



# **Accelerating the innovation of cosmetics and dermatological therapeutics**

**We are working hard to bridge your discovery to the clinic; and scientists to patients**

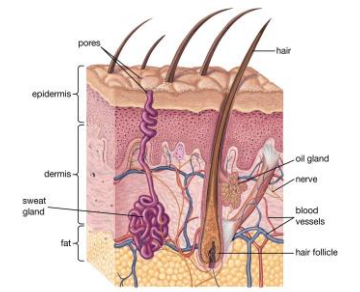
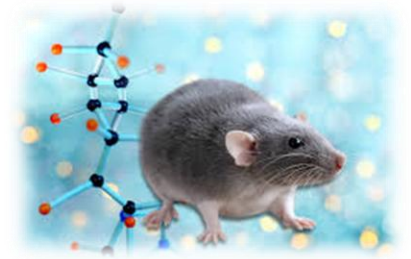
**Founded by scientists; Empowering scientists; Trusted by scientists**



# Animal models for skin research: pro and con

**In realm of skin research, various methodologies are commonly employed, each with its unique advantages and disadvantages:**

- ❑ **Animal and transgenic models, particularly mouse/rat models**
  - ❑ **Used for the investigation of psoriasis, atopic dermatitis and other inflammatory skin diseases**
  - ❑ **Allow for extended monitoring of disease progression within an *in vivo* context**
  - ❑ **May offer some biological insights of diseases under controlled conditions**
- 
- ❑ **Inherent biological disparities between mouse and human physiology may result in differential responses esp. in transgenic models**
  - ❑ **The presence of fur and the thinner nature of mouse skin compared to human skin can potentially have impact on the efficacy of test agents**

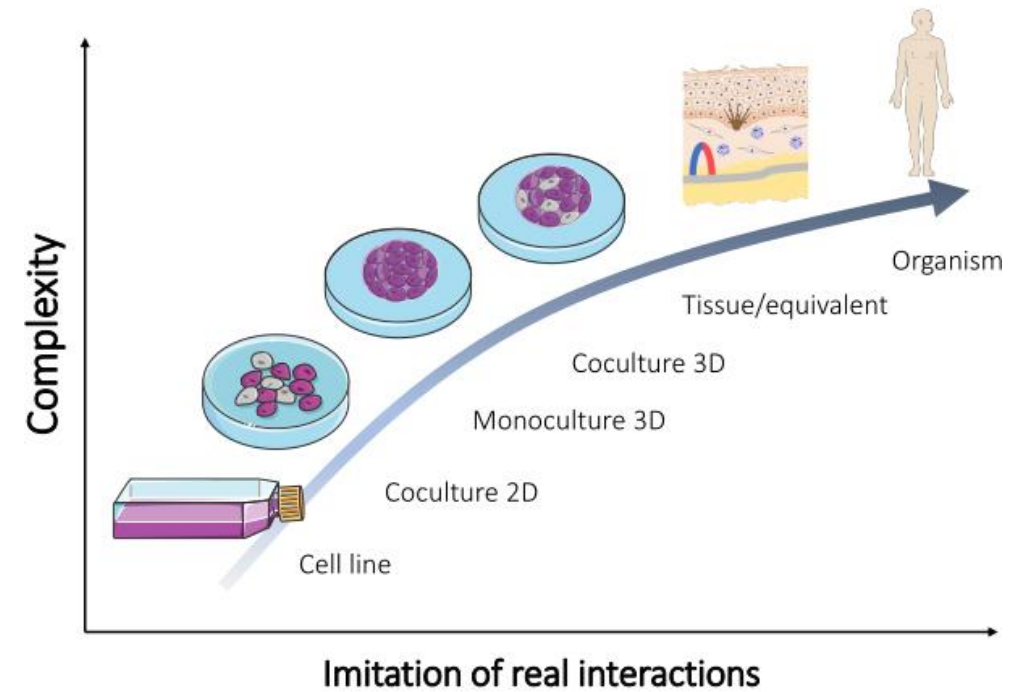


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# In vitro & ex vivo human skin models

Many methods emerge to enable the next generation of innovation in cosmetics and dermatological therapeutics

- ❑ **Human skin related cell lines** (fibroblasts, keratinocytes ...)
- ❑ **High-throughput multi-layer 2D skin models**
- ❑ **High-throughput multi-layer 3D skin models** (Incorporation of fibroblasts + keratinocytes with structured ECM)
- ❑ **Epidermis and dermis spheroids**
- ❑ **iPSC-derived skin organoids with hair follicles, melanocytes, immune cells**
- ❑ **Skin-on-Chip microfluidic platforms**
- ❑ **Microvascularized skin organoids predicting irritation and permeation**
- ❑ **NativeSkin:** *Ex vivo* human skin and living skin explants; fresh biopsy explants with maintained architecture, immune cells, microbiome.



# **SKIN CELLS AND TISSUES FOR INNOVATION OF COSMETICS AND DERMATOLOGICAL THERAPEUTICS**

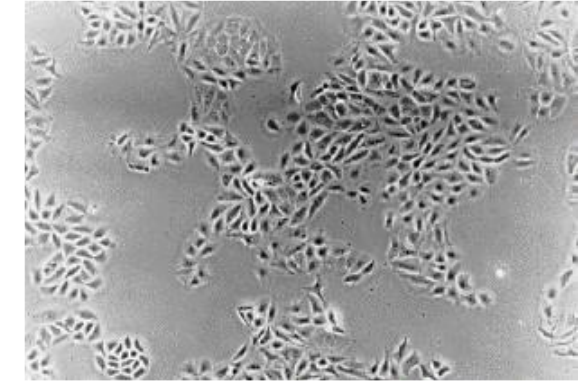
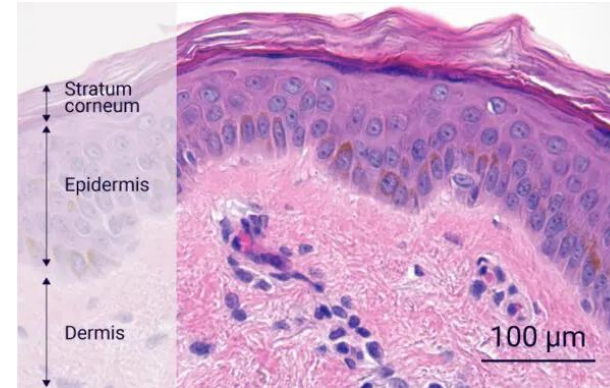
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## Various human skin cells available for testing

- ❑ **Skin related cell lines: keratinocytes (HaCAT), melanocytes (B12, HMe1-1, HMe1-3), immune cells (THP-1, Jurkat), epidermal squamous cells, tracheobronchial epithelial cells and dermal fibroblasts, etc.**
- ❑ **Primary skin cells: obtained from different types of donors and kept in a 2D culture or co-culture (fibroblasts + keratinocytes with or without stimulation with cytokines).**
- ❑ **Primary skin immune cells: such as mast cells, dendritic cells, T cells, etc.**
- ❑ **Epidermis and dermis spheroids (3D-cultured primary cells that reflect the micro-environment of human skin more adequately)**

# Skin cells and biopsies available for testing

- ❑ **Human primary skin cells: 2D cultures**
- ❑ **Human primary skin cells: 3D cultures**
- ❑ **Human reconstructed skin *in vitro* models**
- ❑ **Human native skin tissue *ex vivo* models**
- ❑ **Human skin biopsies (frozen cells, tissues)**
- ❑ **Human skin biopsies (FFPE blocks)**
- ❑ **Human skin D-Squame tapes**

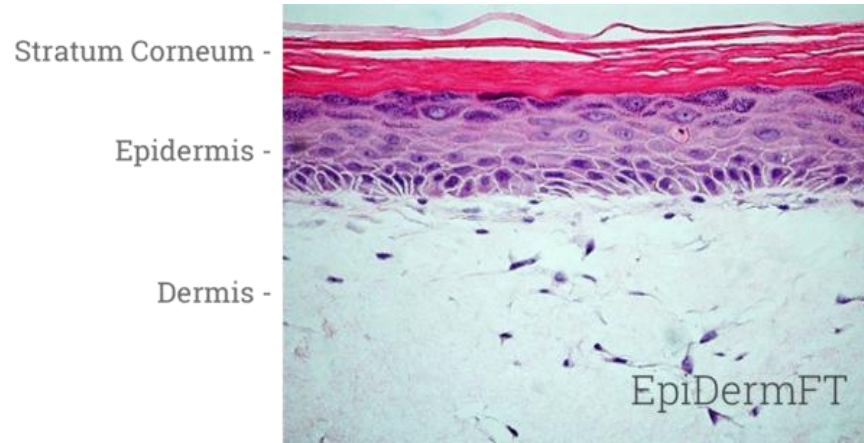


**human keratinocytes**



**D-Squame tapes**

# Re-constructed human skin tissue cultures

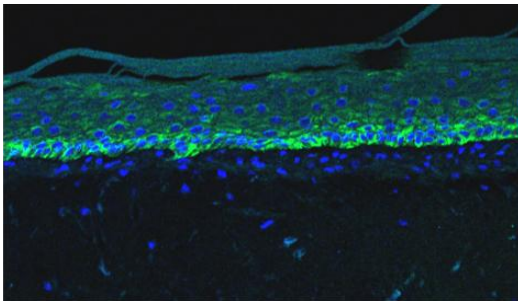


## □ Tissue engineered human skin equivalent / human reconstructed tissues:

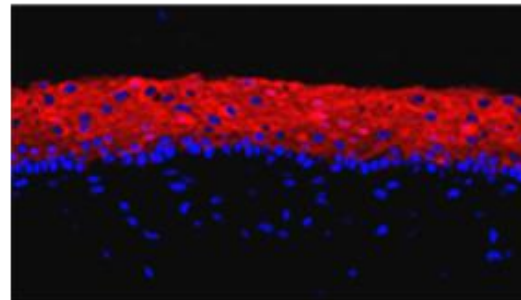
- **EpiSkin™**
- **MelanoDerm™**
- **EpiDermFT™**
- **EpiDerm**

# EpiDermFT system

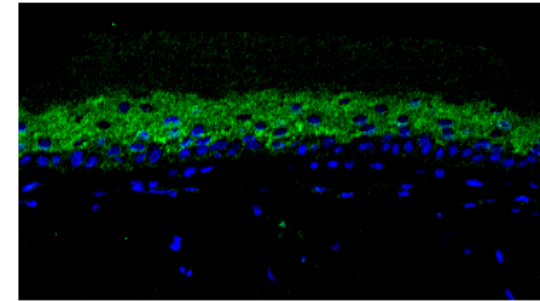
- ❑ **Consists of human **epidermal keratinocytes (NHEK)** and **dermal fibroblasts (NHFB)** cultured to form **a multilayered model of the human dermis and epidermis****
- ❑ **Cultured at the air-liquid interface in easy-to-handle tissue culture inserts**



**keratin 5**



**keratin 10**



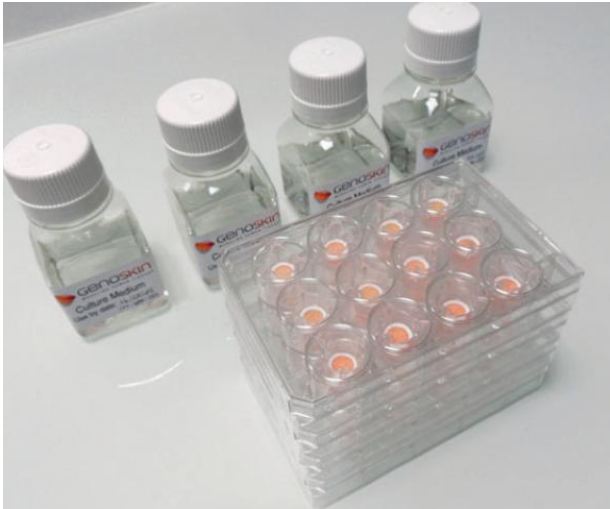
**involucrin**

EpiDermFT consists of organized **keratin 5** expressing **basal cells**, **keratin 10** and **involucrin** expressing **spinous and granular layers**, and cornified **epidermal layers** analogous to those found *in vivo*.

