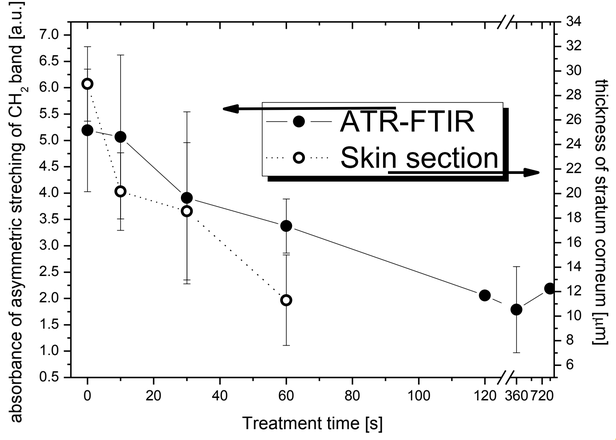
Fit of ATR spectra using 2nd derivation

Lipid and water extraction from skin



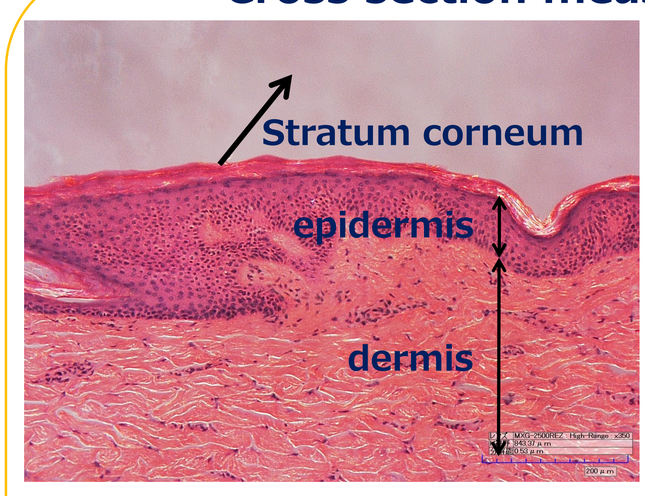


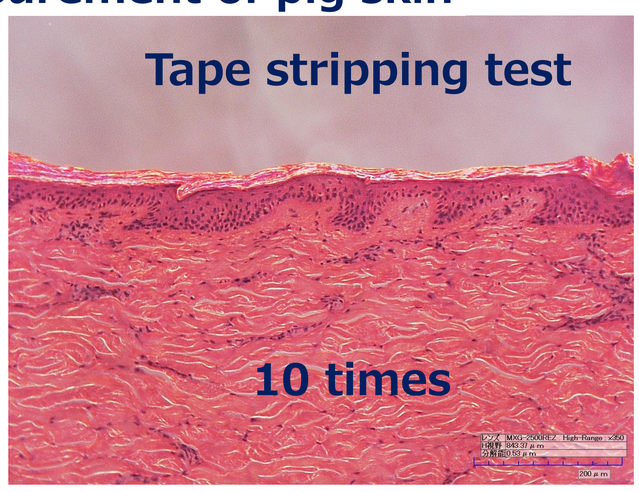


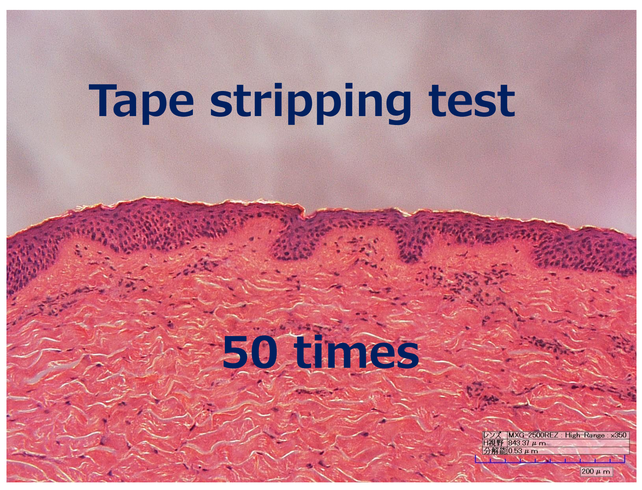


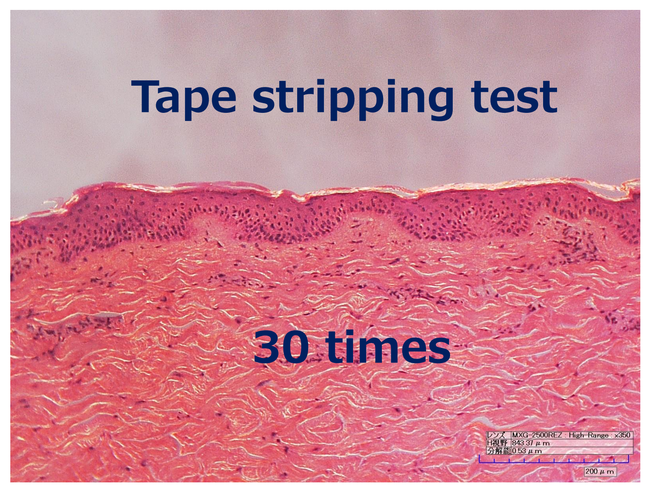
Introduction. Stratum corneum is first barrier that protect our body and does not allow penetration of amount of objects such as drugs. Intercellular route is very often used for drug penetration when stratum corneum lipids are extracted or their structure is changed. This study investigate influence of plasma jet treatment and concurrent effects such as heating and radiation on stratum corneum and lipid extraction.

