Predicting adverse effects of compounds based on high content imaging of cells

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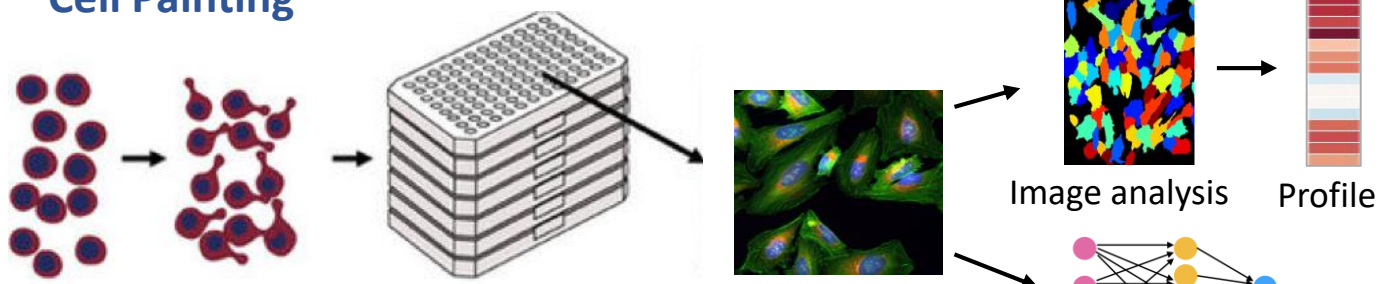
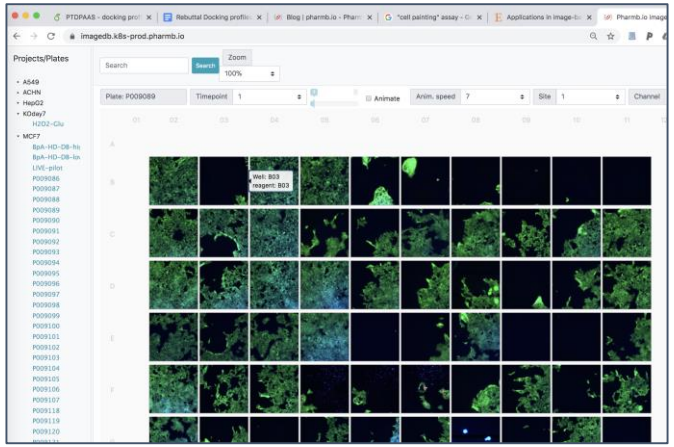
Research group website: www.pharmb.io

