



5 December 2024

ecDNA Role in Cancer

Context: The eDyNAmiC team's groundbreaking research, published in Nature recently, sheds light on the mysterious world of extrachromosomal DNA (ecDNA) and its role in cancer progression and drug resistance.

What is ecDNA?

- In typical human cells, DNA resides within 23 pairs of chromosomes in the nucleus.
- During processes like chromothripsis or DNA replication errors, DNA fragments can break off and form circular, extrachromosomal structures known as ecDNA.
- Previously considered unimportant (appearing in only 1.4% of tumors), modern genomic tools revealed that ecDNA is present in 40% of cancer cell lines and up to 90% of brain tumor samples.

ecDNA and Cancer Progression:

- ecDNA often contains multiple copies of oncogenes, genes responsible for cancer growth.
- Unlike chromosomal DNA, which is fixed, ecDNA is mobile and can interact with other ecDNA to form oncogene hubs.
- These hubs increase oncogene activity, with some being four times more abundant than in chromosomal DNA.
- This overexpression accelerates tumor growth and contributes to drug resistance.

ecDNA and Mendel's Laws:

- ecDNA challenges Mendel's third law of independent assortment, which states that genes located on different chromosomes are inherited independently.
- ecDNA clusters during cell division, allowing cancer cells to preserve advantageous genetic combinations over multiple generations.
- This is known as the "jackpot effect", enhancing tumor growth and survival.
- This discovery redefines genetic inheritance, showing that not all genes are inherited randomly.

ecDNA as a Target for Cancer Treatment:

- The structure of ecDNA creates a vulnerability in cancer cells.
- The interaction between ecDNA and cellular transcription machinery leads to DNA damage,

prompting the use of the protein CHK1 for repair.

- BBI-2779, a drug that blocks CHK1, was tested and found to selectively kill cancer cells with ecDNA, reducing tumor size in mice with stomach cancer.
- This opens possibilities for targeted therapies for cancers driven by ecDNA, such as glioblastoma, ovarian cancer, and lung cancer, where traditional treatments often fall short.

The Implications of ecDNA:

- 17% of tumor samples contain ecDNA, with high concentrations in liposarcomas, brain tumors, and breast cancers.
- Prevalence increases after chemotherapy, and ecDNA correlates with metastasis and worse outcomes.
- These findings challenge current cancer biology and genetic principles, making ecDNA a central focus of cancer research and treatment development.

ICJ Begins Hearing Landmark Climate Change Case

Context: The International Court of Justice (ICJ) has started hearings on a crucial climate change case, initiated by Vanuatu, a small island nation facing existential threats from rising sea levels. This case, which seeks an advisory opinion on countries' legal obligations to protect the climate and the consequences for those responsible for climate harm, could significantly impact global climate action.

About the Case:

- **Vanuatu's Proposal:** The case was proposed through a UN General Assembly (UNGA) resolution, co-sponsored by 132 countries. Vanuatu, alongside other small island states, is directly threatened by climate change and seeks to address the lack of legal clarity regarding countries' obligations to mitigate climate harm.
- **Key Questions raised:**
 - » What are the obligations of countries under international law to protect the climate system?
 - » What are the legal consequences for countries causing harm to the climate system?
- **Relevant Legal Frameworks:** This case draws on multiple international legal frameworks, including

Face to Face Centres



5 December 2024

the UN Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, as well as other legal texts such as the UN Convention on the Law of the Sea and the Universal Declaration of Human Rights. It underscores that climate change is both an environmental and human rights issue.



process for requesting advisory opinions, allowing the General Assembly and Security Council to request opinions, and authorizing other UN organs and specialized agencies to do so with General Assembly approval.

UK's Assisted Dying Bill

Context: The UK has moved closer to legalizing assisted dying or euthanasia with the recent passage of the Terminally Ill Adults (End of Life) Bill, which allows terminally ill patients to request assistance in ending their lives.

Significance of the Case:

- While the ICJ's opinion is advisory, its impact could be far-reaching:
 - » **Reaffirming Climate Obligations:** The case could strengthen legal obligations for climate protection, particularly by holding developed nations more accountable for their historical emissions and failure to meet climate finance targets.
 - » **Establishing Legal Consequences for Climate Harm:** The ICJ may define legal consequences for countries causing climate harm, potentially paving the way for compensation mechanisms for vulnerable nations like small islands.
 - » **Influencing Global Climate Negotiations:** The advisory opinion could influence COP negotiations, urging developed countries to meet their Paris Agreement commitments and reinforcing the call for climate finance.
 - » **Precedent for Climate Litigation:** The ICJ's ruling could set a precedent for future climate lawsuits, providing legal clarity and encouraging further climate-related litigation worldwide.