The dermal compartment is composed of a collagen matrix containing viable normal human **dermal fibroblasts** (NHDF). The epidermal and dermal layers are **mitotically and metabolically active** and exhibit *in vivo*-like morphological and growth characteristics which are uniform and highly reproducible.

# Nativeskin (*Ex vivo* human skin culture)

- ❑ **A full-thickness human skin biopsy embedded in a nutrient-rich matrix, with the epidermal surface exposed to air.**
- ❑ **A robust platform used for studying the response of live human skin to compounds and cosmetics, following either topical or systemic administration.**
- ❑ **A close alternative to direct testing on human skin.**
- ❑ **Skin biopsies are maintained within a patented matrix, preserving their viability and functionality for up to 7 days and preventing any lateral diffusion of topically applied formulations.**



- ❑ **A maximum of 48 NativeSkin access<sup>®</sup> 8mm can be produced with a skin sample from one donor.**
- ❑ **Donors available:**
  - Donors can be male or female, from age 18-90, and of any phototype.
  - The majority of the donors are female (90%), aged between 30 and 50 (60%), with a 2-3 phototype (90%).

# NativeSkin vs reconstructed skin models



**NativeSkin:** *Ex vivo* skin explant models retain the complete native skin cell population, including keratinocytes, melanocytes and Langerhans cells, alongside a dermal matrix containing fibroblasts, collagen, elastin, glycosaminoglycans, and other components.

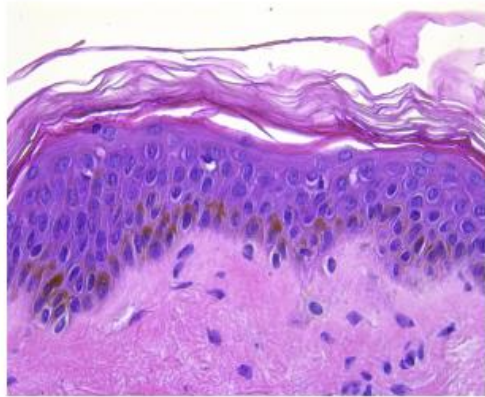
Feature	Reconstructed Skin (e.g., EpiDerm)	NativeSkin®
Physiological relevance	Artificially reconstructed, greater relevance than 2D models	Real human tissue, closer representation of real human skin physiology
Skin appendages	Absent	Present (hair, glands, vessels)
Immune components	Usually absent or minimal	Present (resident macrophages, T cells, LCs)
Donor variability	Homogeneous cell lines, high reproducible	Reflects real human heterogeneity
Culture lifetime	Longer (2–3 weeks)	Limited (~7–10 days)
Throughput	Higher	Lower
Epidermal barrier	Not as robust as human skin	Enables assessment of barrier function endpoints
Cost	High	more costly than 2D cells and 3D <i>in vitro</i> models
Availability	On shelf	Dependent on surgery schedules
Complexity	Limited compared to normal human skin	Maintains complex cell-cell and cell-matrix interactions
Applications	Confirmation of results from 2D screening, investigating in-depth biological pathways to accelerate discovery, useful for validating results from earlier <i>in vitro</i> screens,	Strong translational evidence to help predict <i>in vivo</i> efficacy, translating molecular data to real world results, predicting <i>in vivo</i> efficacy to guide clinical studies, correlating molecular mechanism with clinical outcomes

# DERMATOLOGICAL BIOASSAY PLATFORMS AND READOUTS

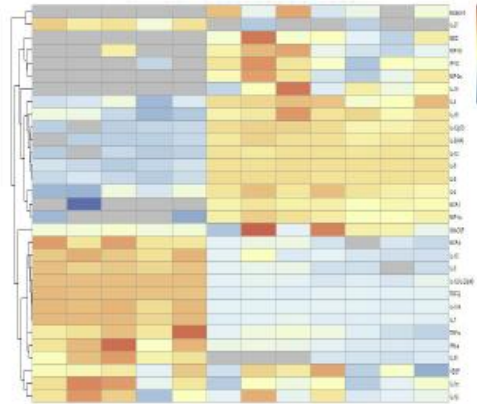
**@AXELA**

# Multi-parameter data acquisition and interpretation

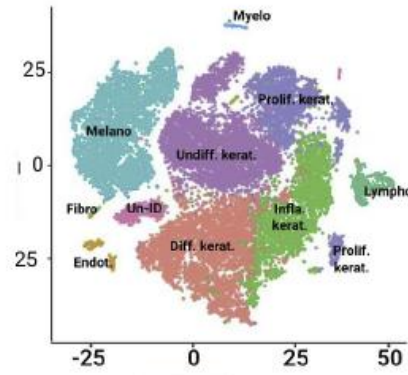
Imaging (Histology, IF)



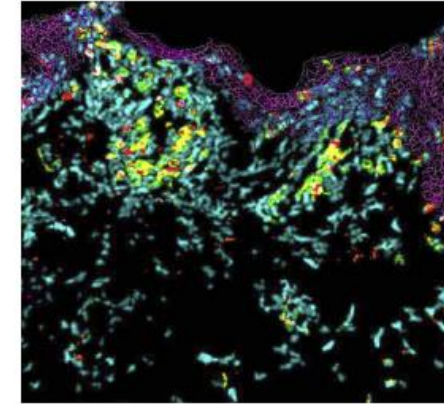
Multiplex Cytokine Analysis



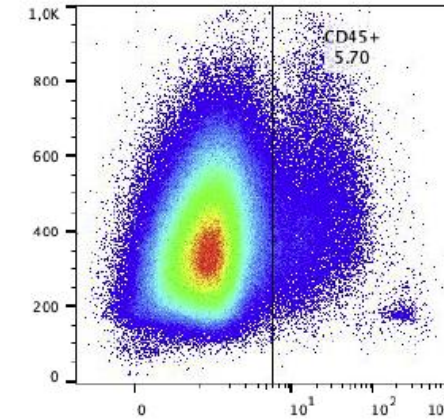
Transcriptomic Analysis



Spatial Biology



Flow Cytometry



## Data integration - Support for decision making



Selecting the most promising candidates



Identifying mechanisms of action



Predicting secondary adverse effects in skin

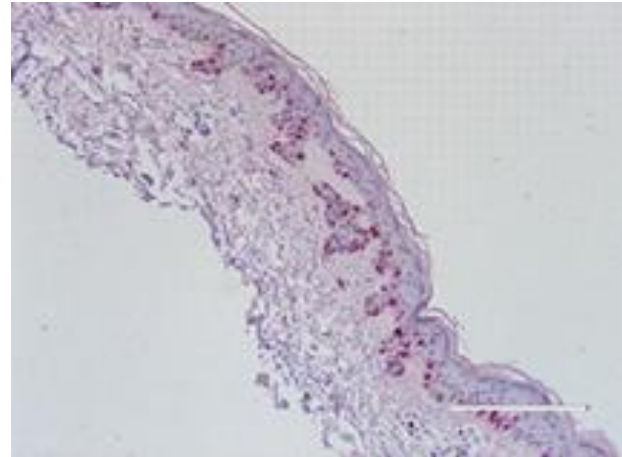
# Advanced IHC/mIHC/IF/FISH platform for skin staining



**42-Slide Capacity | Trusted Antibodies | Validated Reagents | Simultaneous/Sequential Multiplex Protocols**



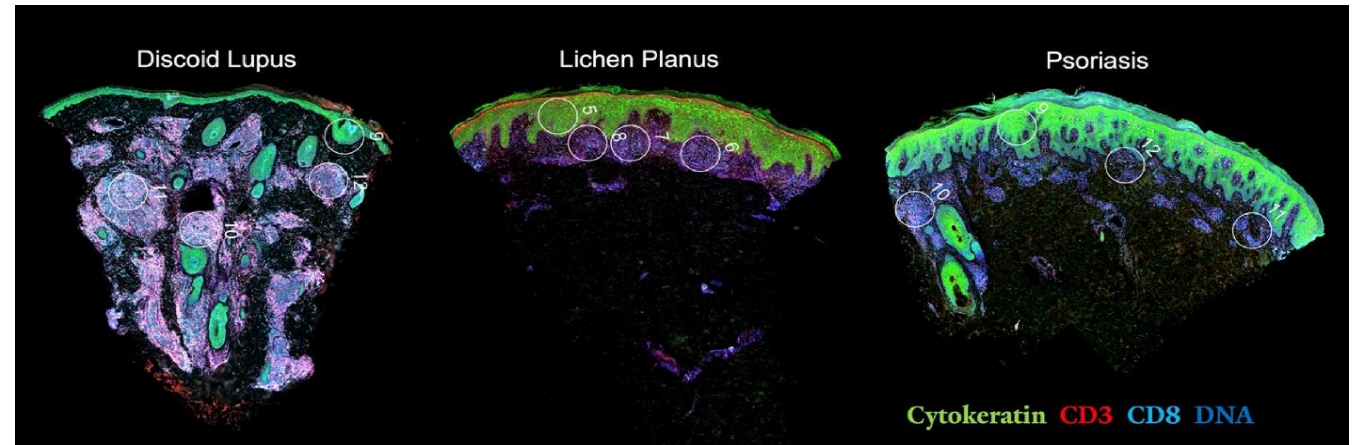
**SLIDEVIEW™ VS200 Whole Slide Imaging Scanner**



**SOX10, Melanoma**



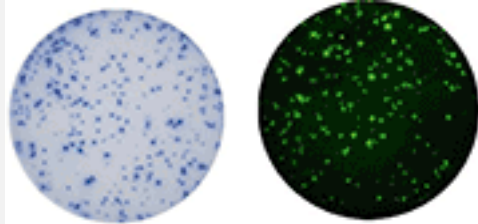
**MART1, Melanoma**



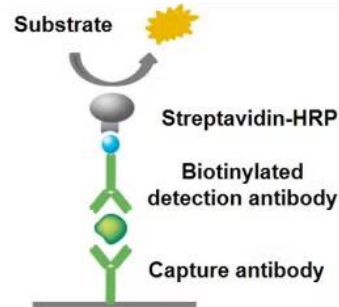
**skin immune microenvironment is arranged spatially and temporally**

# Ultrasensitive, high-plex immunoassays for various biomarkers

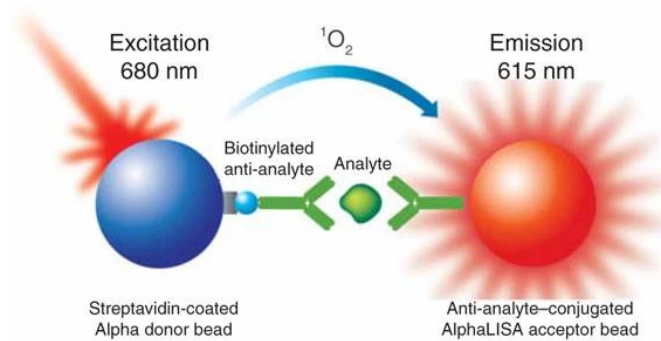
- AlphaLISA
- AlphaPLEX
- CBA
- CytoTOF
- DELFIA
- ELISA
- ELISpot
- FCM
- FirePlex
- FluoroSpot
- FPPA
- IF & mIF
- IHC & mIHC
- Immuno-PCR
- LUMIT
- Lumix
- MSD
- NULISA
- O-link
- ProQuantum
- RPPA
- SimpleWestern
- SMC
- WB



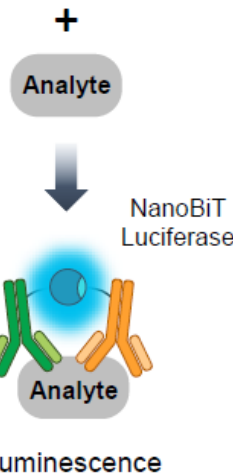
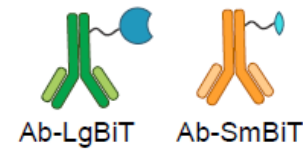
ELISpot