Cell Painting



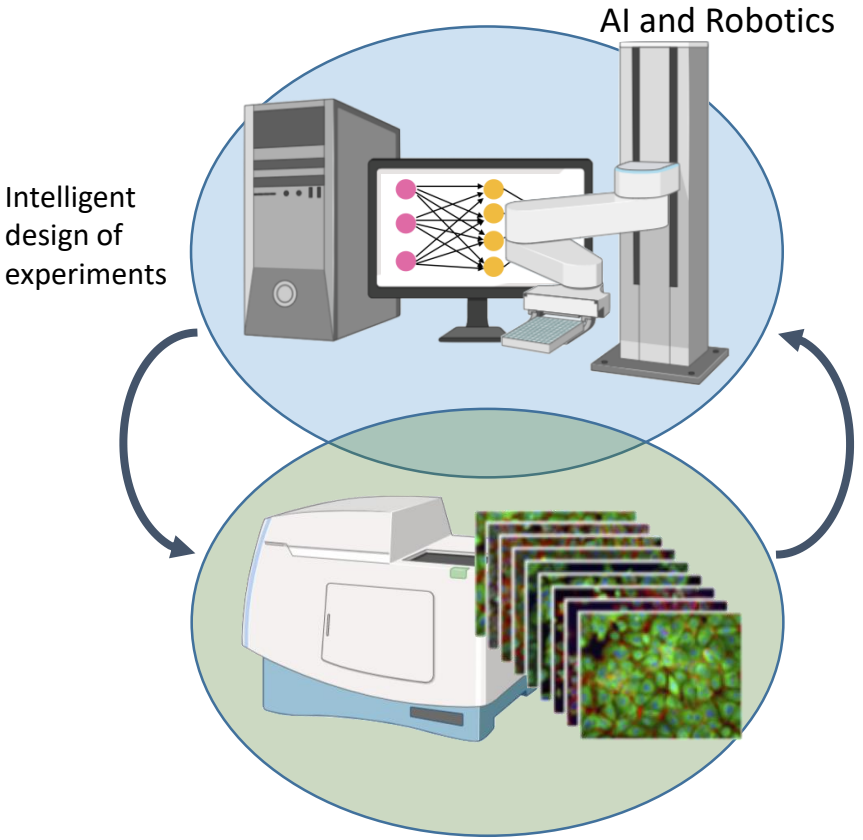
Bray et al. Nat Protoc 2016

Open Source Lab Automation



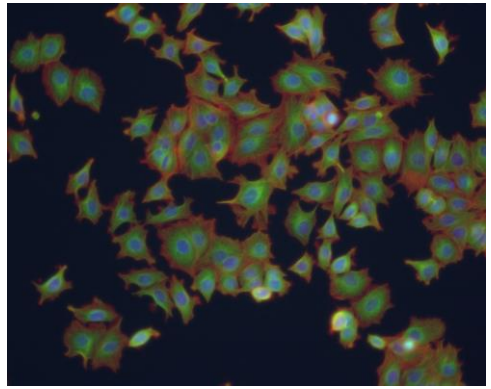
https://github.com/pharmbio/aros

Goal: Autonomous Phenomics

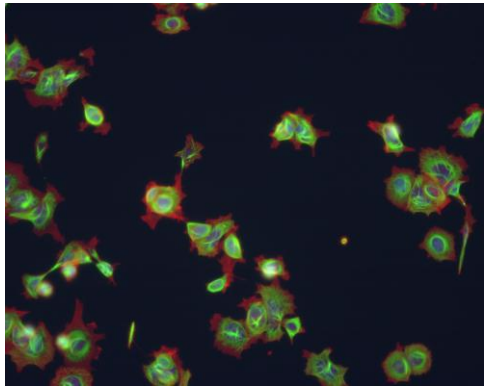


Example applications

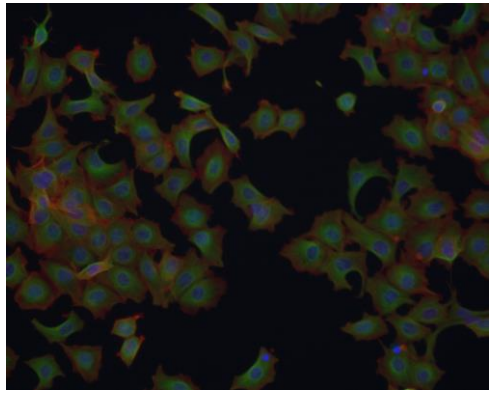
Cell painting combined with AI modeling for predicting MoA (Kensert et al. 2019)[1]



