Beyond protein-mediated regulation of cell division: the case of CHERR long non-coding RNA

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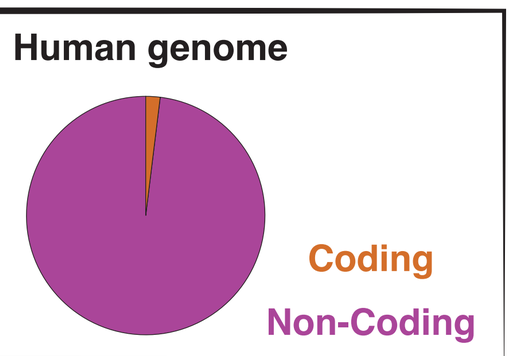
1. Long non-coding RNAs: the dark that matters

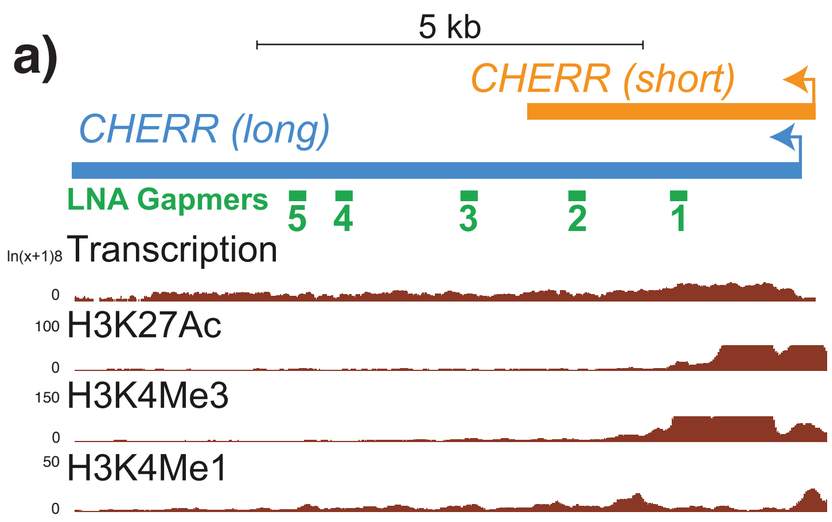
Thanks to the Human Genome Project and modern transcriptome studies, we now understand that **most of the human genome does not encode proteins**.

Approximately 98% of human DNA is termed ***dark matter***, a realm scientists are still exploring.

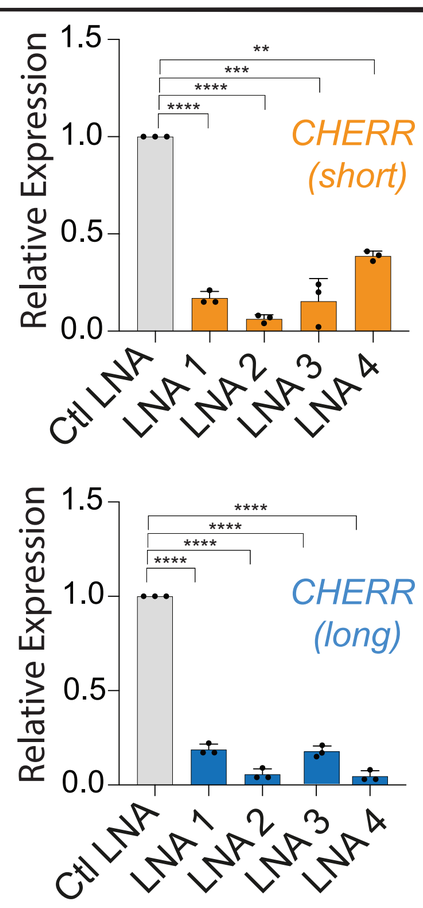
To date, 20,000 **long non-coding RNAs (lncRNAs)** have been identified, equivalent to the number of protein-coding genes, however only few subsets have been thoroughly characterised.