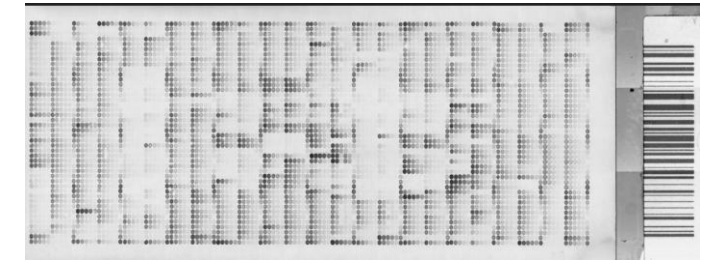
ELISA



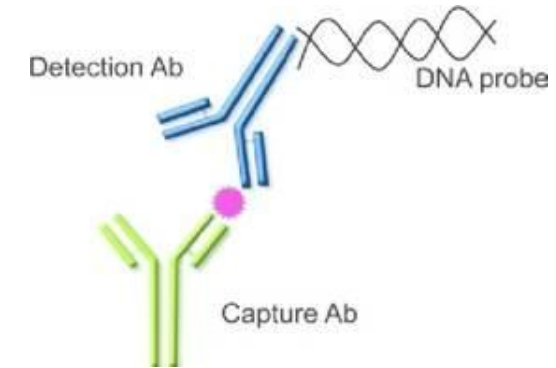
AlphaLISA



LUMIT

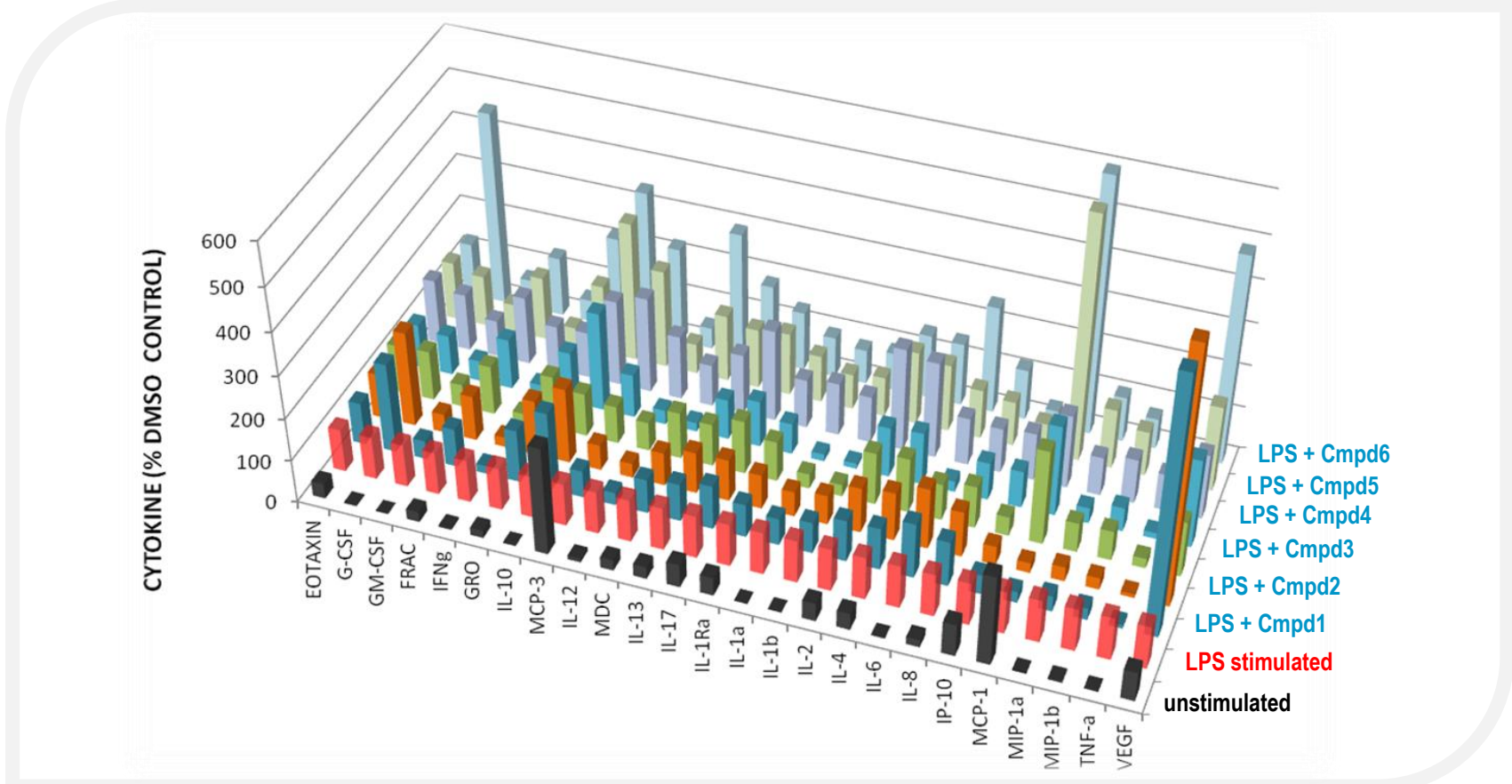
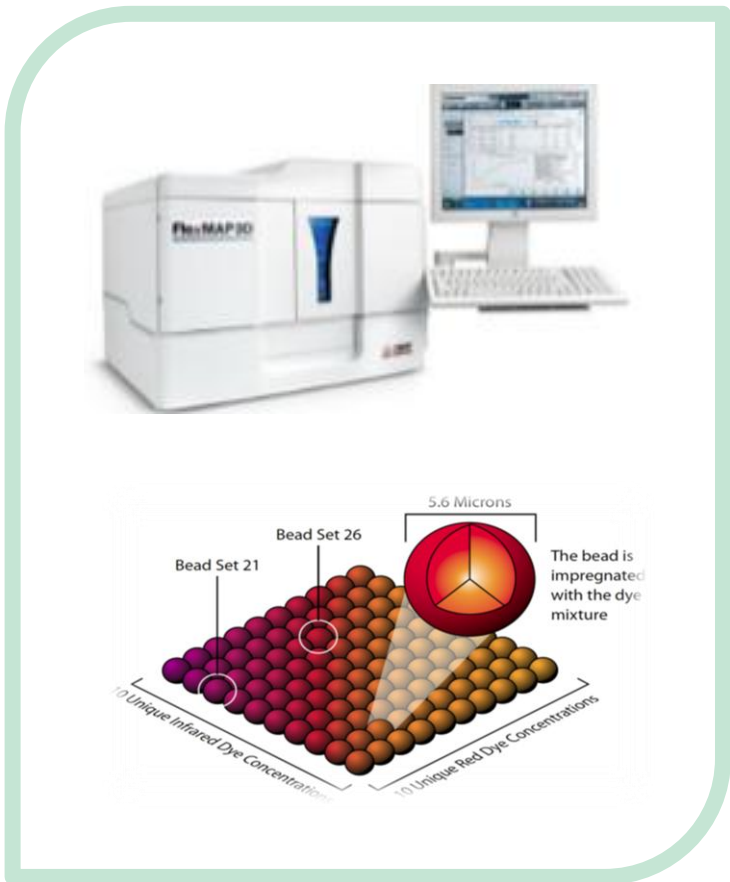


RPPA



Immuno-PCR

# Luminex assay to measure 25 cytokines from inflamed skin cells



Luminex multiplex assay clearly demonstrated:

- LPS induces production of many inflammatory cytokines from human skin cells (20 patients)
- Compounds tested show different immunomodulatory activities

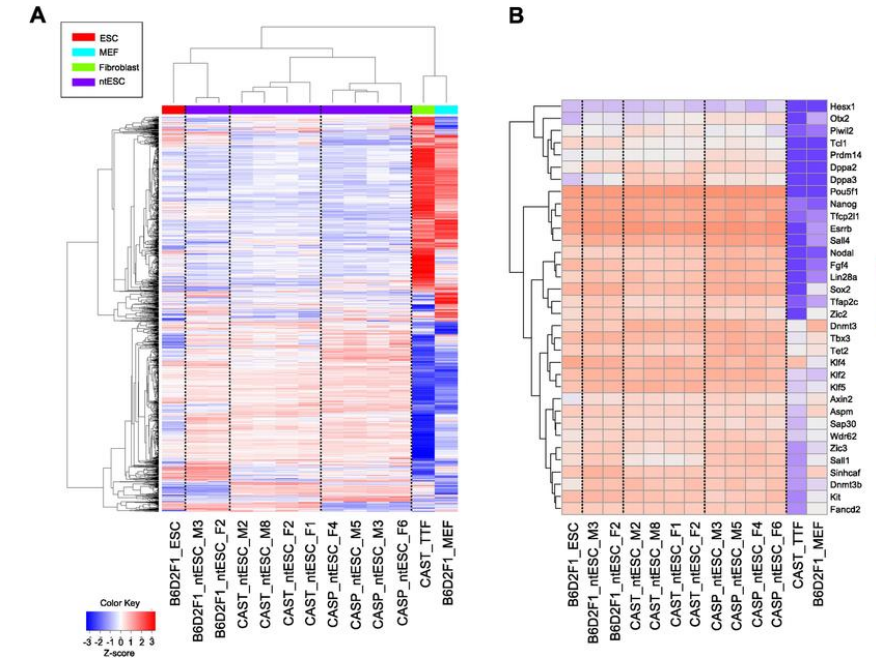
# RNA sequencing (RNA-seq) for skin testing

## RNA Sequencing (RNA-Seq):

- **High-throughput sequencing with Illumina platforms**
- **Flexible input: low-input RNA, FFPE samples, or bulk tissues**
- **Rigorous QC measures: RIN assessment, adapter trimming, contamination removal**
- **Optimized library prep protocols for accurate transcriptome coverage**

## Bioinformatics Analysis:

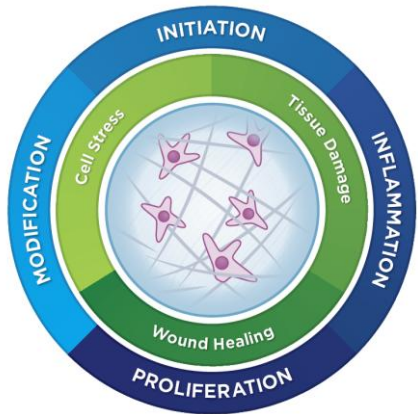
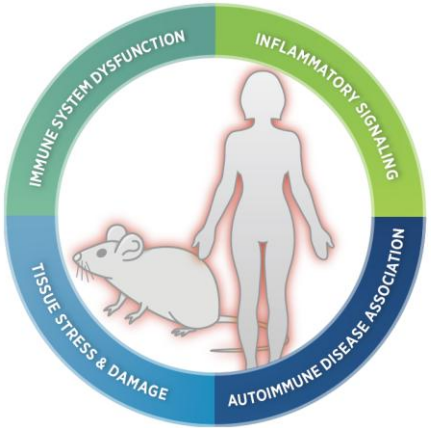
- ✧ **Read alignment and transcriptome assembly (STAR, HISAT2, StringTie)**
- ✧ **Batch effect elimination**
- ✧ **Differential gene expression (DEG) analysis**
- ✧ **Functional enrichment analyses (GO, KEGG, Reactome)**
- ✧ **Visualization: PCA, clustering, heatmaps, volcano plots**
- ✧ **Advanced statistical modeling: co-expression networks, survival analysis, biomarker stratification**
- ✧ **Clinical integration: companion diagnostics, drug development**



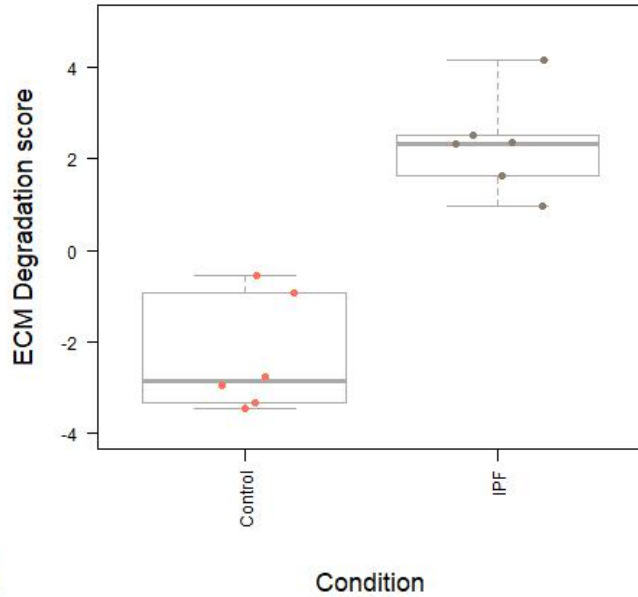
**Hierarchical clustering heatmap based on RNA-seq analysis**

