Biological Clocks

**Biological clocks that go haywire can cause human ailments. The same medicine can harm or help you, depending upon when it is taken in relation to your own clock time. Biological clocks play a significant part in some allergies and mental diseases. *(Clifford R. Hicks, in Catholic Digest)***

**A recent study of 30 cancer patients at the University of Minnesota shows that two powerful cancer-fighting drugs are less toxic if taken at certain times of day: Adriamycin does less harm to blood cells at 6 a.m., and cisplatin produces less nausea at 6 p.m. Also, in animal tests, each drug seems to be most effective at the hour when it is least toxic. The reason for the differences, says Minnesota’s Dr. William Hrushesky, is circadian rhythms – the changes that occur regularly during a 24-hour period in such body measurements as temperature, blood cell counts and cell division. Researchers suspect that since many cancer drugs attack dividing cells, the drugs might work best and with fewest side effects if given when cancer cells are actively reproducing and healthy cells are resting. At a recent meeting of the American Cancer Society, Hrushesky predicted that such biological clockwork will eventually be proved to influence the safety and effectiveness of all drugs, from penicillin to birth-control pills. *(Discover magazine, 1981)***

**“Your daily timing system,” explains Professor Brown, “behaves as if you have a built-in tape recorder, with a loop of tape that moves at a rate of about one circuit per day. Upon this tape certain functions are impressed, which recur with daily frequency until they are erased or substituted. When you cross several time zones, these complex daily patterns soon get out of synchronization. When you cross several times zones, these complex daily patterns soon get out of synchronization. It takes several days to shift them on the tape, one by one, to match the rhythm of your new environment. The patterns can be very precisely plotted: they really are highly accurate clocks. If I could study your kidney for a few days to determine its rhythm, I could use it as a clock, and tell the time within three or four minutes. *(Clifford R. Hicks, in Catholic Digest)***

**Certain diseases such as Cushing’s Syndrome and filariasis now can be readily diagnosed through distinctive patterns of biologic rhythms. Emotional illnesses such a schizophrenia and manic depression may also be related to the speeding up or slowing down of certain internal rhythms. *(Clifford R. Hicks, in Catholic Digest)***

**Even more promising are experiments in the timing of drugs and medicine at the University of Minnesota, the Chicago Medical School, and the University of Oklahoma. “We are now asking,” says Dr. Halberg, “not only what amount of a certain drug should be used, but at what time the drug should be administered in relation to the patient’s system, since the effect of a drug may vary drastically with the time it is administered. Work with animals indicates that timing frequently can tip the scales between life or death when a heavy dose of ce3rtain drugs is used.” *(Clifford R. Hicks, in Catholic Digest)***

**Dr. Alain Reinberg of Paris has found that human beings do undergo hours of changing resistance to the effects of histamine and antihistamine, depending upon the stage of their biological rhythms. Since rhythms frequently differ from a precise 24-hour period, Dr. Halberg points out that “it is not the clock hour that is important in administering some drugs and medicine, but the physiologic timing.” *(Clifford R. Hicks, in Catholic Digest)***

**An American scientist, wired and instrumented like an astronaut, touched down at the airport in Manila. A medical team immediately began testing his alertness and coordination. At the same time one of his colleagues was going through a similar procedure in Rome. Both were groggy after landing. Instruments implanted in their bodies and mental tests they took showed that they couldn’t even add a simple column of numbers. What happened to those high-flying Ph.D.’s? Their fast jet hops across at least five time zones had thrown their built-in clocks far out of kilter. *(Clifford R. Hicks, in Catholic Digest)***

**But here is another mystery. Rhythms now can be precisely plotted, and it turns out that almost none of them is exactly a 24-hour cycle when the organism is deprived of light and temperature clues. All daily rhythms run slightly longer or shorter than 24 hours, yet supposedly they are tuned to the revolution of the earth. Why the discrepancy? *(Clifford R. Hicks, in Catholic Digest)***

**Plants function similarly. Before the turn of the century, the German botanist Wilhelm Pfeffer noticed that bean seedlings perform a rhythmical sleep-waking dance, lifting their leaves by day and drooping them at night. Scientists assumed that they were responding to sunlight and warmth. But were they? Pfeffer put the bean seedlings in a sealed box, and kept the temperature and light constant. The bean plants not only continued the dance, but precisely timed it to the ever-changing daylight-darkness cycle outside their closed box. How does a bean seedling know when it is time to go to sleep or wake up? All plants ever tested have shown such rhythms. And most rhythms are timed to approximately 24-hour cycles. *(Clifford R. Hicks, in Catholic Digest)***

**You have similar biological clocks, and so does every other living thing.**

***(Clifford R. Hicks, in Catholic Digest)***

**Living organisms may be able to measure the duration of daylight and darkness; or they may obtain clues through changes in temperature. But at the University of Toronto Drs. Kenneth C. Fisher and Eric T. Pengelley kept a ground squirrel in the laboratory at exactly 35 degrees F and in precise 12-hour cycles of light and darkness for two years. The squirrel hibernated from October to May, its normal hibernation period each year. How did it know when to go to sleep? Who set its internal alarm to wake it up? *(Clifford R. Hicks, in Catholic Digest)***

**Our bodies may prefer to run on a 25-hour day. Researchers who went into caves to study human biological clocks found the 24-hour day was an hour short of perfect. *(L. M. Boyd)***

**Precisely on October 23 each year, the swallows of Capistrano fly off to their winter resort, and each spring they return to their southern California home on March 19. What crosses out the days on their innate calendar? *(Clifford R. Hicks, in Catholic Digest)***

**The beat of your own body under such conditions is between 25 and 25 ¾ hours (it varies slightly with individuals). Two student volunteers were placed in an isolation chamber which was kept at a constant temperature and humidity. They were told to study, exercise, eat, and sleep whenever they wished. Without any clues from outside the chamber, their pattern for activity quickly settled into a day that was 25 hours and 45 minutes long. *(Clifford R. Hicks, in Catholic Digest)***

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