Newsletter

Cancer Consultants of America

Bridging the Gap Between Cancer and Understanding®

Cancer Answers

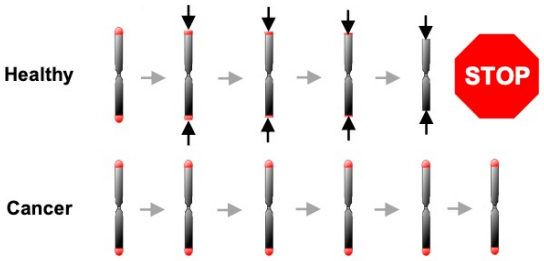
Telomeres: The Cellular Clock



Located at opposite ends of the chromosome is a region of DNA known as the telomere (red ends of the chromosome in the figure to the left). During cellular duplication, the DNA is replicated and serves as the DNA for the newly formed cells. After each round of DNA replication, the telomeres progressively get shorter. Over time, the telomeres will become so short that it signals to the cell it has reached its limit for any future rounds of cellular duplication. This limit is known as the "Hayflick Limit" which is ceremoniously named after Dr. Leonard Hayflick who is credited for this discovery. The gradual erosion of the telomeres serves as a cellular clock, limiting the cell lineage to about 40-60 rounds of duplication.

Certain cancers are able to avoid the limitations of telomere erosion thereby enabling the cancer cells to become immortal. The mechanism for this immortality involves the activation of a gene named telomerase. Telomerase is an enzyme giving the cell the ability to maintain the length of telomeres and subsequently avoiding the limitations of a cellular clock.

Not only is the cancer cell immortal but it also has the ability to replicate without any limitations and produce even more immortal cancer cells.



(continued next column)

This continuous replication is one feature, among many, that is shared among cancer cells commonly known as The Hallmarks of Cancer. More specifically, this Hallmark is titled Limitless Replicative Potential which describes the cancer cell's ability to replicate indefinitely without being bound by the restraints of a cellular clock.

Fortunately, in the age of cancer therapy advancements, drugs have been developed that target the telomerase enzyme. Recently, the US FDA approved the drug Imetelstat (Rytelo) for the treatment of myelodysplastic syndrome (MDS) which is a unique blood cancer. Imetelstat is a small molecule inhibitor that directly binds to a component of telomerase and shuts down the cancer cell's ability to maintain the telomeric ends of the chromosome. This loss of maintaining the telomeres eventually makes the cancer cells mortal without the ability to produce more cancer cells. Additional therapies, including immunotherapies, are being developed that target other unique aspects of telomerase. In the end, these drugs bring mortality to what used to be immortal cancer cells.

Submit your **Cancer Answers** topics to info@cancerconsultantsofamerica.com

We Are Available to You

Please contact us today if you would like more information about how our services can benefit you and your family.

Services:

- Individual and Family Cancer Education
- Medical Appointment Liaison Services
- Information Seminars and Public Speaking Events

Fun Facts – October

Cancer Awareness Month:

- Breast Cancer (Pink) 🎀
- Liver Cancer (Emerald Green) 🎗️

October 5 – World Teachers' Day 🍎

October 8 – National Fluffernutter Day 🥪

October 12 – National Kick Butt Day 🦵🍑

October 16 – World Food Day 🍔🌽🥕

October 24 – United Nations Day 🌎🌍🌏

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October 2026