# NanoString nCounter genomic profiling of skin cells

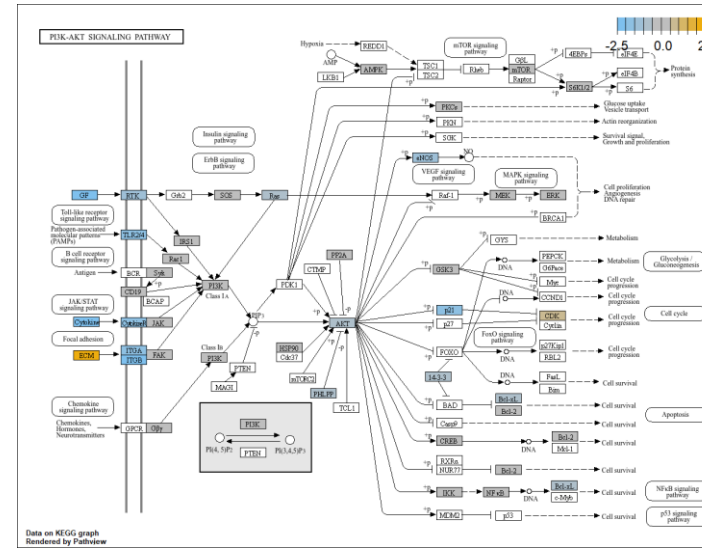
**Focused on specific Pathways, Tx, pathogenesis**



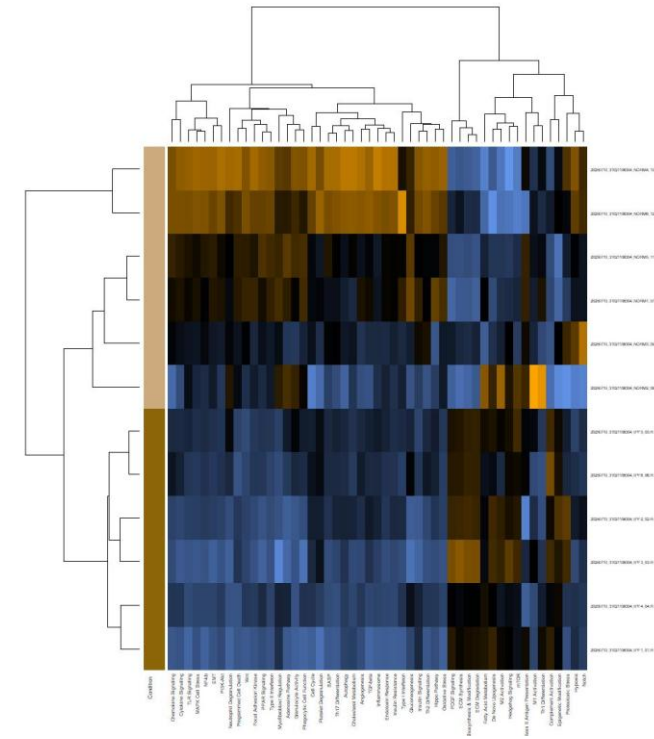
**Pathway score**



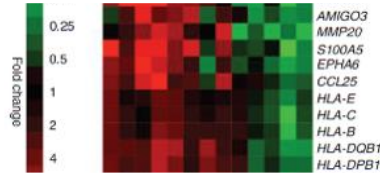
**Pathway view**



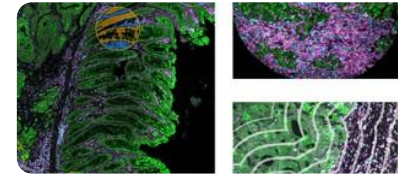
**Heatmap signatures**



# Spatial proteomics & genomics for skin research



nCounter



DSP/GeoMx



## Bulk Gene/Protein Expression Profile

## Spatial Resolution of Gene/Protein Expression

SAMPLE INPUT

- **5000–20000 Cells**

- **20-200 Cells**
- **Multi-Cellular**

SAMPLE TYPE

- **Tissue (FFPE / FF) / Biofluids**

- **Tissue (FFPE / FF) on glass slides**

ANALYTE

- **RNA, DNA, Protein**

- **RNA, Protein (using well-validated antibodies)**

PLEX ABILITY

- **~800 Genes**
- **Translational**

- **Whole Transcriptome**
- **Discovery**

DATA ANALYSIS

- **Multiple pathway(s) analysis**
- **Clinical research signatures**
- **Cell type profiling**

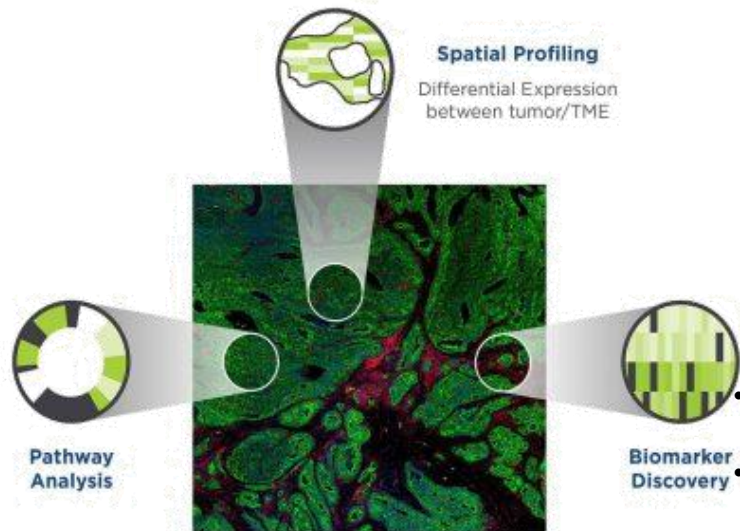
- **Morphology and spatial context**
- ***In situ* Spatial resolution for any target**

# Cutting-edge DSP

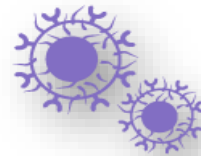


The GeoMx DSP Platform, a flexible spatial solution for drug discovery and translational research

- **Simultaneous *in situ* spatial analysis of proteins or mRNAs from a single tissue or cell samples**
- Pre-designed panels for RNA and protein analysis
- Focused regions of interest (ROI) shed light on the true biology of each sample
- ROIs from different sections of tumor and microenvironment are analyzed individually to provide a clear picture of what is happening biologically
- Explore biology with more targets and analytes than ever before, getting publishable data faster
- Comprehensive end-to-end service with expertise in IHC, mIHC, pathology, sequencing, nCounter and GeoMx

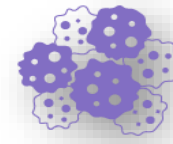


## Immunology



- in situ immune repertoire characterization
- Immune response profiling of normal and diseased states

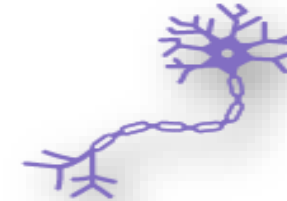
## Dermatology



- Epidermal–dermal architecture
- Immune infiltration patterns
- Drug pharmacodynamic effects
- Cell–cell interactions driving disease

## Applications

### Neuroscience



- Contextually profile neural and stem cells
- Characterization of neurodegenerative disease pathology

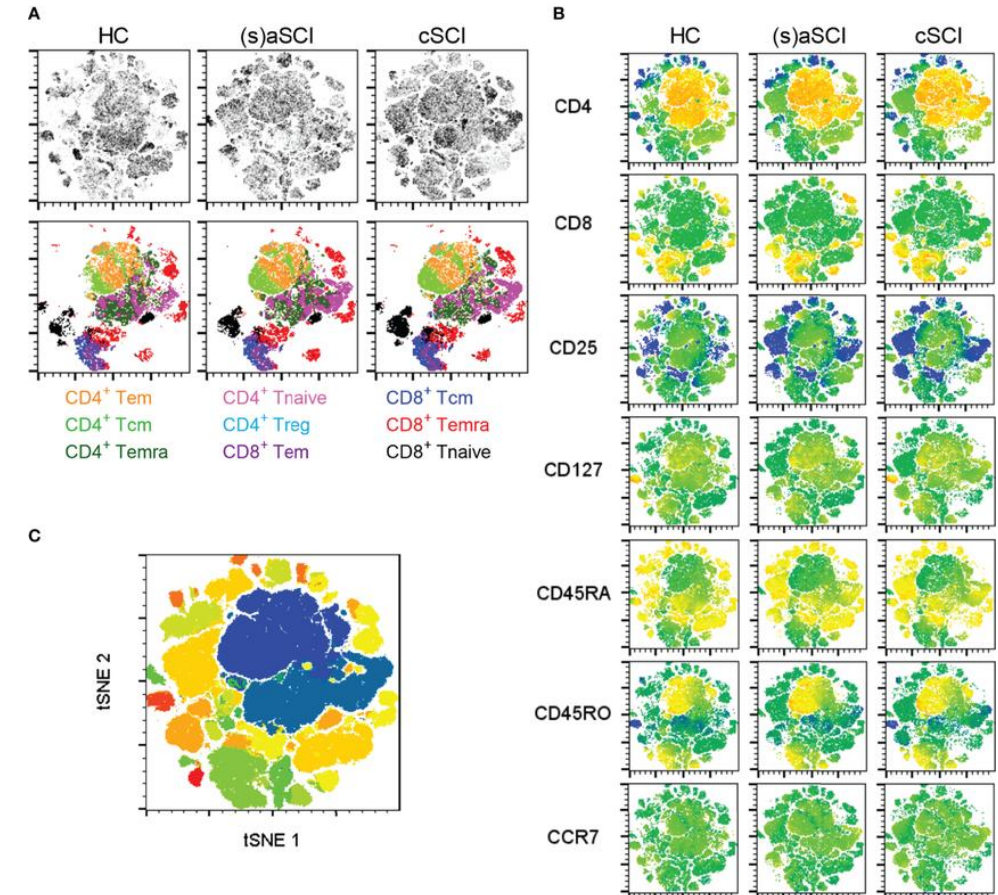
### Pathology



- High-plex analysis of expression in normal and diseased tissues
- Biomarker discovery and characterization
- Monitor therapy response

# High-dimensional flow or mass cytometry

- **Immunophenotyping**
- **PhosFlow Assay**
- **Quantification of Antibody Internalization**
- **Cell Signaling / Calcium Flux**
- **Multiplex Cytometric Bead Array (CBA)**
- **Multiplex miRNA Profiling**
- **Multiplex mRNA Assay (PrimeFlow)**
- **Cell Cycle, Proliferation, Apoptosis, NETosis, Phagocytosis**
- **Identification of Low Expressed Antigens**
- **Nano-particle Size Quantification, Cellular Up-take Analysis**
- **Cell Sorting**
- **Antibody Labeling**
- **Receptor Occupancy**
- **Micronucleus Assay for Genotoxicity**
- **And more...**



# Axela *in vitro* and *ex vivo* skin testing

- ❑ Our skin models enable the evaluation of chemical compounds, cosmetic ingredients, and final formulations across **various applications**, such as:
  - **Anti-aging test**
  - **Skin integrity test**
  - **Skin inflammation test**
  - **Skin pigmentation test**
  - **Genotoxicity test**
  - **Skin irritation test**
  - **Oxidative stress test**
  - **Wound healing test**
  - **UV protection test**
  - **Phototoxicity test**
  - **Drug discovery for: psoriasis, eczema/dermatitis, alopecia, fibrosis, melanoma, lupus erythematosus, vitiligo, wound healing, scleroderma/sclerosis, etc**
  
