

# Analysis of Skin Tape Strips

## Study Design Considerations

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Protein assays within Olink panels have been optimized for the dynamic range present in human plasma and serum. Results are reported as NPX™ units which are used to compare relative changes in protein abundance between study groups. Identification of true biological differences between study groups is facilitated by reducing technical variability to the fullest extent possible. This includes using the same collection procedure for each sample, keeping the same number of freeze/thaw cycles, and maintaining even storage conditions.

Within a study, all samples should be randomized across all plates and it is best to use a balanced number of samples across the study groups.

In addition to plasma and serum, strategies have been developed to analyze alternative types of samples. Tape stripping is a minimally invasive technique for removing the skin's outermost layer, the stratum corneum. Typically, an adhesive tape is pressed onto the test site of the skin and then abruptly removed. It is used to assess the efficacy of cosmeceutical and dermatological formulations, dermal toxicology, as well as research on skin conditions and diseases.

Samples are normalized by the area of the tape strip. However, samples can also be normalized by a set protein concentration (0.5 mg/ml is ideal but samples often have lower protein abundance). Biological replicates may be included to account for technical variation in sample preparation, and a few technical replicates can be included for better estimation of CVs when using an alternative matrix. To evaluate protein assays at risk for hook, it is recommended to run a few samples from each study group at two additional dilutions. Lysis buffer alone can be included to monitor background noise.

## Recommendations for Sample Preparation

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### Lysis buffer

- RIPA buffer can be custom made as: 50 mM Tris-HCl (pH 7.4), 150 mM NaCl, 1 mM EDTA, 1% Triton X100, 0.1% deoxycholate.
- Other lysis buffers are possible. More information on lysis buffers can be found in the document *Running alternative matrices: Buffer compatibility with Olink* or please contact [support@olink.com](mailto:support@olink.com).

### Skin tape

- There are several commercial sources for skin tape: follow manufacturer instructions for use of commercial products.

## Sample protocol for skin tape strips

### Materials and Equipment

- D-Squame® tape strips (3.8 cm<sup>2</sup>; CuDerm)
- 15 ml conical tube
- 1.5 ml Eppendorf LoBind® microcentrifuge tubes
- RIPA buffer
- Sterile nitrile gloves
- Sterile tweezers
- Sterile scissors
- Bath sonicator
- Refrigerated microcentrifuge

*Optional:* Roche cOmplete™ Mini Protease Inhibitor Cocktail (#11836153001).

### Procedure

- 1) Collect a D-Squame tape strip sample by pressing against the skin for 10 s with a standardized pressure (225 g/cm<sup>2</sup>) and then abruptly remove from the skin.
- 2) Prepare RIPA buffer with/without protease inhibitors in a 15 ml tube and place on ice.
- 3) Prepare four 1.5 ml tubes with 300 µl of RIPA buffer and place on ice.
- 4) Cut the strip into quarters and transfer each quarter to separate 1.5 ml tubes containing buffer with tweezers. Carefully push the strips to the bottom of the tube.

*Note:* Ensure that the tape strips are completely immersed.

- 5) Sonicate for 15 min in an ice bath (0-4°C) placed within an ultrasonic bath.
- 6) Combine and transfer eluates to a new 1.5 ml tube.
- 7) Centrifuge at high speed for 5 min at 4°C to remove particulates.
- 8) Transfer supernatant to a new 1.5 ml tube.
- 9) Aliquot and store samples at -80°C.

## Pre-Dilution Strategies

Target 96:

[illegible]

## Target 48:

1:1

*Note:* Dilutions are denoted as A:B, where A=number of sample units and B=total number of units after dilution, therefore 1:1 = undiluted or 'neat' sample.

## Publications using Olink

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He H, Olesen CM, Pavel AB, Clausen ML, Wu J, Estrada Y, Zhang N, Agner T, Guttman-Yassky E. Tape-strip proteomic profiling of atopic dermatitis on dupilumab identifies minimally invasive biomarkers. *Front Immunol.* 2020; 11:1768. DOI: 10.3389/fimmu.2020.01768. [Link](#)

Taslimi Y, Agbajogu C, Brynjolfsson SF, Masoudzadeh N, Mashayekhi V, Gharibzadeh S, Östensson M, Nakka SS, Mizbani A, Rafati S, Harandi AM. Profiling inflammatory response in lesions of cutaneous leishmaniasis patients using a non-invasive sampling method combined with a high-throughput protein detection assay. *Cytokine.* 2020; 130:155056. DOI: 10.1016/j.cyto.2020.155056. [Link](#)

Please contact [support@olink.com](mailto:support@olink.com) for further information on running alternative matrices.

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