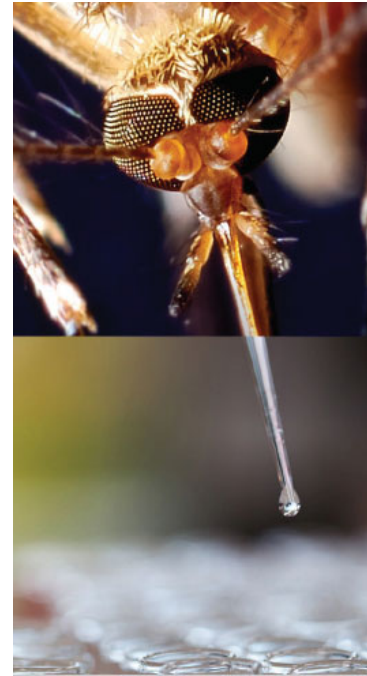
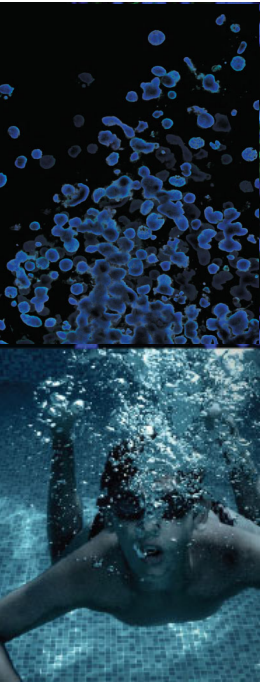




# ATCC<sup>®</sup> Cell Line Land: Reference-Quality RNAseq Data from Credible ATCC<sup>®</sup> Cell Lines

Ajeet P. Singh, PhD  
*Senior Scientist, ATCC*

Credible Leads to Incredible™



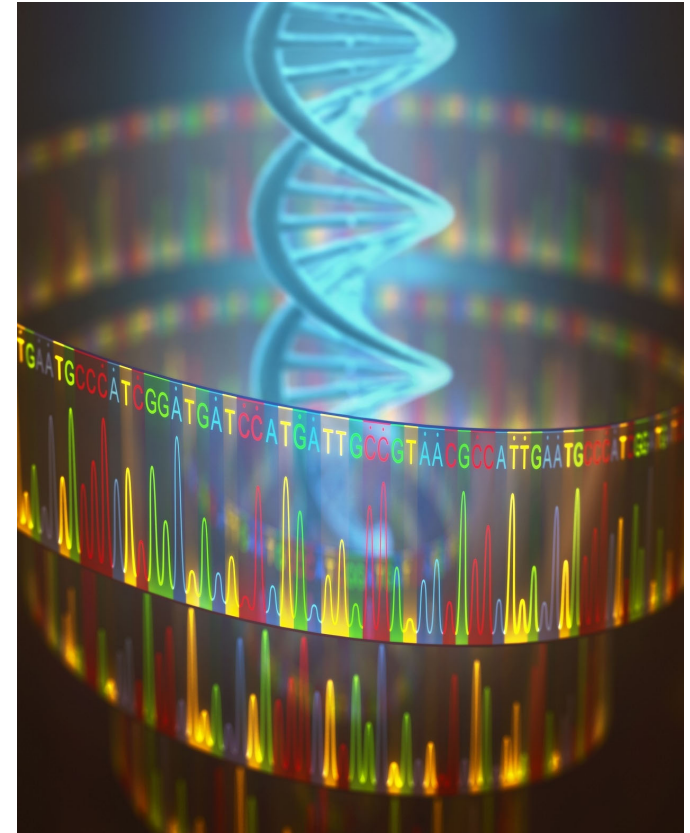
# About ATCC

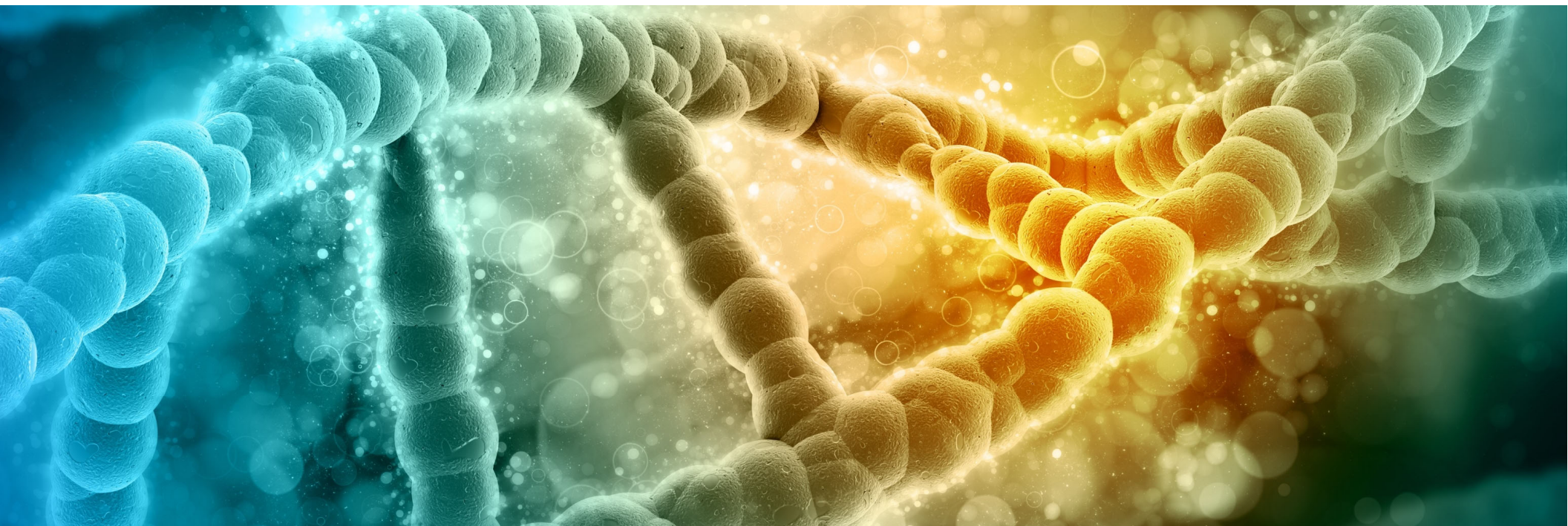
- Founded in 1925, ATCC is a non-profit organization with HQ in Manassas, VA, and an R&D and Services center in Gaithersburg, MD
- World's largest, most diverse biological materials and information resource for cells and microbes – the “*gold standard*”
- Innovative R&D company featuring gene editing, microbiome, NGS, advanced models
- Partner with government, industry, and academia
- Leading global supplier of authenticated cell lines, viral and microbial standards
- Sales and distribution in 150 countries, 19 international distributors
- Talented team of 450+ employees, over one-third with advanced degrees



# Agenda

- Irreproducibility in research
- Development of authenticated genomic data of ATCC's cell lines
- High level view of gene expression pattern across cell line panels
- ATCC Cell Line Land applications showcase
- Summary