- ❑ Our skin models are suited for **diverse testing purposes**, such as:
  - Efficacy assessments, topical applications, dermal and epidermal studies
  - Percutaneous absorption, metabolism, long-term studies, repeated-dose assays
  - Investigations into Langerhans cells, skin-resident T cells, immune responses, melanogenesis, etc
  
- ❑ Our skin models possess **multiple advantages**, such as:
  - Models are highly relevant to clinical testing conditions
  - Tissues are excised from different body areas
  - Allows for both systemic administration and topical application for skin absorption and barrier function studies
  - Donor customization available such as restrictions regarding age, gender or phototype
  - 2D/3D dermatoscope available

# **TESTS FOR R&D OF COSMETICS & DERMATOLOGICAL THERAPEUTICS**

**@AXELA**

# Anti-aging test

- **Aging-related enzyme assays** (elastase, collagenase, hyaluronidase, and tyrosinase)
- **Proliferation (Ki67) and differentiation** (Keratin 10 and Filaggrin) assays
- **Immunoassays to quantify senescence-associated secretory phenotype (SASP) factors** (IGFBP6, IGFBP2, CCL4, IL-1 $\beta$ , GM-CSF, PLGF, Angiogenin, MIF-1, MIP-1A, Gro- $\alpha$ , IL-6, MCP-4, Gp130, ICAM-1, MCP-1, IL-8, MIP-3A, Osteoprotegerin, TIMP-1, uPAR, TNFRI, and TNFRII)
- **Beta-Galactosidase activity** (correlates with senescence of the cells)
- **mRNA expression of anti-aging biomarkers** (Collagen 1A1, Collagen 3A1, Elastin, MMPs, TIMPs, Pro-collagen, Hyaluronic Acid, Inflammatory Mediators)

# Anti-oxidative test

**ROS Detection:** Measure the intracellular levels of reactive oxygen species

DCFH-DA assay,

Readout: a fluorescence microplate reader or flow cytometry.

**Antioxidant Enzymes:** Assess how the compound affects the activity of antioxidant enzymes

Superoxide dismutase (SOD) assay

Catalase (CAT) assay

Glutathione peroxidase (GPx) assay

Nitrite and nitric oxide metabolism assays

Oxidase/peroxidase assays

Readout: colorimetric or fluorometric assay

**Lipid Peroxidation:** Detect damage to lipids caused by oxidative stress

BARS assay (Thiobarbituric Acid Reactive Substances)

Measures malondialdehyde (MDA) levels, a byproduct of lipid peroxidation.

**Glutathione (GSH/GSSG):** Determine the intracellular redox state

Reduced glutathione (GSH)

Oxidized glutathione (GSSG)

Ratio of GSH/GSSG is a key indicator of oxidative stress

**Mitochondrial Function:** Oxidative stress is closely linked to mitochondrial dysfunction

JC-1 assay: Mitochondrial membrane potential

ATP assay: Measure cellular energy levels

MitoSOX Red: mitochondria-specific ROS detection

**Antioxidant Capacity:** screen antioxidant potential of compounds

DPPH assay: Free radical scavenging ability

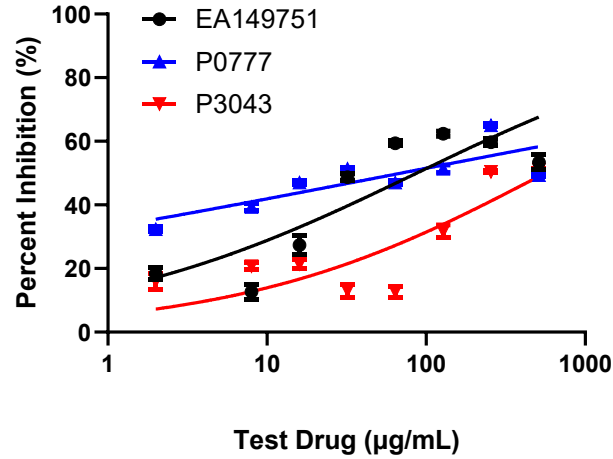
ABTS assay: Antioxidant Trolox Equivalent

FRAP assay: Ferric reducing antioxidant power

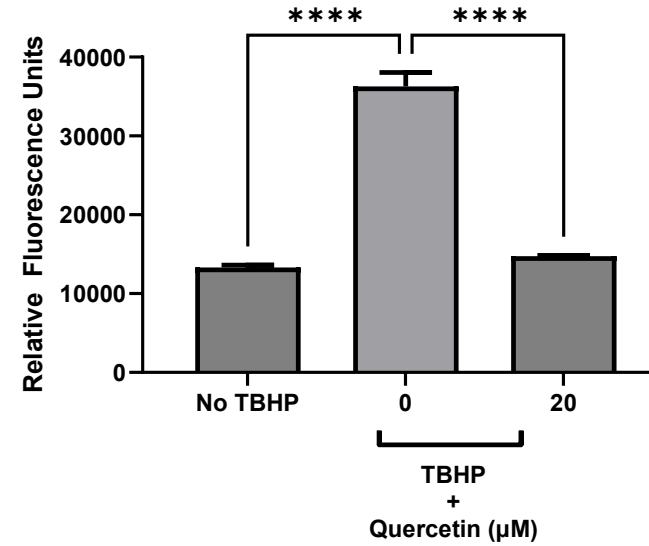
ORAC assay: oxygen radical absorbance capacity

## ROS Detection

**Effect of test compounds on TBHP-induced ROS generation in THP-1 cells**



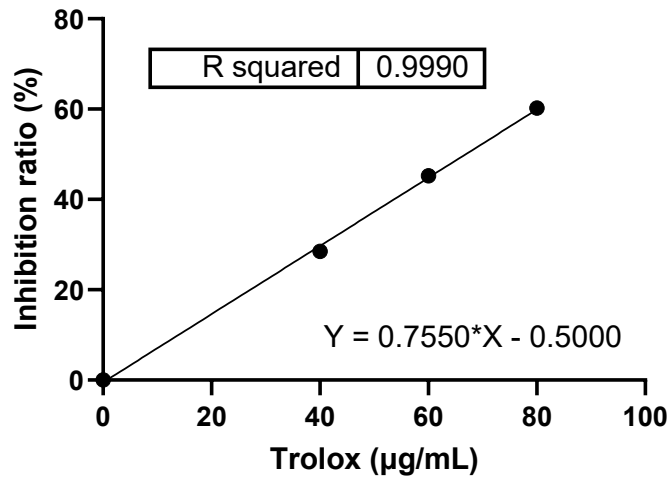
**Effect of Quercetin on ROS (as Control)**



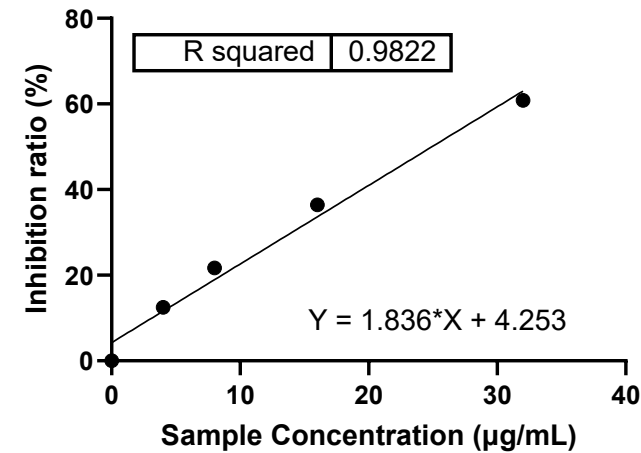
## DPPH assay: Free radical scavenging ability