About ICJ's Advisory Opinion:

- The ICJ's authority to issue advisory opinions is derived from its Statute and the UN Charter:
 - » **Article 65 of the ICJ Statute:** Grants the ICJ the power to give advisory opinions at the request of authorized bodies or agencies under the UN Charter.
 - » **Article 96 of the UN Charter:** Specifies the

Key Aspects of the UK's Assisted Dying Bill:

- **Eligibility Criteria:**
 - » Only terminally ill patients with a prognosis of six months or less to live can request assisted dying.
 - » The patient must be over 18, mentally competent, and a resident of England or Wales for at least 12 months.
- **Process:**
 - » The patient must make a formal request in front of a coordinating doctor and a witness.
 - » The request is then assessed by the coordinating doctor, followed by an independent doctor after a 7-day reflection period.
 - » If both doctors approve, the case is sent to the High Court for review. A second 14-day reflection period follows before the patient can confirm their decision.
- **Administering the Substance:**
 - » The patient self-administers an "approved substance" to end their life, with no doctor involved in directly administering it.

Arguments For and Against the Bill:

- Proponents argue that assisted dying offers terminally ill patients a dignified death and helps end their suffering, particularly when palliative care fails.
- Opponents worry about misuse, especially for vulnerable groups like the elderly or disabled, and suggest focusing on improving palliative care instead.

Assisted Dying in India: Passive Euthanasia

Face to Face Centres



5 December 2024

- India's laws differ, focusing on passive euthanasia, which involves withdrawing life support from terminally ill patients, allowing them to die naturally.

Legal Position:

- The Supreme Court of India, in 2018, ruled that the right to die with dignity is part of the right to life under Article 21, allowing passive euthanasia.

Guidelines for Passive Euthanasia:

- Patients must create a living will specifying their desire to withdraw life support, which must be signed by two witnesses and a Judicial Magistrate.
- A medical board assesses the case before life support can be withdrawn.

Recent Developments:

- In 2023, guidelines were simplified to reduce the Judicial Magistrate's role and set strict timelines, though implementation remains limited.

Comparison of the UK and India's Laws:

- Nature of the Law:** The UK allows active assistance in dying through self-administration of a substance, while India permits passive euthanasia, where life support is withdrawn.
- Eligibility and Consent:** Both require mental competence and consent. The UK involves multiple medical and judicial reviews; India relies on living wills and judicial scrutiny.
- Procedure and Safeguards:** Both countries require approval from medical and judicial authorities to ensure voluntary and informed decisions.
- Scope and Application:** The UK allows assisted dying for terminally ill patients; India focuses on withdrawal of life support without active intervention.

Power Packed News

Study of the Rare Spade-Toothed Whale in New Zealand

- In New Zealand, scientists are studying a spade-toothed whale, one of the rarest whale species in the world. This is the first time a complete specimen is being examined. The whale, a five-meter-long male, washed up on the shore in Otago in July, giving researchers a unique chance to learn more about it.
- The spade-toothed whale is named for its spade-shaped teeth. Only seven of these whales have been recorded since the 1800s, with most found in New Zealand. These whales are deep divers, living in the deep ocean and hunting squid and small fish.
- The dissection is happening at the Invermay Agresearch Centre in Mosgiel. Scientists are studying the whale's body to learn about its stomach, how it makes sounds, and other features. The goal is to understand the whale better and help protect it.
- Mori people from Te Kōwhiri, who have cultural rights over the area, are working with scientists. The whale's skeleton will be kept in the Otago Museum, but the jawbone will be kept for cultural purposes.



One-Stop Centres for Women Abroad: A New Initiative

- The Ministry of External Affairs has received approval for the establishment of nine One-Stop Centres (OSCs) aimed at supporting women in vulnerable situations abroad. These centres will provide immediate assistance and comprehensive support to distressed women, addressing their urgent needs.
- Seven of the proposed centres will be set up in the Gulf countries, including Bahrain, Kuwait, Oman, Qatar, the UAE, and Saudi Arabia, with two centres in Saudi Arabia (Jeddah and Riyadh).
- The remaining two centres will be in Toronto and Singapore, though without shelter facilities. These initiatives are backed by a dedicated budget line to support their implementation.