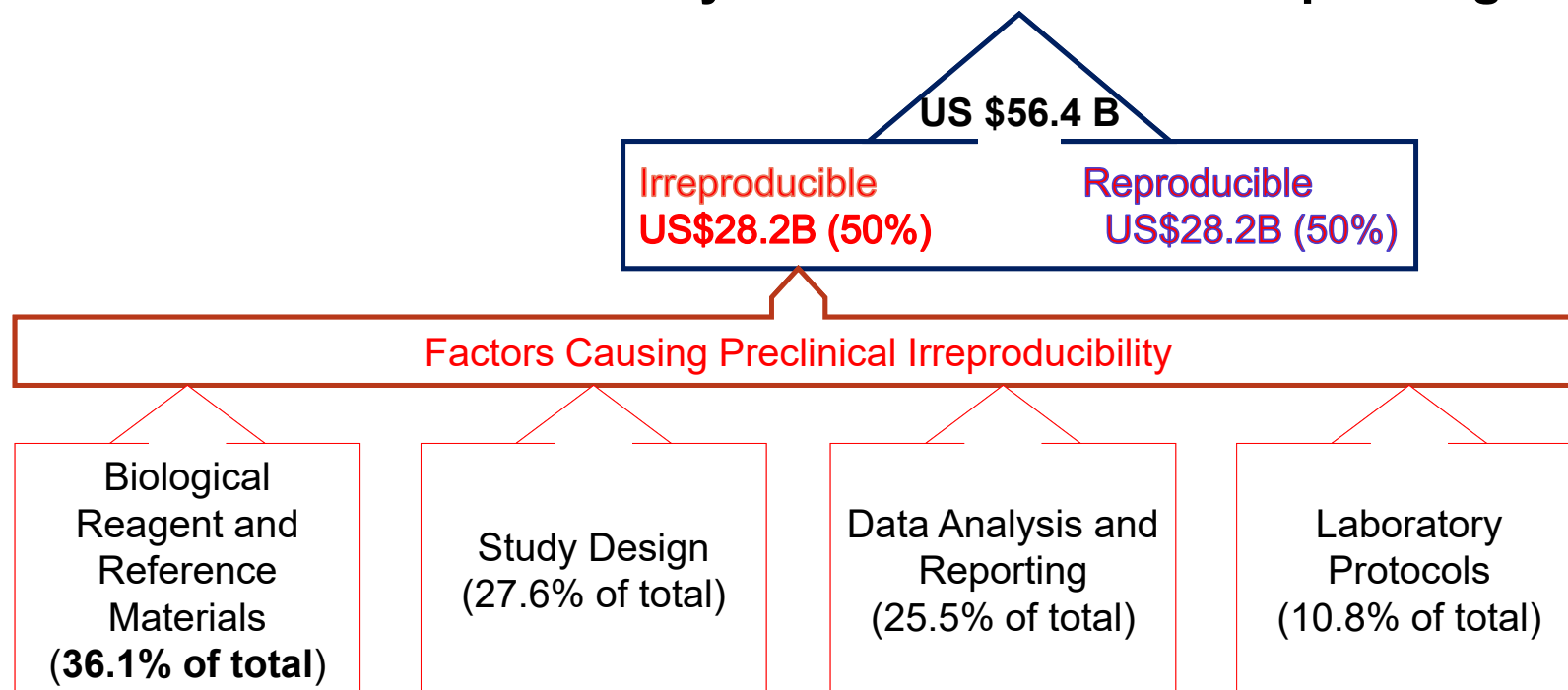




# Irreproducibility in Research

# Irreproducibility in research

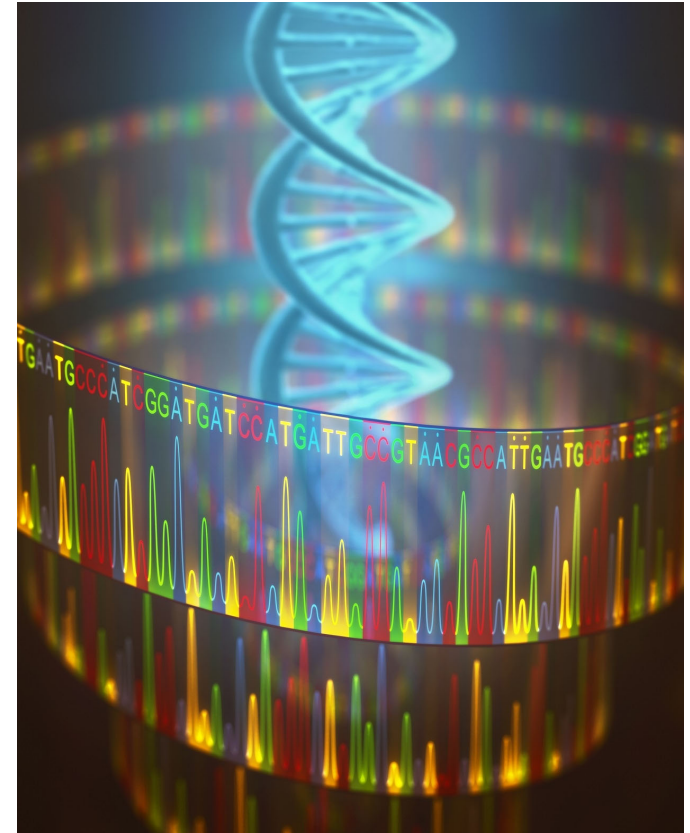
## US Yearly Preclinical Research Spending



Adopted from Freedman et al., PLOS Biology | DOI:10.1371/journal.pbio.1002165 June 9, 2015

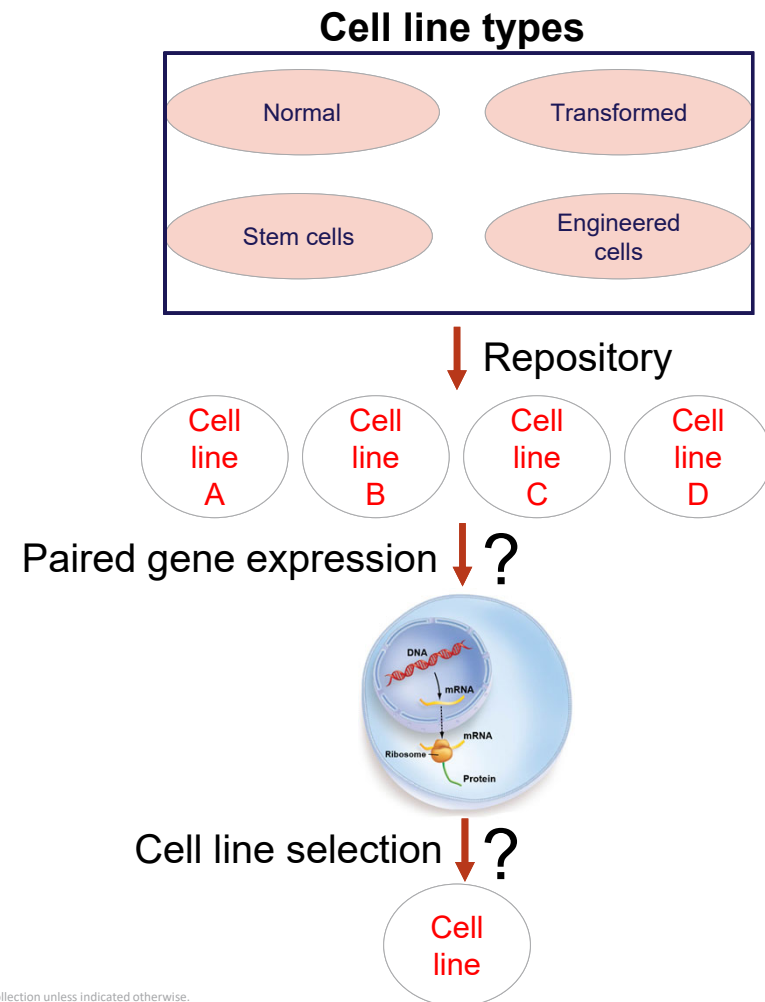
# Accumulation of uncontrolled public data

- It is projected that genomics research will generate ~ 40 exabytes of data by 2025
- Genomes submitted by a variety of labs
- Relatively little curation
- Highly variable quality
- *Public data **NEVER** authenticated by ATCC*



# Common challenges in biopharma R&D

- Finding the right cell line for the research is difficult
- Many cell types are not good model for the disease of interest
- Pre-existing data is often not reproducible
- Search, analyze and incorporate multi-omics data into cell line selection
- Cell lines associated OMICS data never produced/deposited from the repository