Trolox is a water-soluble analog of vitamin E

**Trolox**



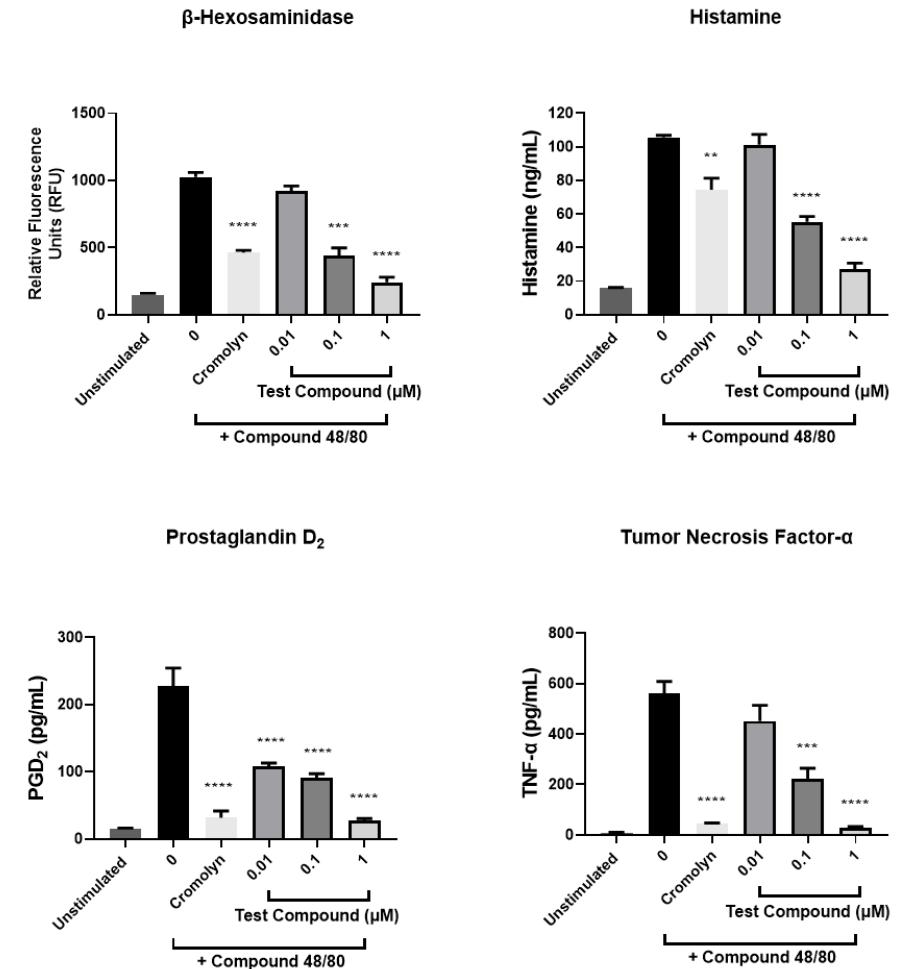
**P3043**



# Skin inflammation/dermatitis test

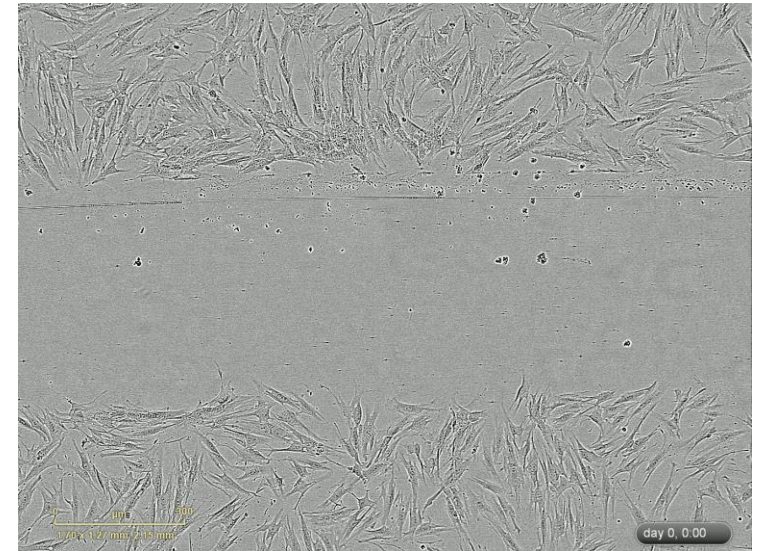
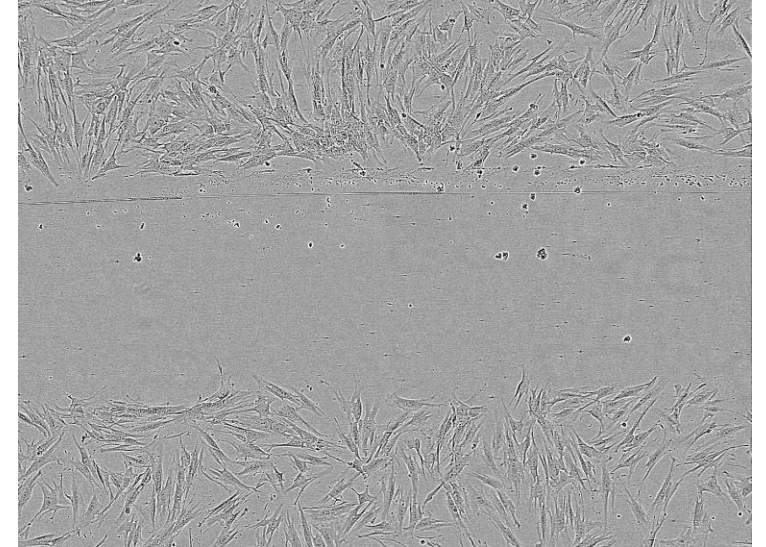
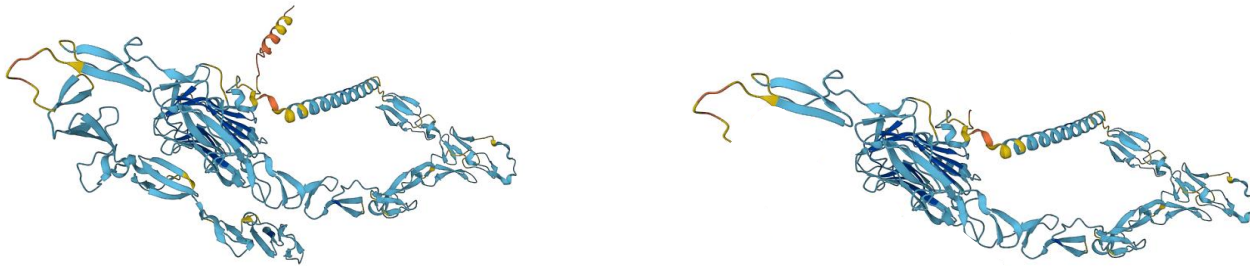
- ❑ **Loricrin and filaggrin expression by IHC staining**
- ❑ **Immune cell activation/infiltration (T cells, macrophages, mast cells, all immune cells) by multiplex IHC staining**
- ❑ **Multiplex immunoassays to quantify cytokine release** (IL-1 $\alpha$ , IL-1 $\beta$ , TNF $\alpha$ , IFN- $\gamma$ , ICAM1, MIP1 $\beta$ , MCP-1, IP-10, MMP-9, uPA) and angiogenic growth factor release (Angiopoietin-1, EGF, FGF2, CXCL1)
- ❑ **Profiling of skin microbiome**

## Degranulation of Mature CD34+ hematopoietic precursor-derived mast cells



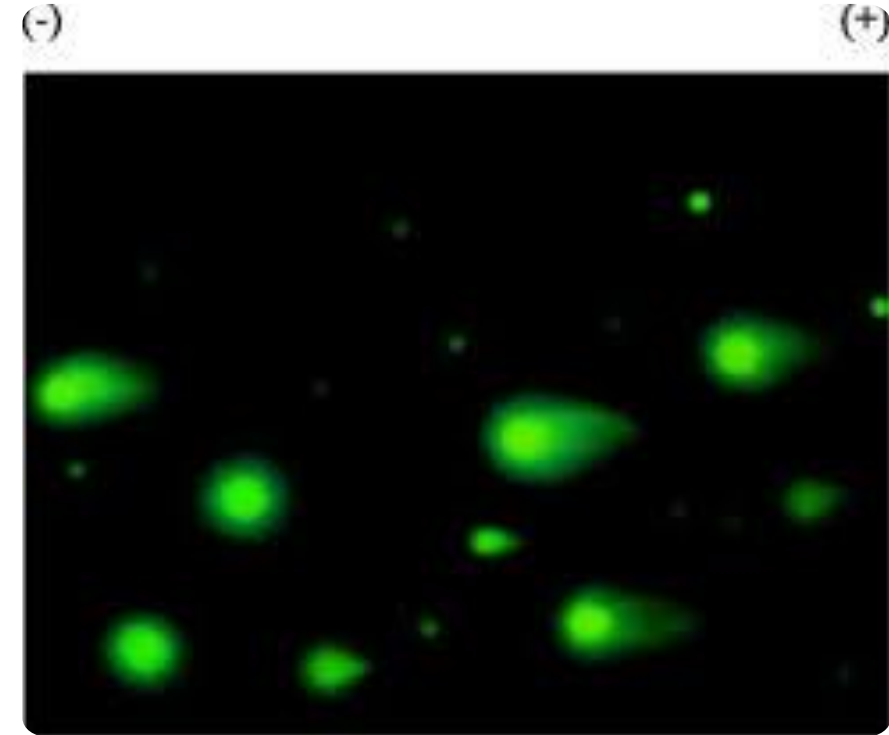
# Wound healing test

- **Scratch assay with monolayer of keratinocytes or dermal fibroblasts using live cell imaging**
- **Evaluation of gene expression of pro-inflammatory cytokines, growth factors, transcription factors, heat shock protein desmogleins and collagen markers (IL1A, IL6, CXCL8, TGFB1, PDGFC, NF $\kappa$ B1, TP53, HSP90AA1, HSPA1A, HSPD1, DSG1, DSG3, COL1A1, COL3A1)**



# Genotoxicity test using dermal cells

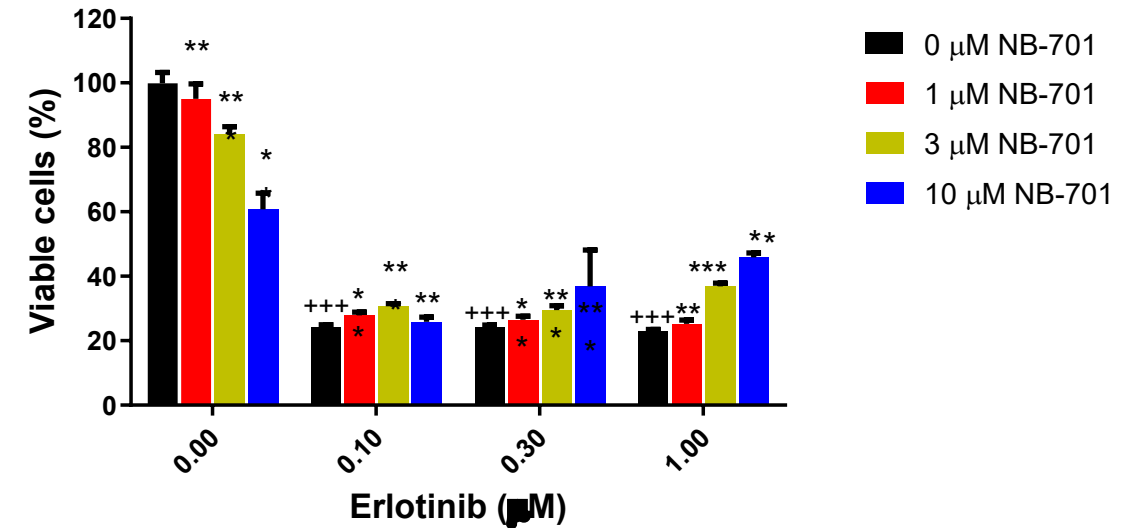
- **COMET assay: single cell gel electrophoresis (damaged DNA image looks like a comet), is a sensitive test for analyzing DNA damage in individual cells.**
- ***In vitro* micronucleus test (MNT) (OECD487)**
- ***In vitro* chromosomal aberration test (OECD483)**
- **immunofluorescence staining of pH3 (phospho histone 3, a marker of G2/M phase)**
- **immunofluorescence staining of pH2AX (phospho histone 2AX, a marker of double strand DNA breaks)**
- **Examination of DNA damage pathway activation (e.g. p53 activation).**



# Skin integrity test

- Evaluation of tissue integrity with **H&E staining** to examine spongiosis, parakeratosis, necrosis and epidermal/dermal separation
- Examination of **tissue metabolism** through gene expression markers (r18s, CDKN2A, KRT14, KRT16, TNF $\alpha$ , IFN- $\gamma$ , MMP9, MMP12, IVL, LOR, Col1a2, and IL-1 $\alpha$ , etc.)
- Measurement of **trans-epithelial electrical resistance (TEER)**
- Evaluation of the formation of functional barrier as a result of differentiation using protein or RNA expression of specific differentiation markers in 2D or 3D skin models

Effect of EGFRi  $\downarrow$  NB-701 on cell proliferation of 3D skin culture (72 h treatment)



\* P<0.05, \*\* P<0.01, \*\*\* P<0.001, compared to 0 μM AC-701  
 +++ P<0.001, compared to DMSO control  
 One-way ANOVA with Dunnett's test

# Skin pigmentation & phototoxicity test

- **Microscopic and macroscopic darkening analysis**
- **Histology analysis**
- **Melanin synthesis** using a colorimetric assay
- **Tyrosinase expression and activity using a colorimetric assay to examine treatment with active ingredients for whitening or tanning application**
- **Morphological changes after UVA or UVB exposure by H&E staining of skin samples and DNA damage by IHC staining**



# Anti-psoriatic drug testing

## Features of our psoriasis model:

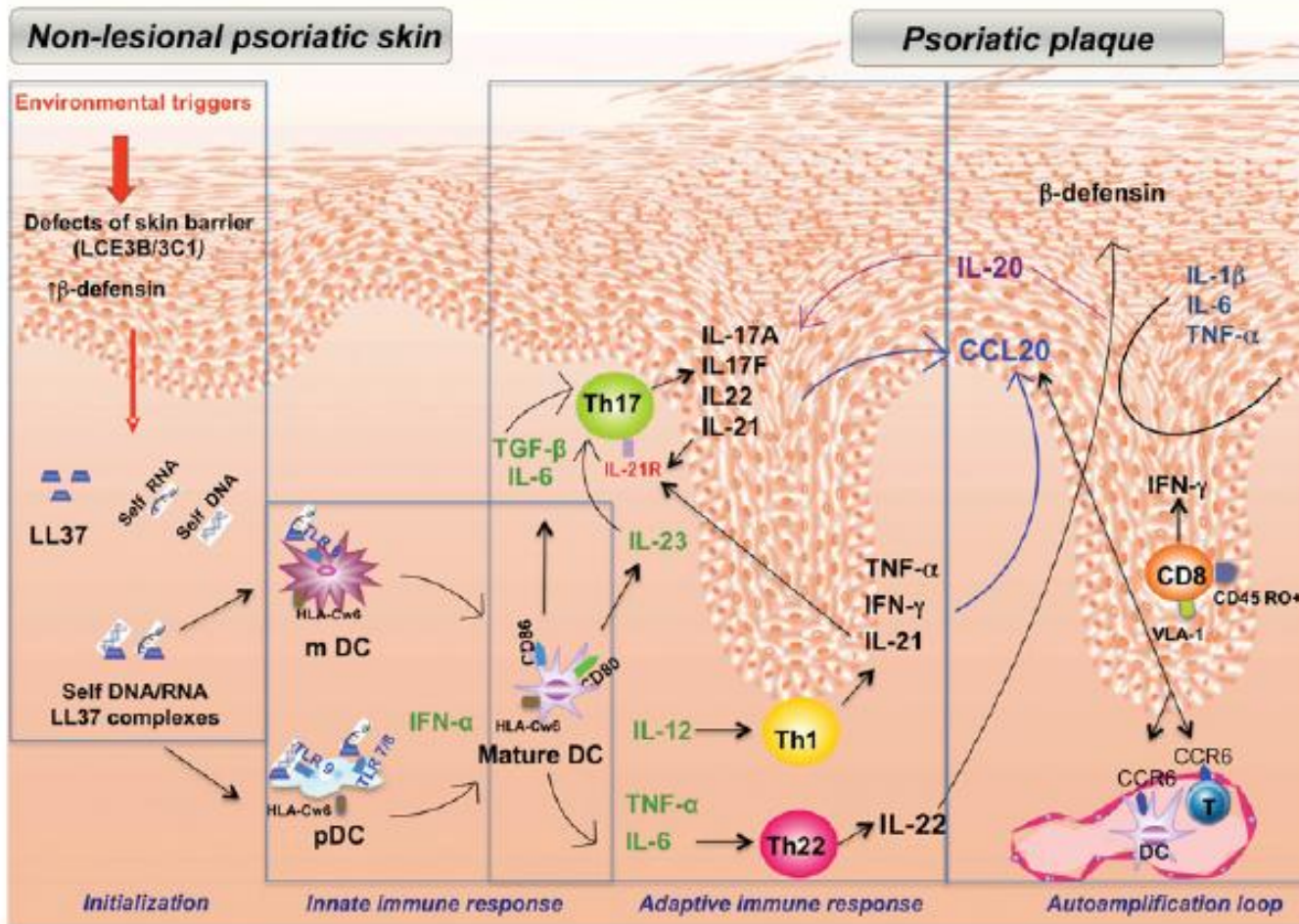
- The **co-culture** of keratinocytes, fibroblasts, dendritic cells, and T-cells enables the screening of candidate drugs and enhances our understanding of the biological mechanisms underlying psoriatic disease.
- The **3D Psoriasis Skin Model** offers an intermediate approach between traditional cell cultures and animal models.
- More accurately replicates the cell differentiation and metabolic changes characteristic of psoriatic lesions. Additionally, 3D models avoid nonspecific influences from surrounding organs and tissues, making them a preferred choice over animal models for some studies, as animal skin differs significantly from human skin.
- This model is well-suited for drug screening and evaluating new pharmacological strategies.

