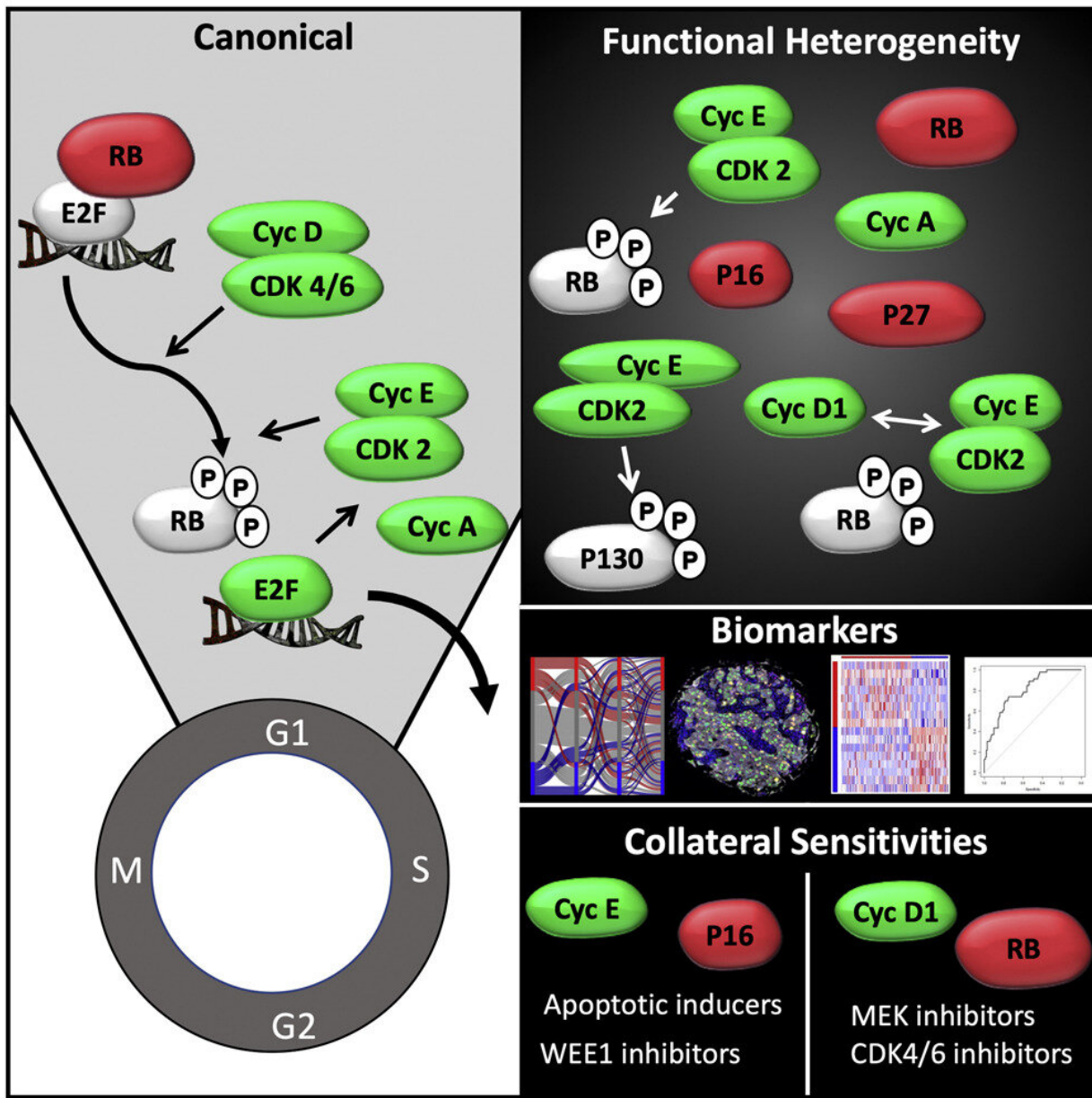


Targeting the cell cycle could overcome cancer treatment resistance

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Graphical abstract. Credit: *Cell Reports* (2022). DOI: 10.1016/j.celrep.2022.110448

Scientists from Roswell Park Comprehensive Cancer Center have shed light on a different way of overcoming mechanisms of resistance to specific therapeutic agents used to treat cancer. In a new article published March 1 in the journal *Cell Reports*, the researchers propose a new approach to cancer treatment based on the way different cancer cells divide.

A collaborative team led by Agnieszka Witkiewicz, MD, Professor of Oncology, and Erik Knudsen, Ph.D., Professor of Oncology and Chair of Molecular and Cellular Biology, from Roswell Park investigated over 500 [cell lines](#) from a multitude of cancer types, as well as preclinical tumor models. The researchers then analyzed [cancer cells](#) based on their dependency for CDK and CCN, two genes that drive the cell cycle and determine how often a cancer cell divides.

"We found that the way cancer cells divide is highly varied, and that diversity represents a tremendous challenge for some widely used cancer therapies because it often contributes to treatment resistance," says Dr. Witkiewicz, the study's senior author. "However, with a better understanding of these heterogenous features of cancer cell division, different therapies could be deployed in a more precise and effective fashion."

Using advanced biochemical analyses and genetic sequencing, the team uncovered vast differences in the requirement for CDK and CCN among cell lines and [cell types](#), highlighting the complex and heterogenous nature of cell cycles. The researchers also identified specific genetic and pharmaceutical vulnerabilities for each method of cell division, opening

the door to more precise types of therapeutic interventions to overcome treatment resistance.

"Targeting the [cell cycle](#) as a means to treat cancer is appealing, since uncontrolled cell growth is the basis of almost all cancers," adds Dr. Witkiewicz. "Cancer cells have developed mechanisms of resistance to some of our most widely used cancer treatments, but with advances in the detection of biomarkers associated with that resistance, we believe we can design targeted and more precise therapeutic interventions that overcome treatment resistance."

More information: Erik S. Knudsen et al, CDK/cyclin dependencies define extreme cancer cell-cycle heterogeneity and collateral vulnerabilities, *Cell Reports* (2022). [DOI: 10.1016/j.celrep.2022.110448](https://doi.org/10.1016/j.celrep.2022.110448)

Provided by Roswell Park Cancer Institute

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