# Solution of research irreproducibility

## ATCC Physical Repository

- 3000+ authenticated mammalian cell lines
- Cell culture
- RNAseq. data



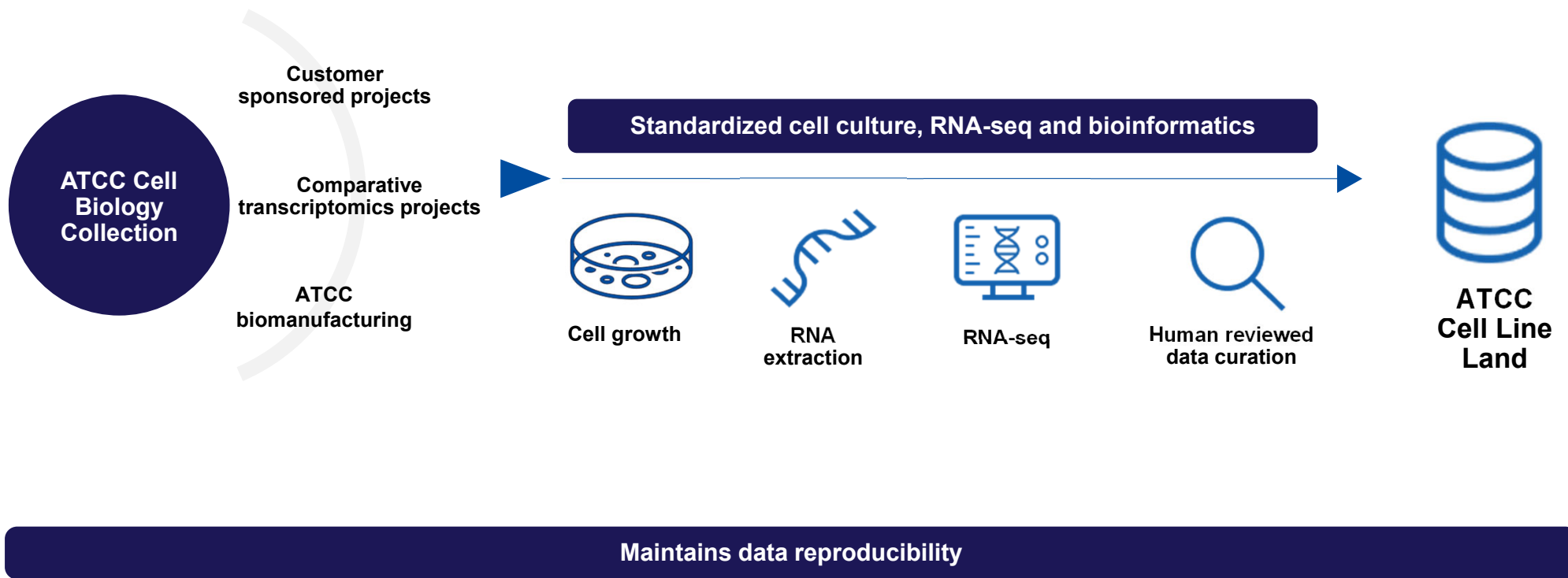
## ATCC Cell Line Land Qiagen Digital Insight

- High quality reference database from a trusted source
- Authenticated
- Traceable
- Reproducible
- Standardized
- Complete data provenance
- Bioinformatics solution
- Expanding content





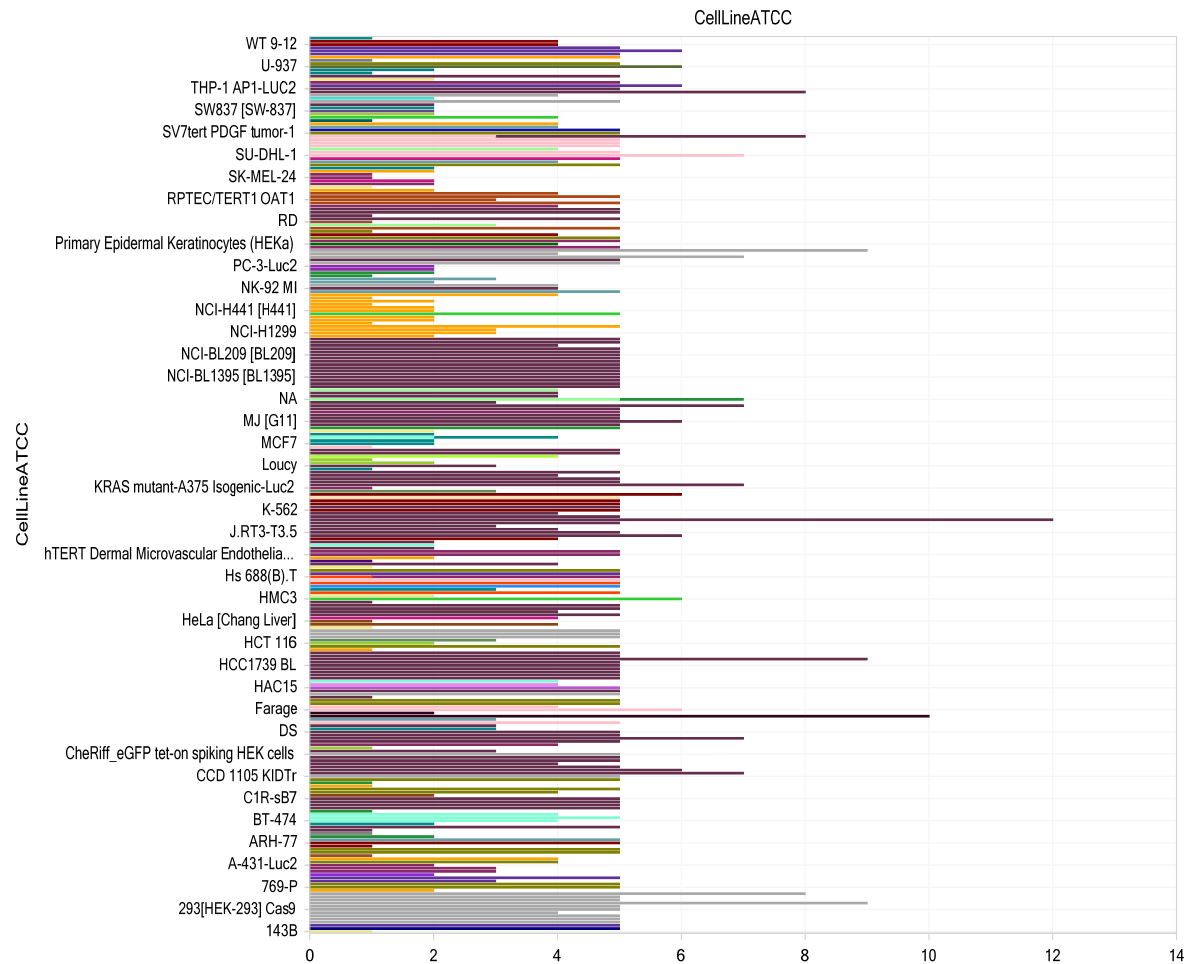
# Data harmonization uses strict QA criteria at each step





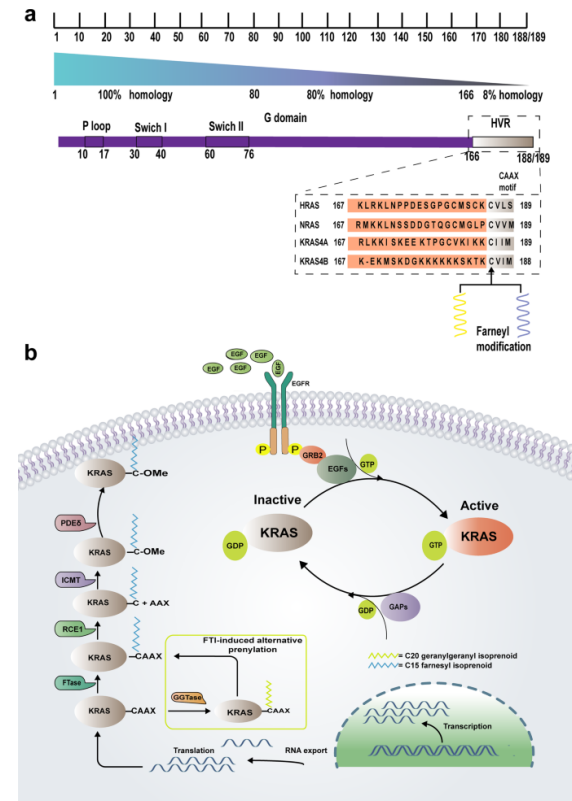
# Solving the Most Common Challenges: Use Case Examples

# Cell lines RNAseq data at the ATCC Cell Line Land



# Comprehensive Exploration of Basal Gene Expression

- KRAS (Kirsten rat sarcoma virus) is a gene that encodes the K-Ras protein, operating within the RAS/MAPK pathway.
- KRAS facilitates signals from the cell's outside to its nucleus, guiding either growth and division (proliferation) or specialized function and maturation (differentiation).
- KRAS functions as a molecular switch, using protein dynamics. When activated, it recruits and activates proteins needed for transmission growth signals, like c-Raf and PI 3-kinase.
- **Clinical significance when mutated**
- KRAS is the most well-known oncogene, exhibits the highest mutation rate across all cancers.
- KRAS is linked to several highly lethal cancers, including pancreatic ductal adenocarcinoma (PDAC), non-small-cell lung cancer (NSCLC), and colorectal cancer (CRC).



