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Single stranded-DNA detection: the role of Wip1 in ATR-dependent pathway

Single-stranded DNA (ssDNA) areas arise in cells as a result of exposure to stress agents like UVC or during repair of DNA double-strand breaks. ATR (ataxia telangiectasia mutated and Rad3-related) is responsible for detecting ssDNA. Recently, it has been shown that one of the most important components of cellular response to the damage is Wip1 phosphatase, which inactivates main elements of DNA damage response (DDR) pathways. We developed a mathematical model of ATR detector system, connected to p53 tumor suppressor responsible for activation of genes involved in the cellular response to the damage (DNA repair/apoptosis). Moreover, we added Wip1 phosphatase, as the main agent responsible for turning off DDR. Our results show that with an accurate dose of UVC and silenced or blocked Wip1, it may be possible to drive cancer cells to apoptotic pathway.

References

- [1] M. Kurpas, K. Jonak, K. Puszyński, *Single stranded-DNA detection: the role of Wip1 in ATR-dependent pathway*, *Mathematica Applicanda* 46(1) (2018), 117–126, doi=10.14708/ma.v46i1.6375.