## Advantages of our psoriasis model:

- Psoriatic human tissue phenotype
- 3-dimensional, highly differentiated
- Highly reproducible and ready to set up
- Ideal for drug screening and basic research
- Cost effective alternative to animal and clinical testing
- Similar to *in vivo* psoriasis skin conditions



# Targets for anti-psoriatic drug discovery



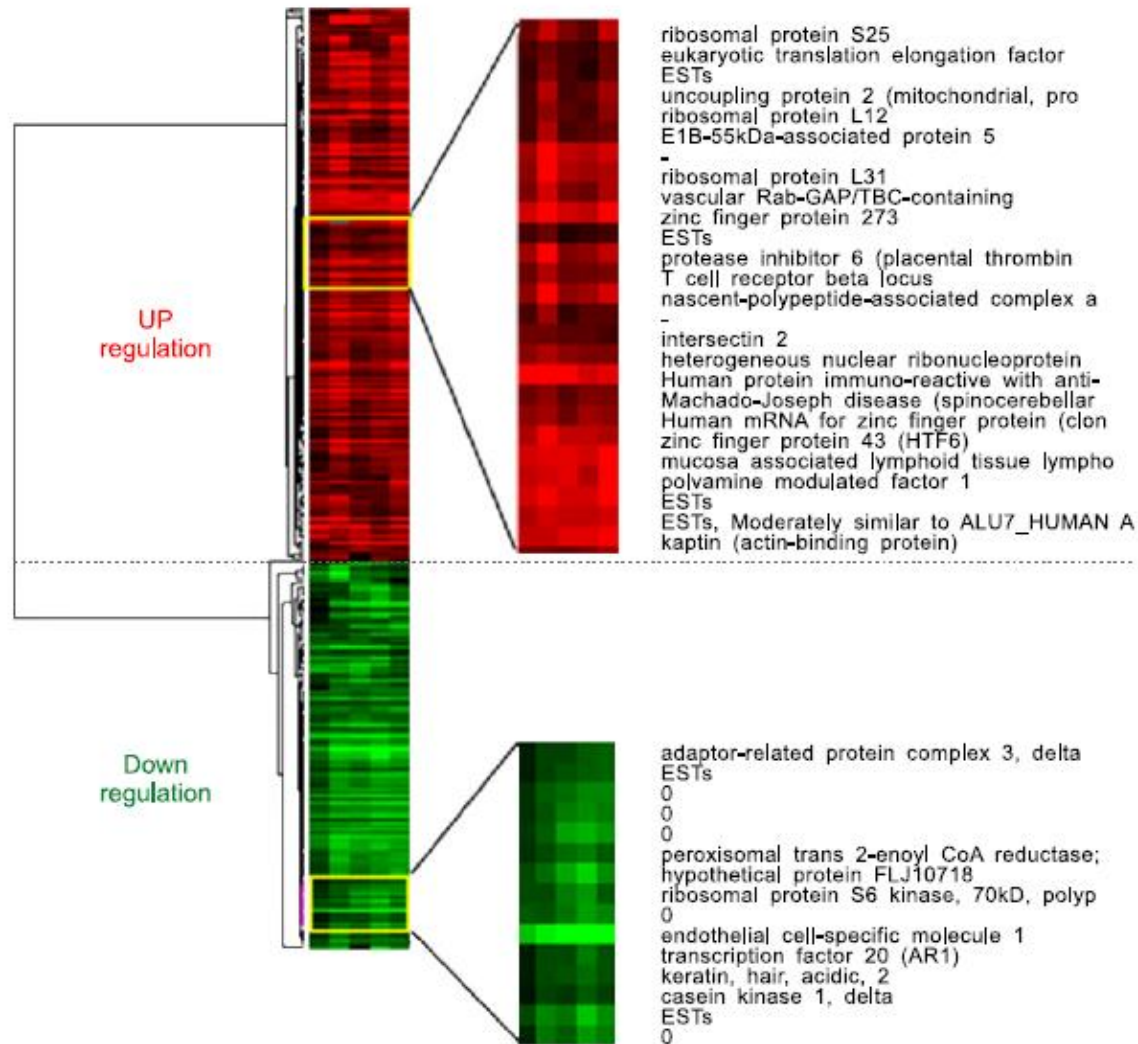
- Environmental triggers and genetic defects alter skin barrier, and contribute to molecular events lead to the synthesis of IFN-α by pDC and maturation of mDC into mature DCs.
- Mature DCs in turn produce multiple cytokines promoting differentiation and expansion of Th1 (i.e. IL-12), Th17 (i.e. IL-6, TGF-β1 and IL-23) and Th22 (i.e. TNF-α and IL-6) cells.
- Th1 and Th17 cytokines induce keratinocytes to produce CCL20, a chemoattractant for CCR6-expressing DCs and T-cells, thus promoting the accumulation of these cells in the psoriatic skin. Th17-related cytokines stimulate DCs and proliferating keratinocytes to make IL-20, a cytokine that promotes keratinocyte proliferation.
- Keratinocytes produce inflammatory cytokines, such as IL-1β, IL-6 and TNF-α, thus contributing to enhance DC activation and expand the local inflammation.

plasmacytoid DCs (pDC)

myeloid DCs (mDC)

Antimicrobial Peptide LL-37 Internalized by Immature DC

# RNAseq analysis of psoriatic vs normal skins



- **5 psoriatic patients were compared with 8 healthy individuals and analyzed using RNAseq**
- **63 genes, including CD44, CD56 and IL7R, were induced in patients**
- **139 genes, including the sphingosine kinase 1 and p16-INK genes, were reduced in the psoriatic patients**

# “Secretome profiling” of psoriatic vs normal bloods

-1.4	-1.16	1.81	1.45	1.17	1.33	-1.52	EOTAXIN
22.2*	19.1	6.44	15.3*	4.16	31.2	12.6	G.CSG
26.8*	27.4	1.52	25.5*	13.3	24.2	12.8	GM.CSF
1.63*	9.28	5.4	4.76*	1.83*	1.45	1	FRACTALKINE
1.38	6.55	1.98	1.52	1.4	1.69	-1.7	IFNg
4.01*	5.45	4.16*	5.21*	3.07*	1.56	2.47	GRO
14.3	9.89	1.91	7.12	3.6*	5.48	9.56	IL.10
2.49*	3.65	6.25*	4.59*	2.3*	2.09	4*	MCP.3
9.67*	1.83	3.84*	3.41*	3.6*	2.97*	1.66	IL.12p40
2.35	2.16	8.07*	1.29	1.58	1.04	2.42	MDC
-2.31	-2.88	-2.75	1.21	-1.69	-1.23	-6.06	IL.13
1.4*	-1.31	1.48	1.48	2.09	1.37	-1.02	IL.17
1.44	-1.25	3.25	1.67	1.04	-1.19	1	IL.1ra
7.86	9.13	1.15	8.07*	7.46*	4.79	6.42	IL.1a
6.71*	10.4	1.07	5.08*	2.63	2.91	4.74	IL.1b
2.69*	1.18	2.57*	2.26*	4.21*	2.13*	1.53	IL.2
-1.05	-1.59	-1.3	1.76	1.25	1.47	-1.38	IL.4
7.34	2.96	2.73	21.2*	2.68	6.41	12.4	IL.6
2.51*	1.14	1.47	3.33*	1.79	1.56	3.12*	IL.8
-16.3*	-8.59	-1.56	-8.14	-17.2*	-8.62	-6	IP.10
-1.21	-1.01	1.82	2.62*	1.19	1.16	3.2*	MCP.1
7.5*	9.45	5.1	27.5*	4.09	10.3	24.2*	MIP.1a
4.42*	4.26	2.49	4.24*	2.06	2.28	3.78	MIP.1b
16.4	5.18	-1.3	2.15	2.45	1.93	7.02	TNF.a
-1.06	1.26	2.39	1.35	1.03	1.21	-4.62*	VEGF
Sarcoidosis	SLE	Crohn	IPF	Scleroderma	Psoriasis	RA	

**Many inflammatory cytokines are significantly overproduced by PBMCs from the skin diseases, such as G-CSF, GM-CSF, fractalkine, GRO, IL-10, MCP-3, IL-12p40, MDC, IL-1, IL-6, IL-8, MIP-1, TNFa. However, IP-10 is lower in diseases.**

$$\text{Number} = \frac{\text{baseline cytokine levels from disease PBMC}}{\text{baseline cytokine levels from normal PBMC}}$$

# **OUR CLIENTS FROM COSMETICS & BIOPHARMA**

# Positive feedback

“Your message is **very timely** as we just submitted the IND which contains all of your in vitro reports. Thanks for doing a **great job**. We would not have gotten this done without Axela...”

-Director of Operations, Chicago Biopharma

“**Harris and his team did a great job with my immune cell assays. They always respond quickly and go above and beyond with data delivery. I will certainly work with them again.**”

- Director

L'ORÉAL

“Your team truly helped us get **better and real-time data** from our xenograft tumor model. We saved many mice in our model without satellite groups.”

- Professor



“We very much appreciate your **flexibility** to work with us and allowed quick assessment of antibodies. I also want to express our appreciation for your weekly data communication. It was **neat, clear, and transparent**. Thank you for your partnership.”

- Principal Investigator



“Working with the team removes the guess work. I always know the status of my project because their senior scientists communicates **directly and regularly**. I would be happy to work with you again in the future if we need assays done.”

- Director



“I was very happy with Axela for my FACS project. They were **very responsive and adaptable** to what turned out to be a more challenging project than I had originally anticipated, with quick response times to emails and **clearly written reports** on ongoing progress.”