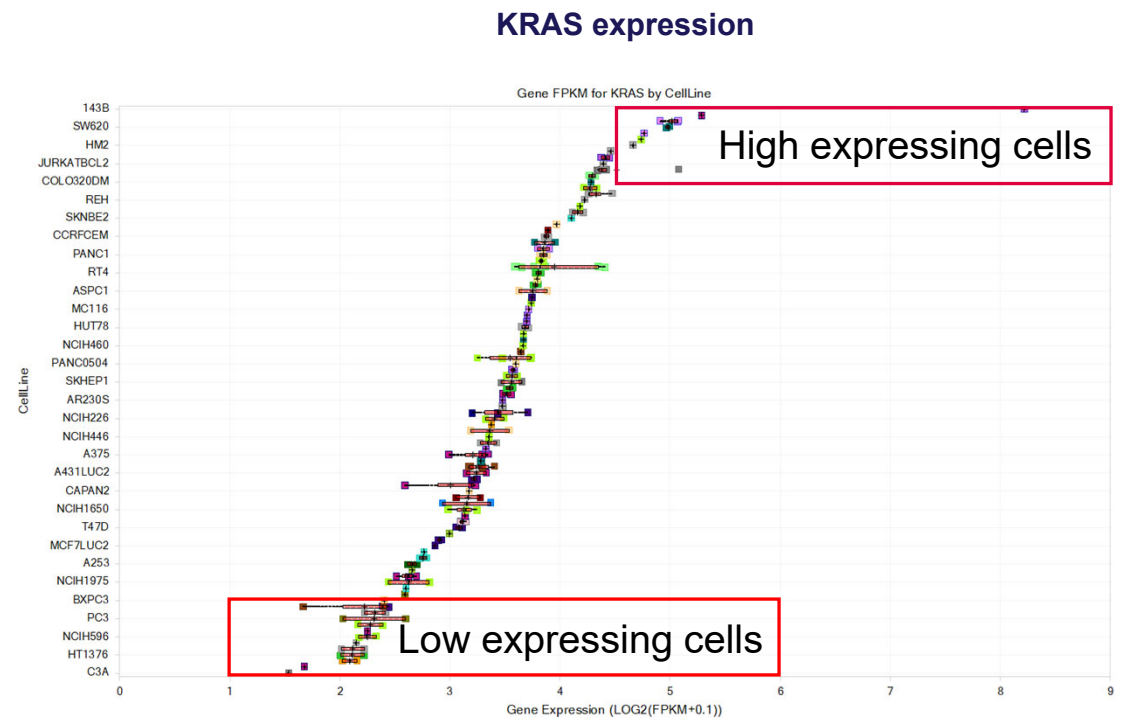
Huang et al., Signal Transduct Target Ther, 2021 Nov 15;6(1):386.

# Identify cell lines based on gene expression level

The need: Cell lines with high or low expression of the gene of interest to use as controls with primary cell lines

## Steps:

- 1 ATCC Land
- 2 Search for KRAS
- 3 Highlight samples with high or low expression from the interactive plot
- 4 Export summary table with expression values and links to product pages

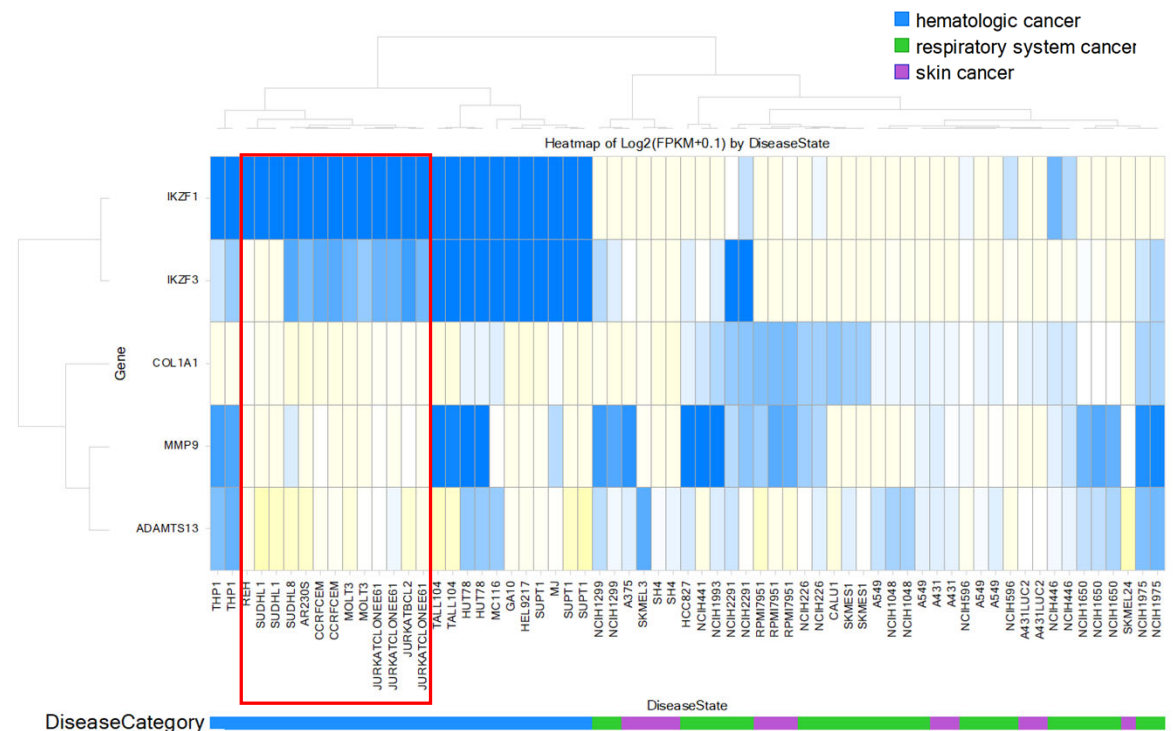


# Find new cell lines based on gene expression correlation

The need: Cell lines that have high expression of two genes but not three other genes

## Steps:

- 1 ATCC Land
- 2 Type multiple genes and search
- 3 Highlight samples with desired expression profile
- 4 Export summary table with expression values and links to product pages

