



Implications for Chronobiology of Cancers

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DESCRIPTION

Chronobiology proves that the organism's adaptation to seasonal environmental variations is related to the temporal genetic component. Therefore, asthma episodes are more frequent and more severe at night, with myocardial infarction occurring especially in the evening or morning, with gastric ulcer exacerbated in the spring and autumn etc.

Bioperiodic activity is rhythmic: daily or circadian periodic; Cycles of second fractions up to several hours or ultradian cycles; Rhythms that last for several days or up to infradian rhythms; Approximately monthly or circular cycles; Annual or circular, seasonal periodicity etc. Each organism is controlled by several biological clocks called oscillators that are interconnected and periodically connected to each other. Biological clocks are regulated by synchronizers that control the seasonal variations of the environment (night fall, dawn rise, socioeconomic life requirements, etc.).

The chronobiology of cancer, depending on its appearance and development, is presented in successive stages: initiation, promotion, progression and malignant transformation. Chronobiology of the mechanisms of cancer origin has theoretically developed and, at the therapeutic level, chronotherapy has been developed. Pre-cancer cell proliferation has a high probability of appearing nuclear lesions, which activate oncogenes or inactivate anticogen and, as a result, induce mechanisms of malignant transformation. Epidemiological research has demonstrated a high potential for hepatic cancer against the background of pathological conditions (cirrhosis, viral or toxic hepatitis), including chronic reproductive enlargement. In a disynchronized liver, cells have a high probability of accumulating an increasing number of chromosome violations.

Each cancer type shows variations in circadian cell division. Therefore, one drug has a higher efficacy if administered at one specific time and another drug at another time. Research has focused on the chronoptimization of therapies related to the tolerance, chronotolerance, as well as drug efficacy, and chronoefficiency of the drugs given to the patient. Twice as many relapses of neoplasms were found experimentally in animals treated

according to chronotherapy principles compared to scientifically treated animals. Similar results were obtained in patients with neoplasms, where the survival of the subjects was twice as high as in those receiving classical treatment.

Determining the difficulty and chrono efficiency of the study involves a great variety of rhythms expressed in tumors. Therefore, the interest in developing appropriate techniques is to determine the rhythm that dictates the specific cell proliferation for each patient, each type of cancer. Optimization of tolerance leads to intensification of chemotherapy and, in the long run, to optimization of efficiency. The use of chronoprogrammable groups of patients is intended for continuous perfusion of anticancer drugs according to complex protocols, which apply on an outpatient basis. Chemotherapeutic doses can be significantly increased without an increase in side effects and with a significant reduction in them. By applying treatments according to the principles of chronoprogramming and chronotolerance, patients with neoplasms and metastases were found to be five times less toxic, with a significant increase in dosage and survival significantly higher. At the same time, surgical dissection of the remaining tumor residue after drug treatment was possible.

In most undeveloped cancers, when the disease maintains a good clinical indicator, the tumor rhythms are close to the patient's unaffected tissues. In cases of advanced neoplasms and poor clinical condition, the rhythm is completely disrupted. Furthermore, cell division rhythms at the tumor level vary from one patient to another. Consequently, individualization of therapies is required and re-synchronization of rhythms through drug therapy is also required. However, medications have the potential to alter patients' biorhythms and, as a result, the most tolerable hours and optimal efficacy. After demonstrating the presence of drug chronoefficiency, practical techniques for the treatment of neoplasms were launched.

Mills developed the release of anticancer substances under the action of ultraviolet rays from microspirulas injected into experimental animals with Ehrlich tumors. Ultrasounds are applied daily at 23:00 hours, which is the optimal time for chronotolerance to cisplatin in nocturnal animals. The results are encouraging. In humans, the polymeric matrices are guided by an artery.

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Received: 01-Jun-2022, Manuscript No. JCM-22-17281; **Editor assigned:** 03-Jun-2022, Pre QC No. JCM-22-1728 (PQ); **Reviewed:** 17-Jun-2022, QC No. JCM-22-17281; **Revised:** 27-Jun-2022, Manuscript No. JCM-22-1728 (R); **Published:** 4-Jul-2022, DOI: 10.35248/2157-2518.22.13.393

Citation: Wein H (2022) Implications for Chronobiology of Cancers. J Carcinog Mutagen. 13:393.

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