- Principal Scientist



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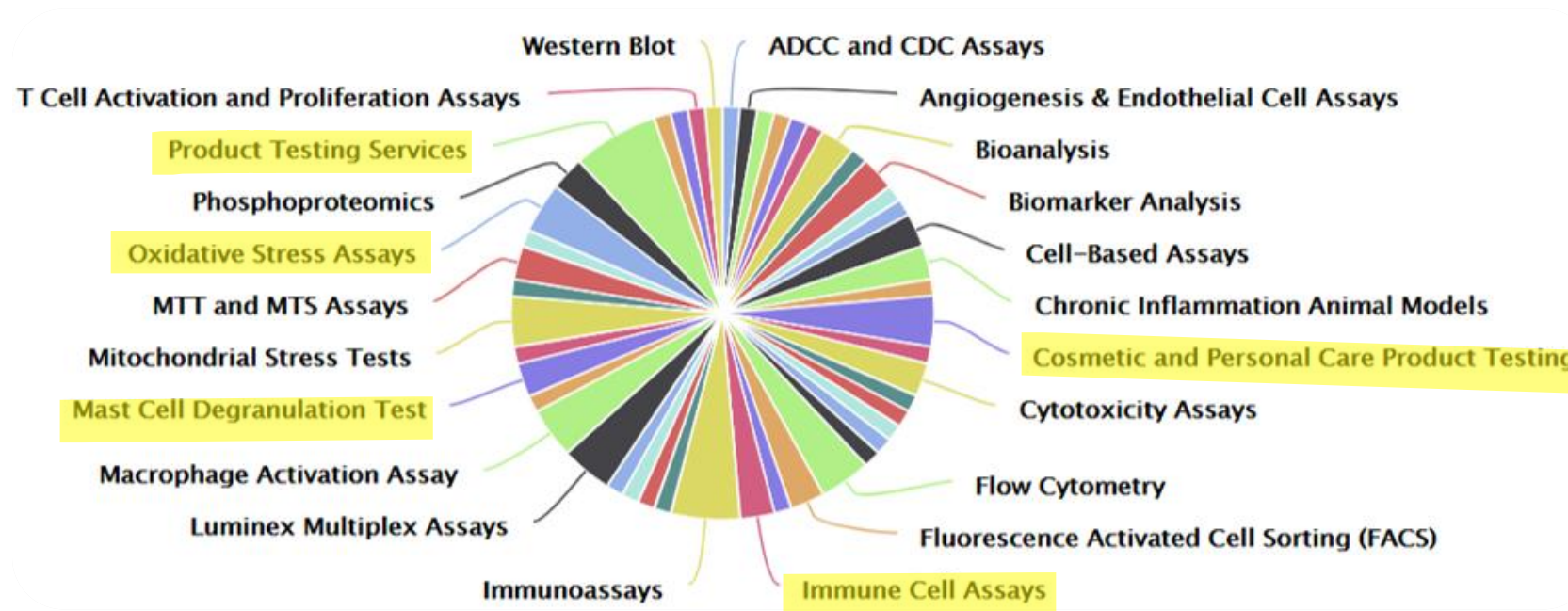
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TOGETHER!**

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# **BACKUP SLIDES**

## About AxelaBio

**AXELA BIOSCIENCES Inc.** is a growing CRO based in New Jersey, specializing in drug discovery biology, translational sciences, bioanalysis and CLIA testing to **ACCELERATE** the development of novel **therapeutics and skincare innovations**. We also offer a range of testing kits and products to support the life sciences industry.



**Preclinical Biology  
& Translational  
Sciences**



**Biomarker Discovery,  
Validation & CLIA-  
Certified Testing**



**Bioanalysis,  
Immunogenicity &  
Toxicity Evaluation**



**Immune Cells  
& Testing Kit  
Production**

# Strong team

## Expertise Areas

◆ Ultrasensitive / Multiplex Immunoassays ◆ Large or Small Molecular Drugs ◆ Cell and Immunotherapy ◆ Cell Sorting ◆ Flow Cytometry ◆ Live Cell Imaging ◆ Gene and Protein Arrays ◆ Biomarkers ◆ Discovery Biology ◆ Translational Medicine ◆ 3-D Cell Culture /Spheroid/Organoids ◆ Multi-Omics ◆ Immunofluorescence, IHC and mIHC ◆ Spatial Proteo-genomics ◆ Bioanalysis ◆ *In Vitro* Toxicity ◆ Cancer ◆ Autoimmunity ◆ Immunomodulation ◆ Molecular Glues ◆ PROTAC ◆ ADC ◆ CDx ◆ LDT ◆ CLIA testing

Trained at



Worked at



# Cutting-edge platforms

- **NanoString GeoMx DSP (spatial transcriptomics and proteomics), 2 X**
- **NanoString nCounter Pro (genomic profiling), 2X**
- **NeoPATH Pro Autostainer**
- **SLIDEVIEW VS200 Whole Slide Imaging Scanner**
- **Flow Cytometry (CytoFlex S with 4 lasers, 13 colors), 2X**
- **Simple Western (Gel-free Capillary-based Automatic Western Blot), 2 X**
- **Tecan Multimode Microplate Reader, 4 X**
- **FlexMAP3D (beads-based protein and gene array, 96- or 384-well format)**
- **Luminex 200 (beads-based protein and gene array, 96- well format)**
- **ABI QuantStudio Real-Time PCR, 2X**
- **LiCor Odyssey Near-Infrared Imaging System**
- **ELISpot Reader**
- **EVOS FL Auto Cell Imaging System**
- **AirClean 600 PCR Workstation**
- **Molecular Devices GenePix 4200AL Microarray Scanner**
- **Miltenyi Biotec autoMACS® Pro Separator**
- **MSD MESO QuickPlex**
- **Integra ASSIST PLUS automated multichannel pipetting Robots**
- **IncuCyte Live Cell Analysis System**
- **O-link Proteomic System**
- **And more...**



**NanoString  
GeoMx DSP  
Spatial Biology**



**NanoString nCounter  
Protein and Gene  
Profiling**



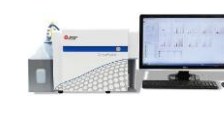
**NeoPATH Pro  
Autostainer**



**Invitrogen EVOS FL  
Auto Live Cell  
Imaging System**



**IncuCyte Zoom  
Live Cell  
Imaging System**



**CytoFLEX  
Multiparameter Flow  
Cytometry**



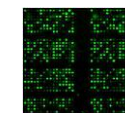
**ProteinSimple Simple  
Western / Capillary-  
Based Immunoassay**



**Luminex-200 and  
FLEXMAP 3D Multiplex  
Immunoassay**



**O-link  
Proteomics  
System**



**Forward and  
Reverse Phase  
Protein Arrays**

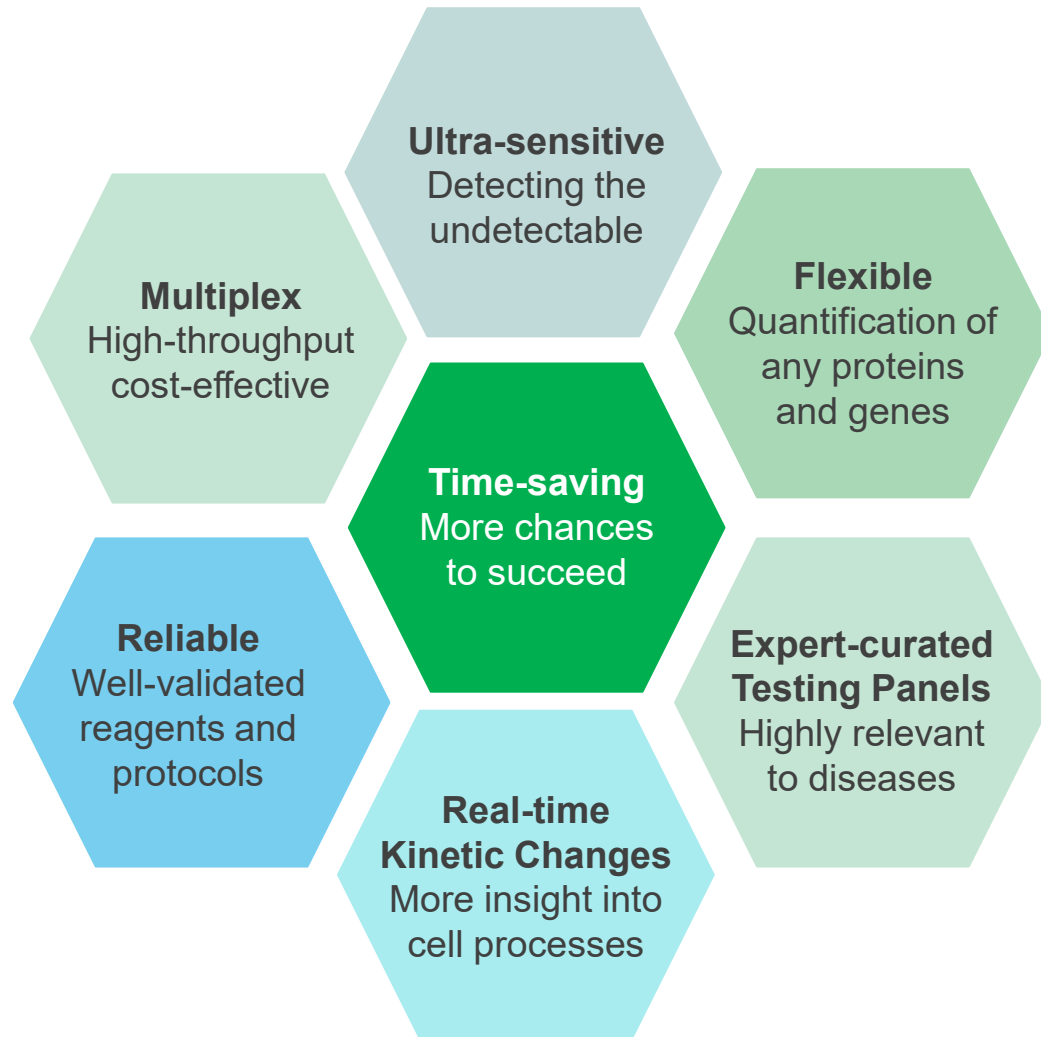


**Tecan Spark  
Multimode Microplate  
Reader**



**QuantStudio  
Real-Time PCR  
System**

# Technical advantages

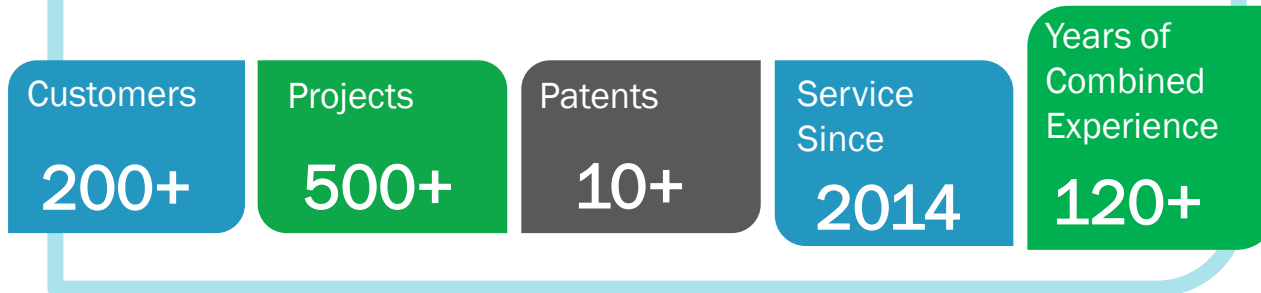


- ❖ **Ultra-sensitive, miniscule amount of samples**
- ❖ **Multiplex and high-throughput**
- ❖ **Real-time and kinetic changes**
- ❖ **Simultaneous spatial data of proteins and genes**
- ❖ **Qualitative and quantitative**
- ❖ **Better data with less animal use**
- ❖ **Expert-curated panels for novel modalities (ADC, CGT, etc.)**
- ❖ **Diverse assay platforms and formats**



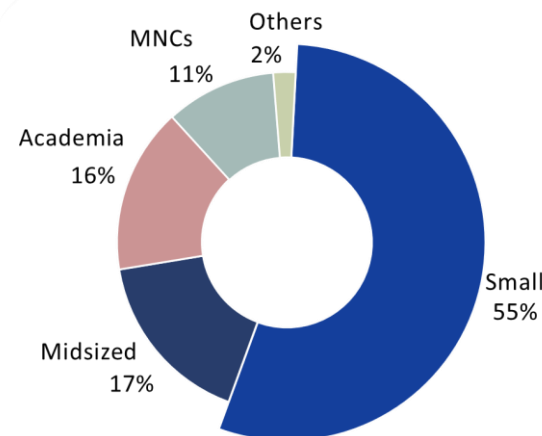
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### Global collaborations