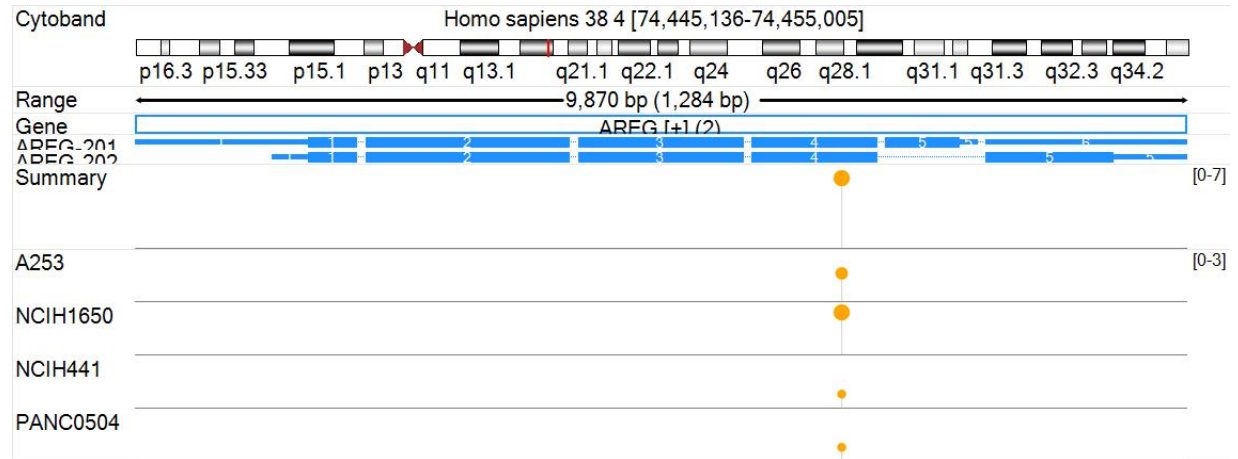


# Identify cell lines with a specific coding mutation

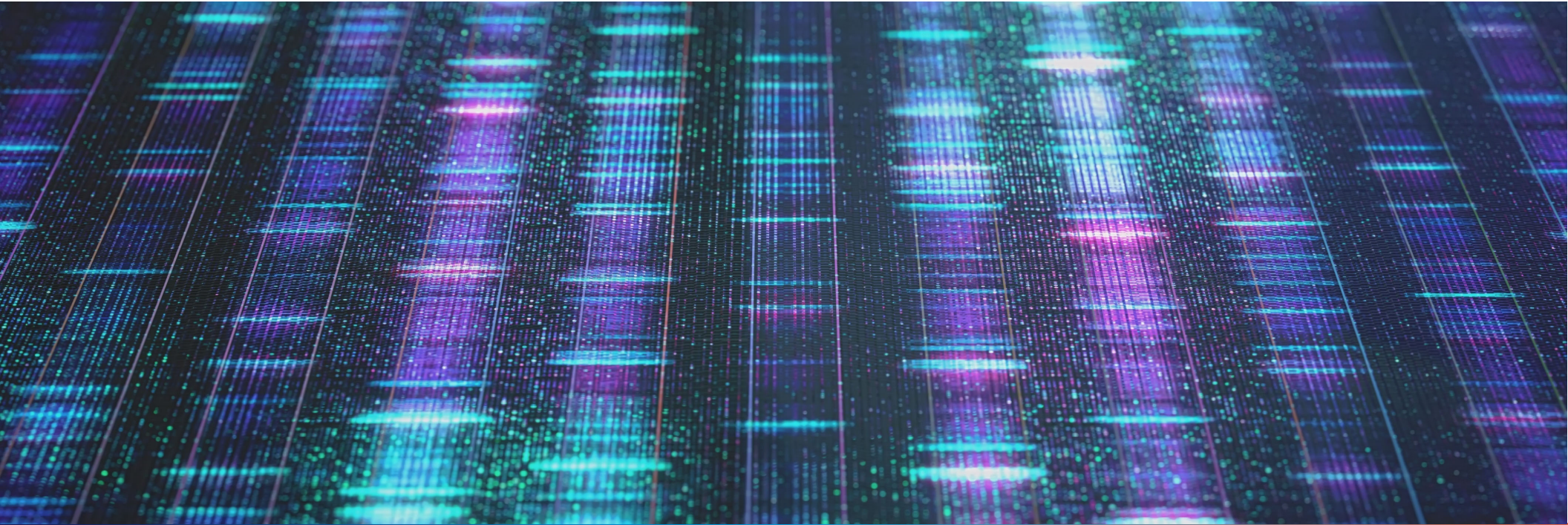
The need: Cell lines that express a specific substitution gene mutation

## Steps:

- 1 ATCC Land
- 2 Search for AREG
- 3 Switch view to RNA-Seq Mutation
- 4 Filter to desired mutation
- 5 Export summary table with expression values and links to product pages



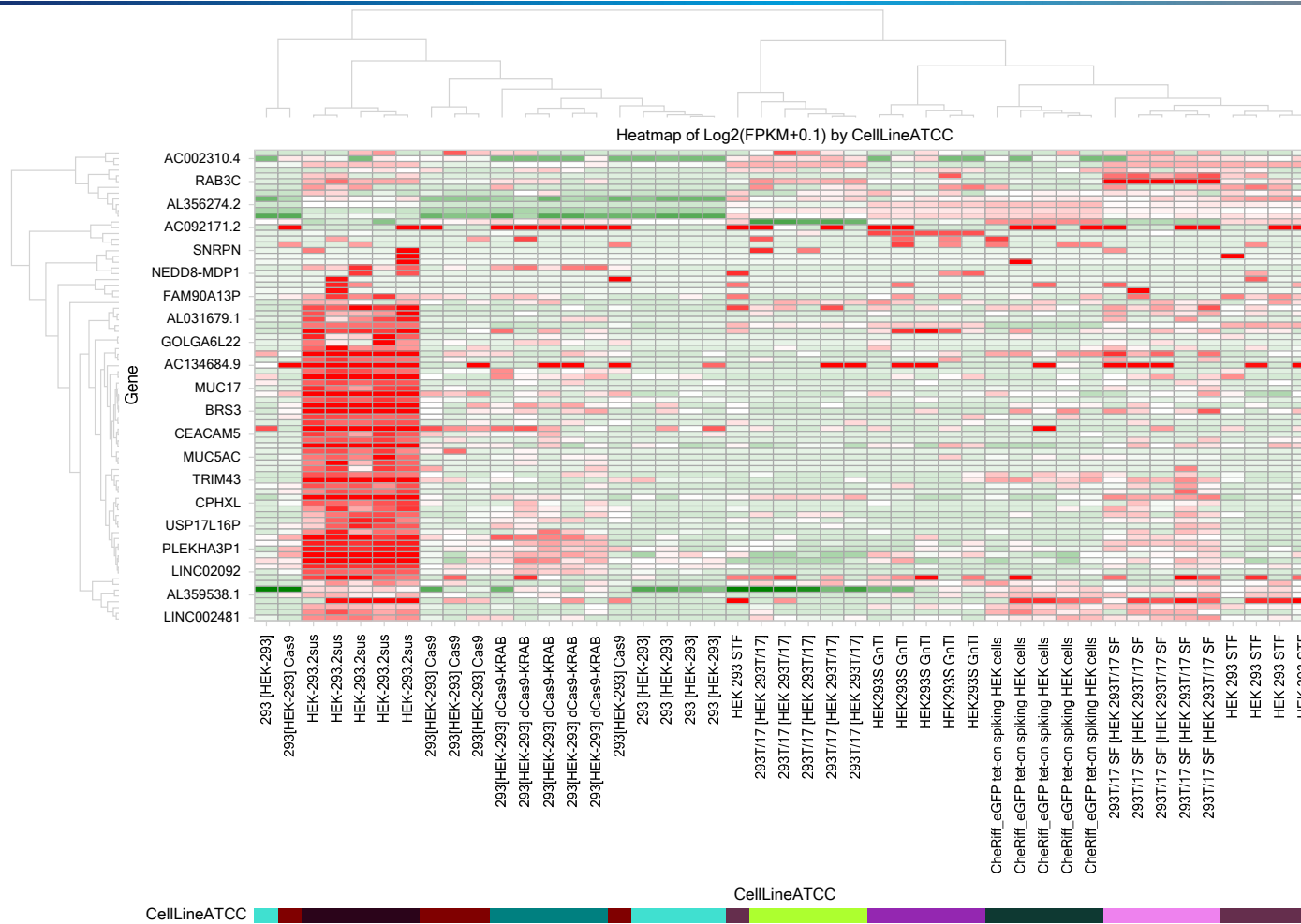
Alternative allele frequency in the general population of 0.00519



