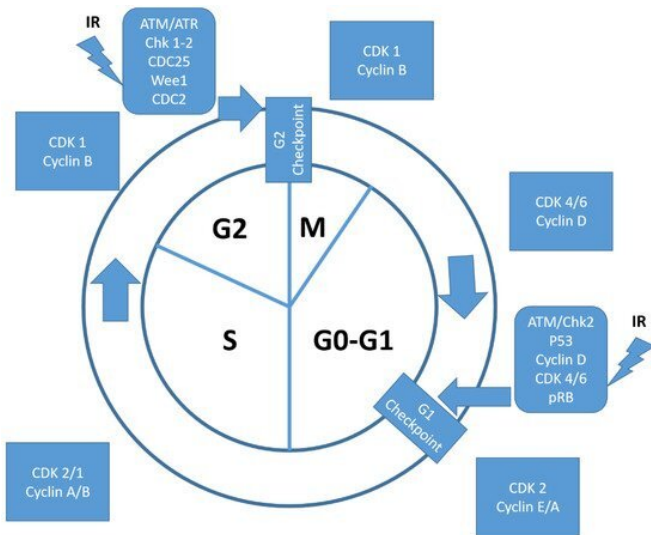


Radiotherapy-induced autophagy may enhance modulation of cell cycle

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Credit: Sbarro Health Research Organization

Building on prior success combining Cyclin-Dependent Kinase (CDK) inhibitors with hormone therapy to treat breast cancer, researchers are now exploring the potential integration of CDK inhibitors with radiotherapy in a paper issued in the *International Journal of Molecular Sciences*. The paper was authored by an international team led by the Sbarro Health Research Organization (SHRO), Temple University, and the University of Siena, Italy, with Prof. Antonio Giordano, M.D., Ph.D., and Prof. Luigi Pirtoli, M.D.

The [molecular mechanisms](#) underlying this combination of anticancer agents is related to autophagy in some cases, say the authors. Autophagy is a cellular process which can enable [cell survival](#), as well as [cell death](#) in particular situations, like in those cancers in which other cell-death mechanisms are ineffective. Targeting CDK regulation, that is, Cyclins, has proven efficacious in previous studies.

Giordano has a long history of research on CDK regulation as a therapeutic target for cancer.

"My early research focused on the role of cell cycle proteins," says Giordano, Founder and Director of SHRO, "including the identification of cellular factor p60, later dubbed cyclin A in subsequent research."

"These advances laid the foundation by demonstrating, as far back as 1989, of a physical link between the cell cycle and cancer," explains Giordano, "opening the door to an area of precision medicine that has reaped many benefits."

Further research by Giordano led to identification of the tumor suppressor gene RB2/p130, Cyclin Dependent Kinases (CDKs) CDK9 and CDK10, and Novel Structure Proteins (NSPs), a newly characterized family of structural proteins which may be involved in the cell cycle.

For this latest paper, the relevant CDKs 4 and 6 are presently the [therapeutic target](#) of drugs effective in hormone-sensitive breast cancers, through a cell-cycle blockade, but their effect is absent or transient in some patients, creating a need for integrative therapeutic options. Previous research has shown that radiotherapy can enhance therapeutic response in high-grade brain gliomas by targeting CDK regulation, through the autophagic degradation of Cyclin D1. Therefore, the authors intend to pursue this line of investigation for innovative therapeutic approaches against other cancers.

More information: Valerio Nardone et al, CDK4, CDK6/cyclin-D1 Complex Inhibition and Radiotherapy for Cancer Control: A Role for Autophagy, *International Journal of Molecular Sciences* (2021). [DOI: 10.3390/ijms22168391](https://doi.org/10.3390/ijms22168391)

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