Cross section measurement of pig skin

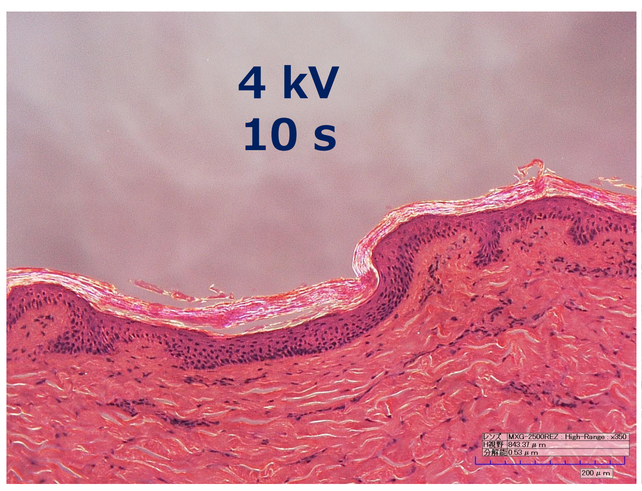


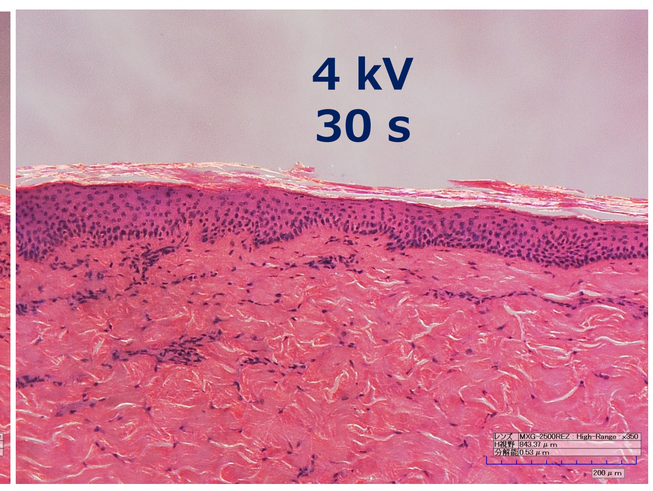


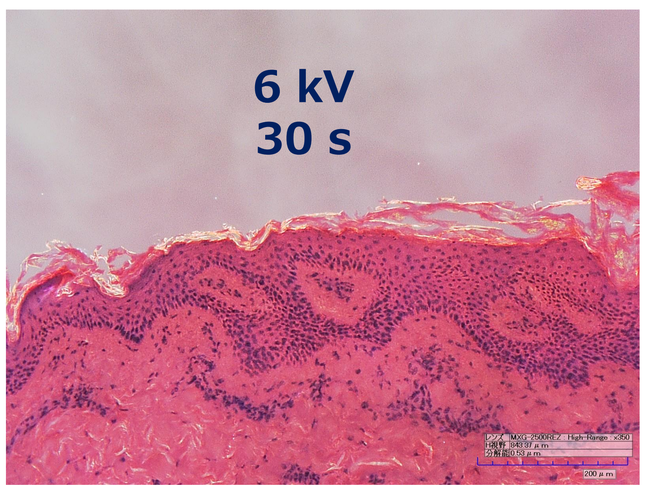


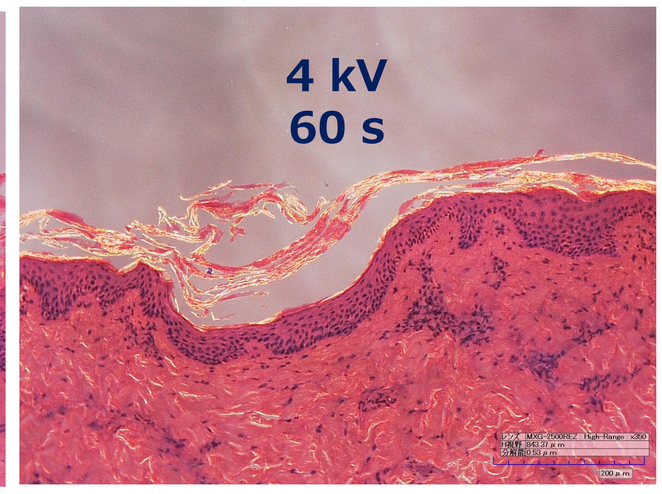


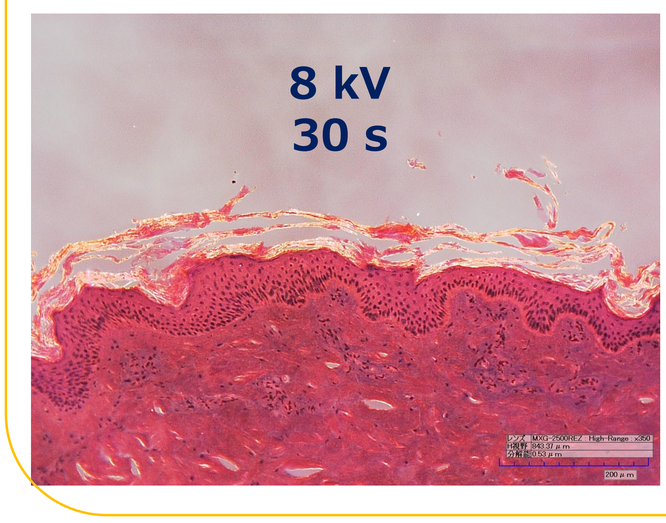
Plasma treated skin by Ar plasma jet

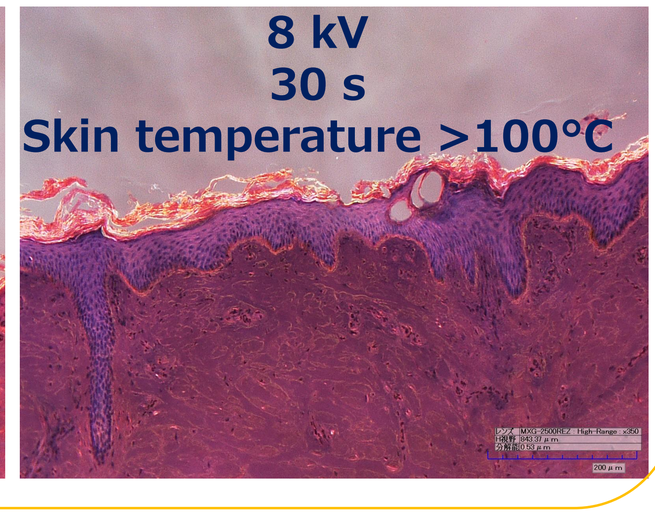












Conclusions

- Applying of plasma dries the skin (increased water evaporation)
- Lipid extraction is non-linear ⟶ after 120 s of applying plasma, no lipid extraction occured
- Temperature up ti 45°C has no effect on lipid extraction. Lipid extraction occured at higher temperatures
- After 10 min of applying of UV light, only small amout of lipids was extracted.
- After 10 s of plasma jet treatment of skin, stratum corneum layer is seriously disrupted