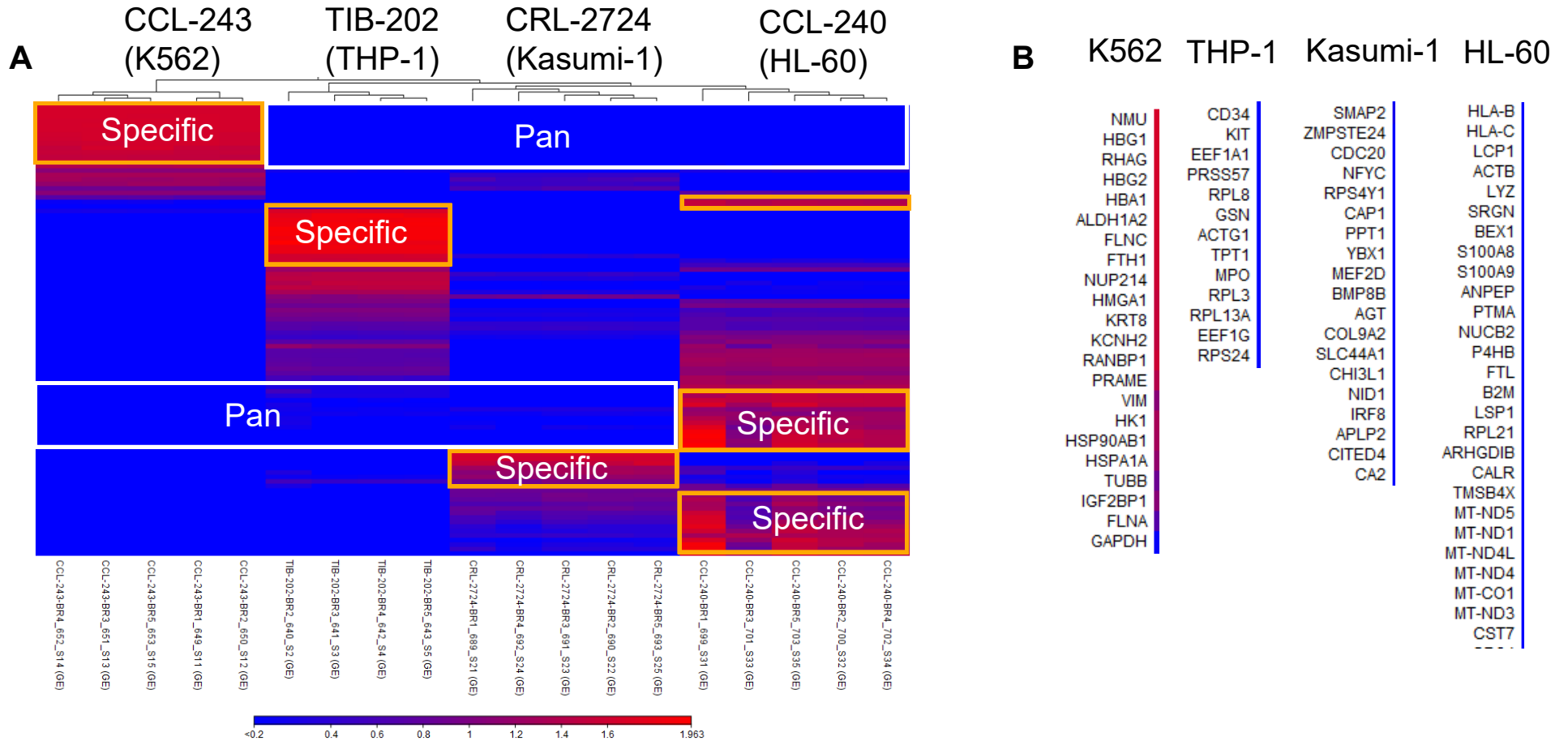
# Discovery & Innovation



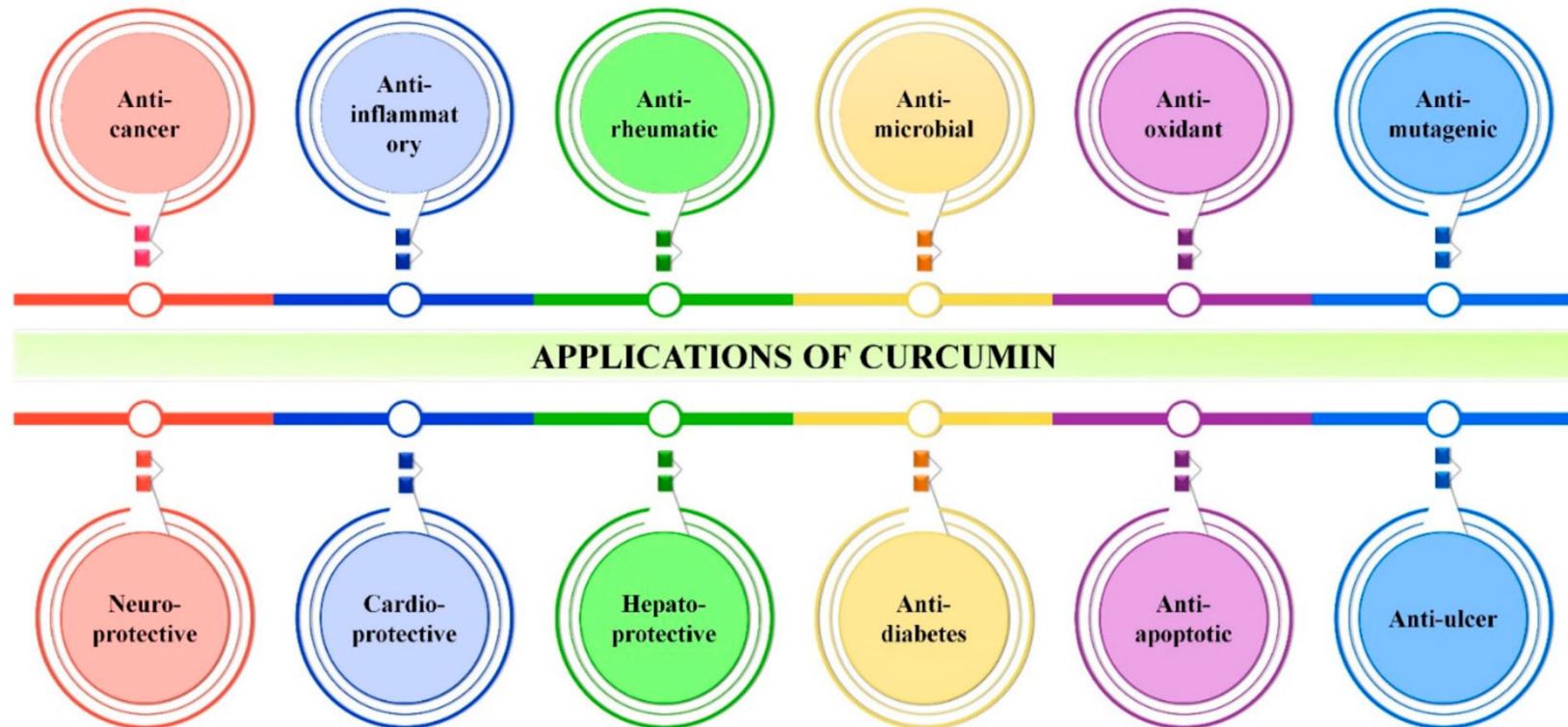
# Comparative gene expression across HEK cell lines