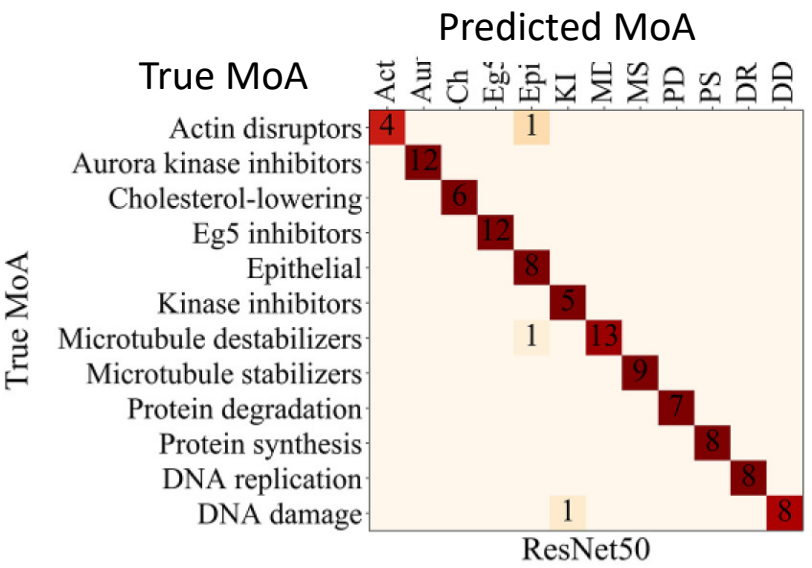
Protein degradation



Microtubule stabilizer

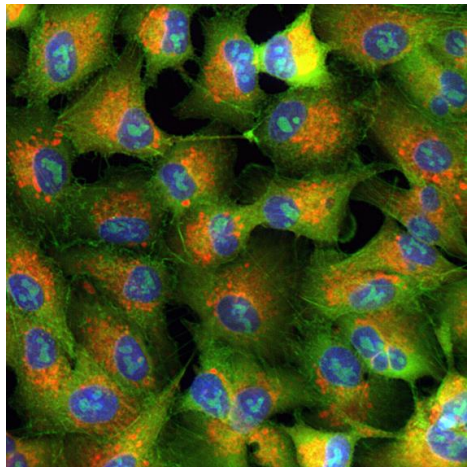


DNA replication

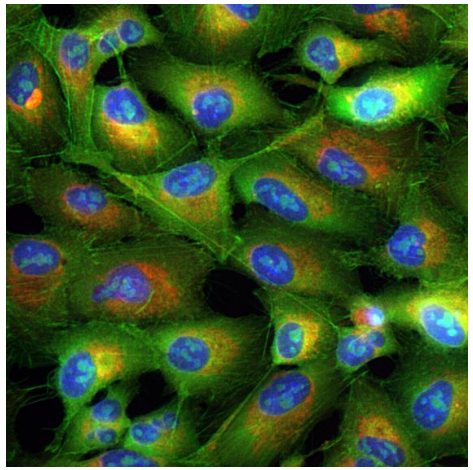


[1] Kensert A, Harrison PJ, Spjuth O. SLAS DISCOVERY: Advancing Life Sciences R&D. 24, 4 (2019)

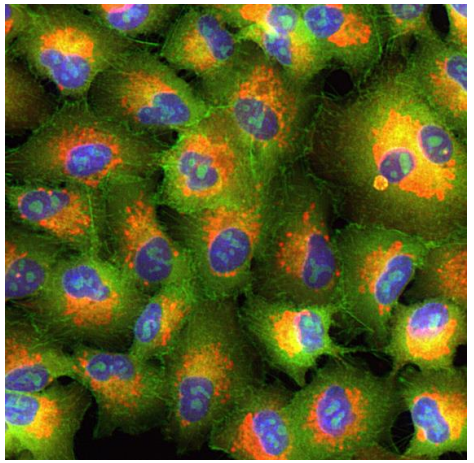
Cell painting profiling of combinations of toxicants (Aggarwal et al., unpublished data)



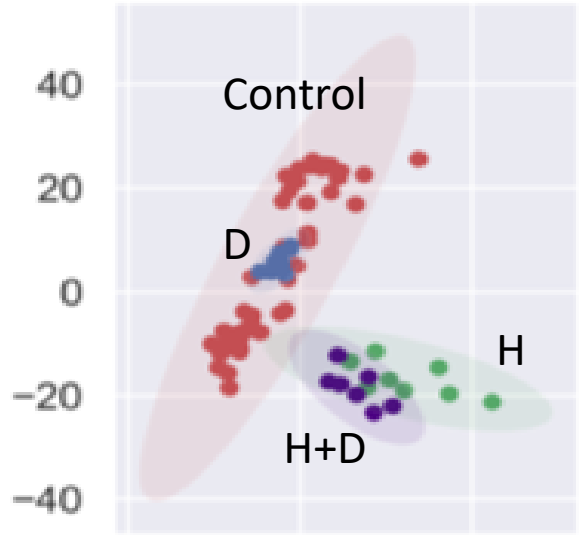
Hexabromocyclododecane (H)



Dibutyltin dilaurate (D)