Face to Face Centres



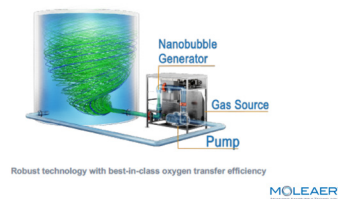


5 December 2024

- The Indian Community Welfare Fund (ICWF), which has been active in Indian Missions worldwide, will play a key role in these initiatives. Revised in 2017, the ICWF now covers a range of assistance services, including emergency aid, legal support, medical care, and repatriation.
- It also provides specific support for Indian women, including legal help and counselling for those abandoned by spouses, and facilitates the payment of fines in certain legal cases to secure the release of detained nationals.

Nano Bubble Technology for Water Purification at National Zoological Park

- The Union Minister of State for Forest, Environment, and Climate Change launched 'Nano Bubble Technology' at the National Zoological Park in Delhi. This technology is designed to improve the health of aquatic animals by cleaning and purifying the pond water.
- It works by removing algae and similar growths, which can cause foul smells and water discoloration. The goal is to keep the water clean, ensuring the well-being of the animals.
- Clean water helps prevent diseases and maintains a healthy environment for the creatures. The technology infuses water with tiny nanobubbles that have a large surface area, making them effective at removing contaminants.
- This initiative represents an important step in protecting aquatic life and promoting sustainable water management in the zoo.



Netumbo Nandi-Ndaitwah: First Female President of Namibia

- Netumbo Nandi-Ndaitwah has made history by becoming the first female president of Namibia. She won the 8th presidential election with over 57% of the vote, defeating her closest opponent, Panduleni Itula, who received 26%.
- Nandi-Ndaitwah, who is a member of the South West Africa People's Organization (SWAPO), has been a key figure in Namibian politics since the country's independence in 1990.
- SWAPO also won a majority in the National Assembly, securing 51 out of 96 seats. Nandi-Ndaitwah's election is an important milestone for women's political representation in Africa.
- As president, she will work on continuing Namibia's development and addressing key challenges like economic growth and social issues.



Oxford Word of the Year 2024: "Brain Rot"

- Oxford's Word of the Year 2024 is "Brain Rot," a term used to describe the cognitive decline caused by spending too much time consuming trivial online content. This term reflects concerns about how social media and the internet can negatively impact mental health.
- More than 37,000 people voted on the word, and "brain rot" was one of the six shortlisted terms. Other words included "dynamic pricing," "lore," and "slop."
- The phrase "brain rot" was first used in 1854 by Henry David Thoreau in his book Walden, but it has gained new meaning in today's digital age.
- Oxford University Press's selection of this word highlights growing worries about how excessive use of low-quality online content is affecting cognitive abilities, especially among younger generations.

Face to Face Centres



5 December 2024

Uber Shikara: Asia's First Water Transport Service on Dal Lake

- Uber has launched Asia's first water transport service, Uber Shikara, in Dal Lake, Jammu and Kashmir. This new service allows tourists to book pre-arranged shikara rides through the Uber app.
- The service, which started with seven local shikara operators, offers a convenient and scenic way for visitors to explore the lake. The shikaras are based at Nehru Park, a popular island in the middle of Dal Lake, and can carry up to four passengers.
- Uber Shikara is similar to services the company has launched in other European cities like Venice, Italy. The service is expected to boost local tourism and provide a digital solution for a traditional form of transportation.



West Bengal Declared as a Top Heritage Tourism Destination by UNESCO

- UNESCO recently recognized West Bengal as a top destination for heritage tourism. This honor highlights the state's rich cultural and historical heritage. The recognition also acknowledges the growth of heritage tourism in the state, which has created jobs for thousands of young people.
- In response, the Chief Minister of West Bengal, Mamata Banerjee, noted that 2,489 homestays had been established in the state, with 65% of them located in North Bengal.
- The government is also focusing on infrastructure projects, including the construction of the Jagannath temple in Digha and a bridge over the Muriganga River at Ganga Sagar Island.
- The UNESCO recognition of West Bengal as a heritage tourism destination will help attract more international visitors and promote sustainable tourism that supports local communities.



Face to Face Centres