# Basal expression patterns of genes in leukemia cell Lines

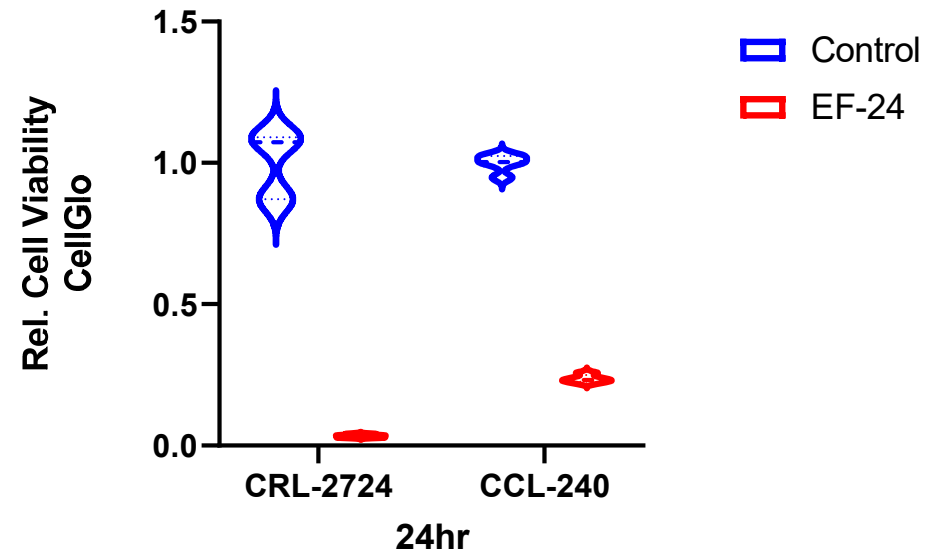
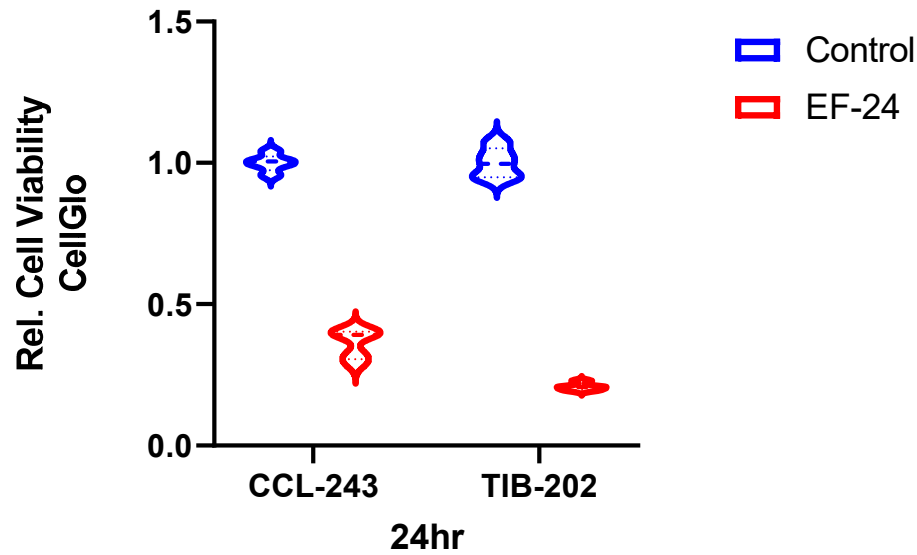


# Biomedical applications of curcumin

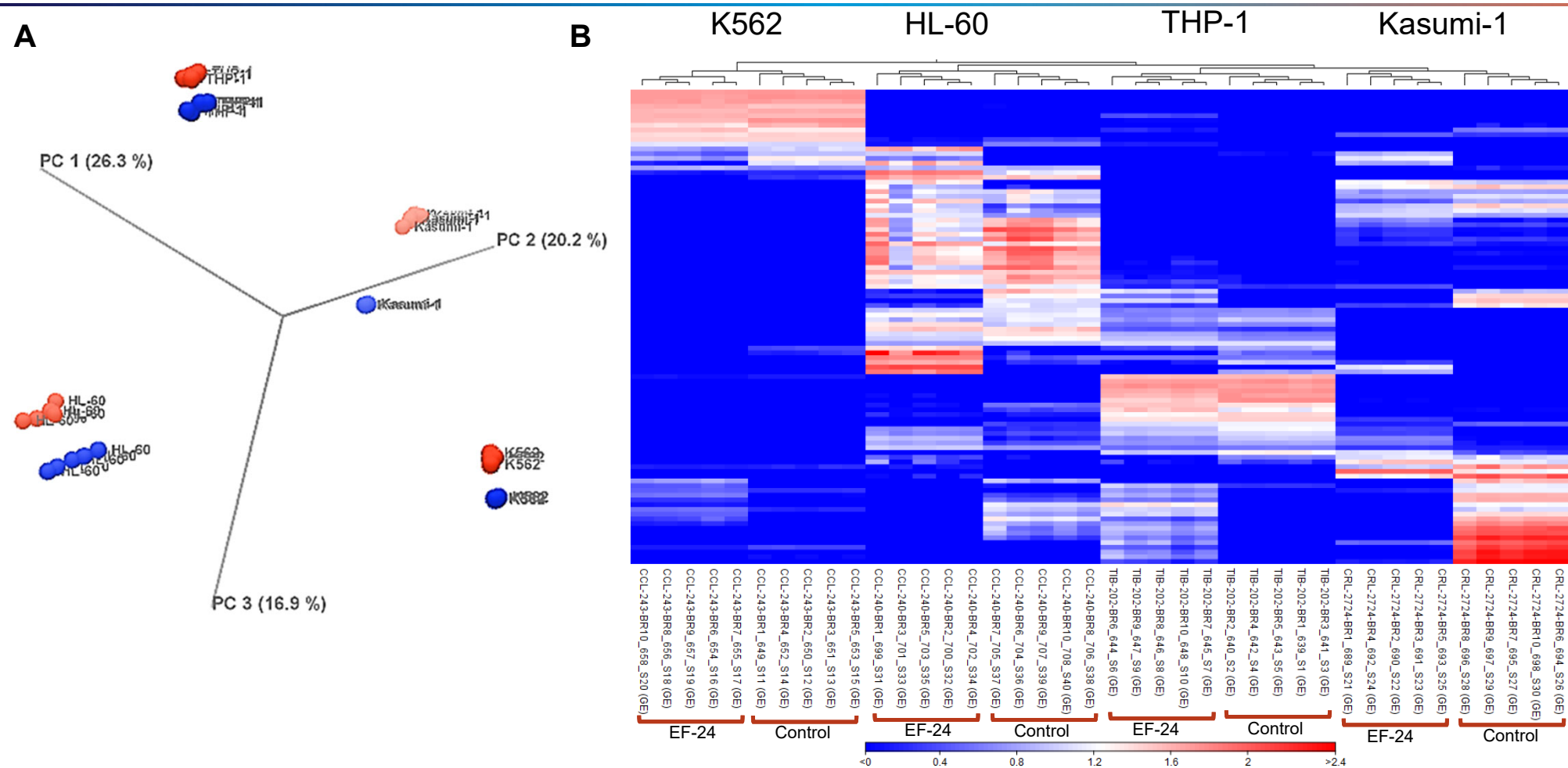


Adopted from Sohn et. Al., *Pharmaceutics* **2021**, 13, 2102.