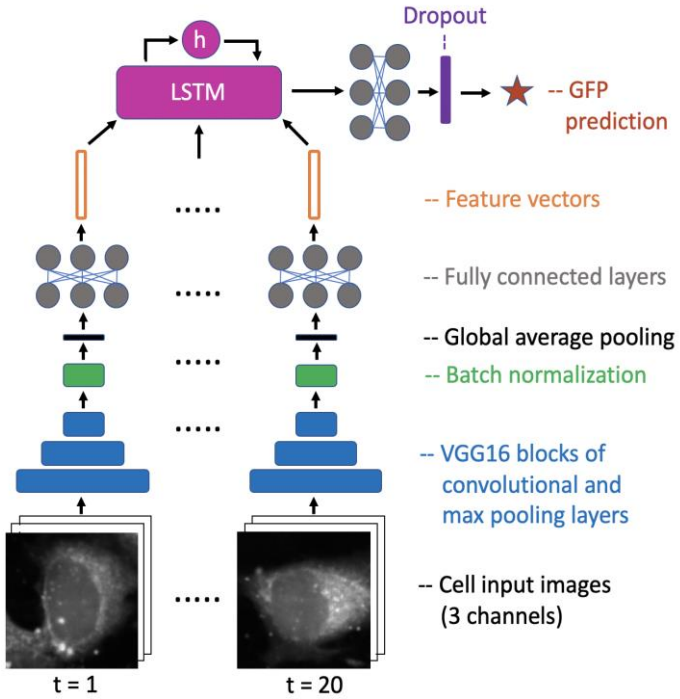
H + D

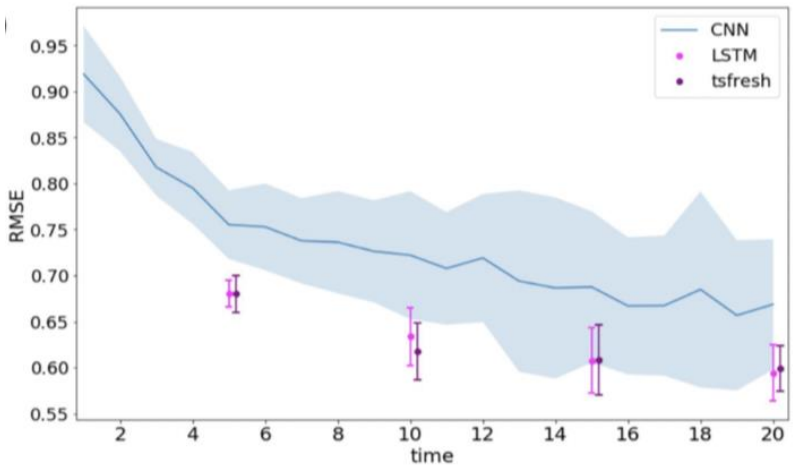


PCA score plot

AI methods development

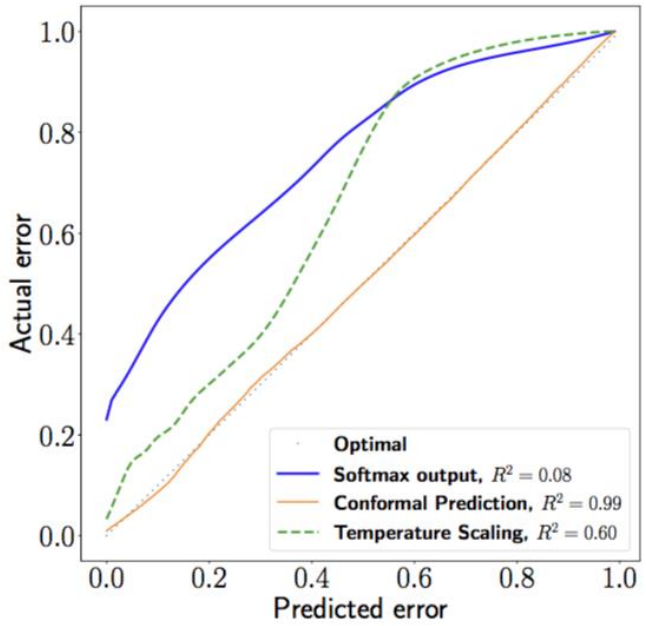
Deep learning models for time-lapse microscopy image data





Harrison P, Wieslander H, Sabirsh A, Karlsson J, Malmsjö V, Hellander A, Wählby C, Spjuth O.
bioRxiv. 2020.04.06.027672 (2020).
DOI: 10.1101/2020.04.06.027672

Conformal Prediction for valid estimates of confidence in predictions



Wieslander H., Harrison P, Skogberg G, Jackson S, Fridén M, Karlsson J, Spjuth O, and Wählby C. "Deep learning with conformal prediction for hierarchical analysis of large-scale whole-slide tissue images." *IEEE Journal of Biomedical and Health Informatics*. Early access (2020).
DOI: 10.1109/JBHI.2020.2996300