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The circadian clock as a potential biomarker and therapeutic target in pancreatic cancer

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Abstract

Pancreatic cancer (PC) has a very high mortality rate globally. Despite ongoing efforts, its prognosis has not improved significantly over the last two decades. Thus, further approaches for optimizing treatment are required. Various biological processes oscillate in a circadian rhythm and are regulated by an endogenous clock. The machinery controlling the circadian cycle is tightly coupled with the cell cycle and can interact with tumor suppressor genes/oncogenes; and can therefore potentially influence cancer progression. Understanding the detailed interactions may lead

to the discovery of prognostic and diagnostic biomarkers and new potential targets for treatment. Here, we explain how the circadian system relates to the cell cycle, cancer, and tumor suppressor genes/oncogenes. Furthermore, we propose that circadian clock genes may be potential biomarkers for some cancers and review the current advances in the treatment of PC by targeting the circadian clock. Despite efforts to diagnose pancreatic cancer early, it still remains a cancer with poor prognosis and high mortality rates. While studies have shown the role of molecular clock disruption in tumor initiation, development, and therapy resistance, the role of circadian genes in pancreatic cancer pathogenesis is not yet fully understood and further studies are required to better understand the potential of circadian genes as biomarkers and therapeutic targets.

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Data availability

Not applicable.

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Contributions

GP, AMA, MA, and RP performed the data collection. The draft was prepared by GP, DK, HG, HF, and MN. The study was designed and supervised by GP, SMH, GAF, MK, and AA. All authors read and approved the final manuscript.

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Ethics declarations

Competing interests

The authors declare that they have no competing interests.

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Not applicable.

Consent to participate

Not applicable.

Consent for publication

Not applicable.

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