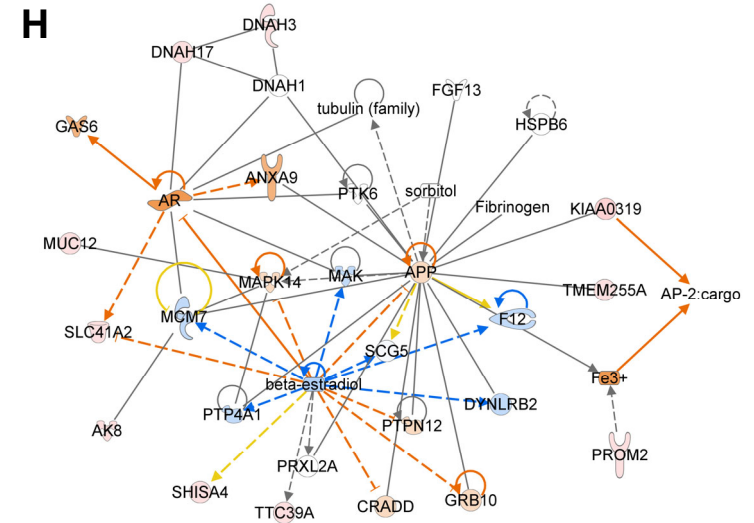
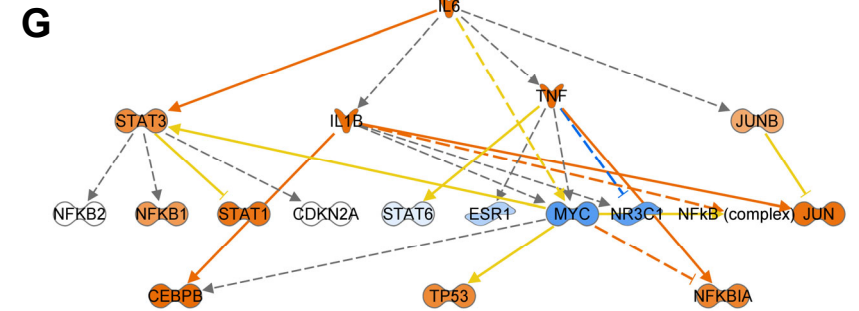
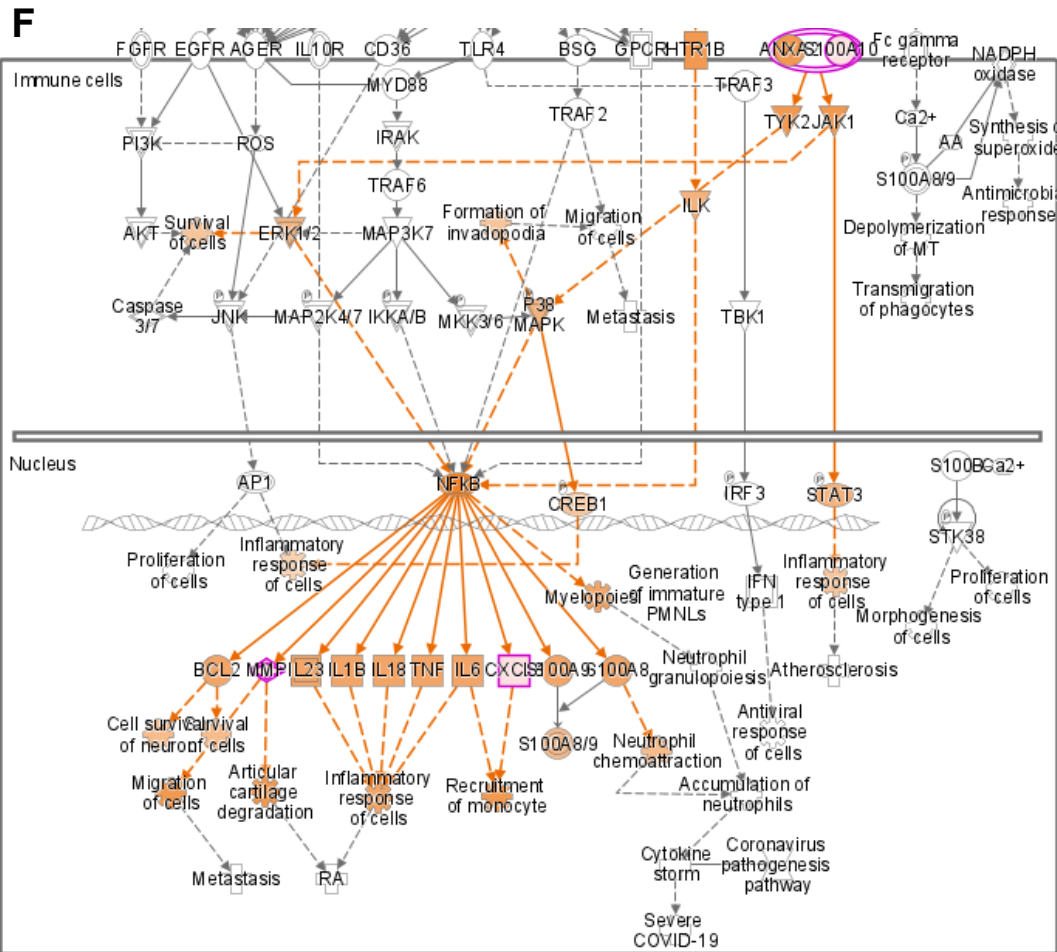
# EF-24 exhibits cell killing activity in leukemia cell lines



# Functional & genomic discovery of EF-24 targets

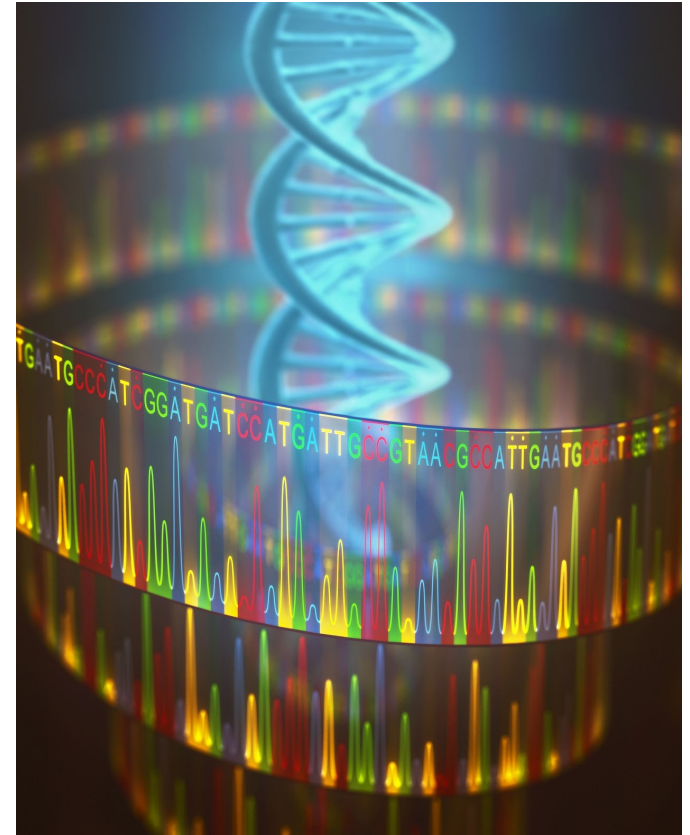


# Shared pathway activated in EF-24 treated cells

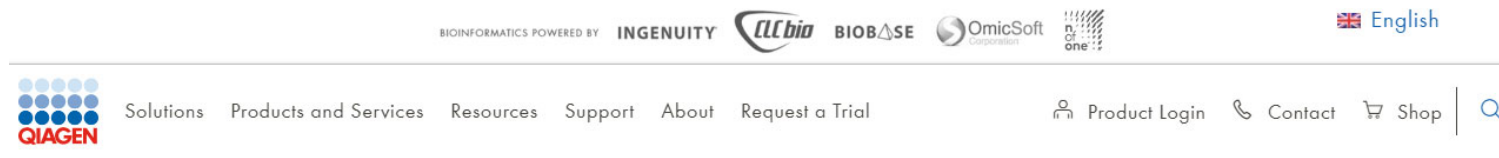


# Summary

- In summary, the ATCC Cell Line Land serves as a comprehensive OMICS data resource, featuring meticulously curated, verified cell lines that can be traced back to ATCC's biorepository.
- The synergy of bundling data with authenticated cell lines not only saves valuable time and resources in cell line characterization but also fosters expediting hypothesis-free discoveries and enhances experimental design.
- Specifically tailored to address challenges in selecting cell lines for biopharma R&D, ATCC Cell Line Land stands out as a continuously expanding repository, incorporating over 1,000 datasets annually through quarterly releases.
- The data generation follows a rigorous and standardized ISO 9001:2015 compliant workflow, ensuring both reliability and scientific reproducibility."



# Learn more: Qiagen Digital Insights/ATCC Cell Line Land



<http://digitalinsights.qiagen.com/atcc-cell-line-land>

## ATCC Cell Line Land

**Manually curated cell line 'omics data from the most popular cell lines in ATCC's collection**

ATCC Cell Line Land is a continually growing database of cell line 'omics data from both common and novel human and mouse cell lines and primary tissues and cells from ATCC. It empowers you to precisely plan and design your preclinical experiments by speeding up cell line characterization with unique, high-quality cell line 'omics data from a trusted source.

[REQUEST A CONSULTATION](#)



# Upcoming events

## **SOT 63rd Annual Meeting and ToxExpo 2024**

- Salt Palace Convention Center, Salt Lake City, Utah
- March 11, 2024 - March 13, 2024, **booth #401**

## **AACR Annual Meeting 2024**

- San Diego Convention Center, San Diego, California
- April 05, 2024 - April 10, 2024, **booth #1413**