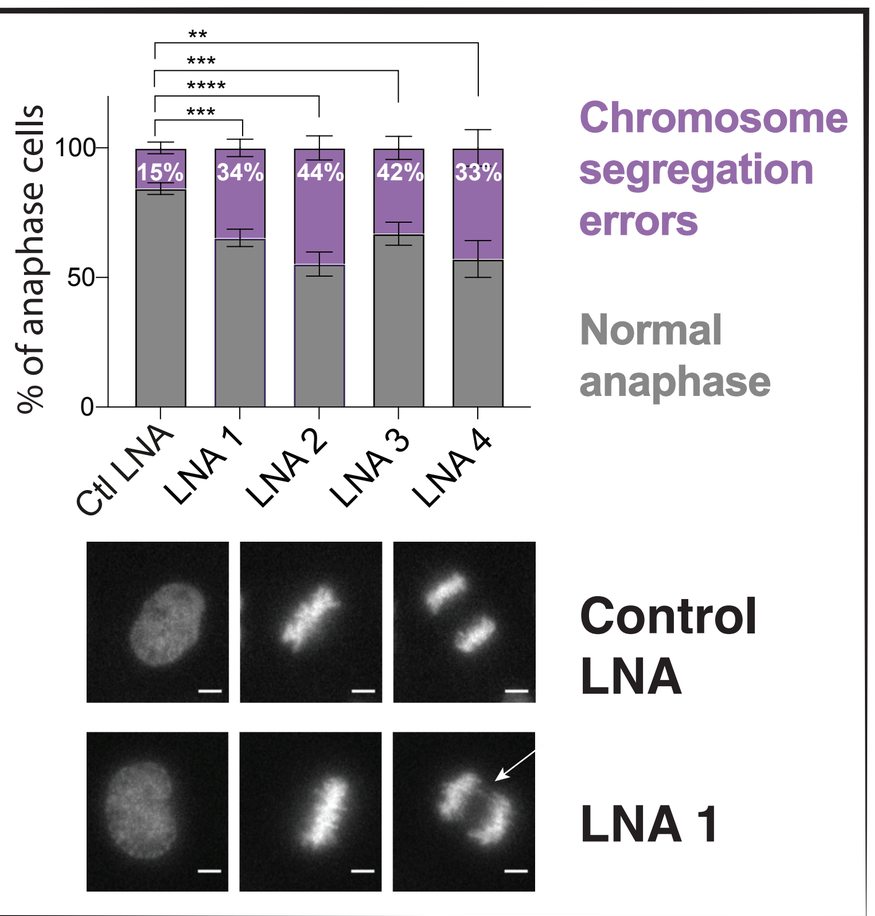


2. CHromosomE segregation Regulating non coding RNA (CHERR)

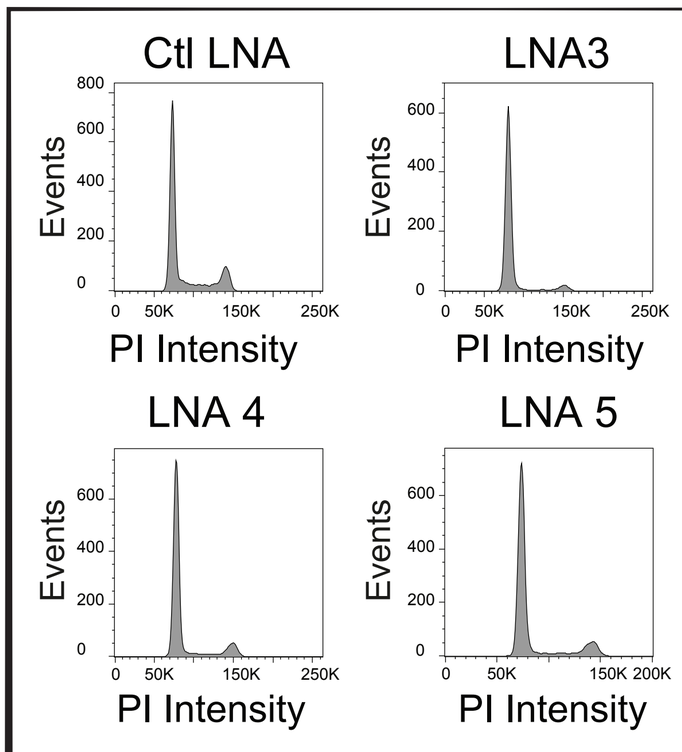


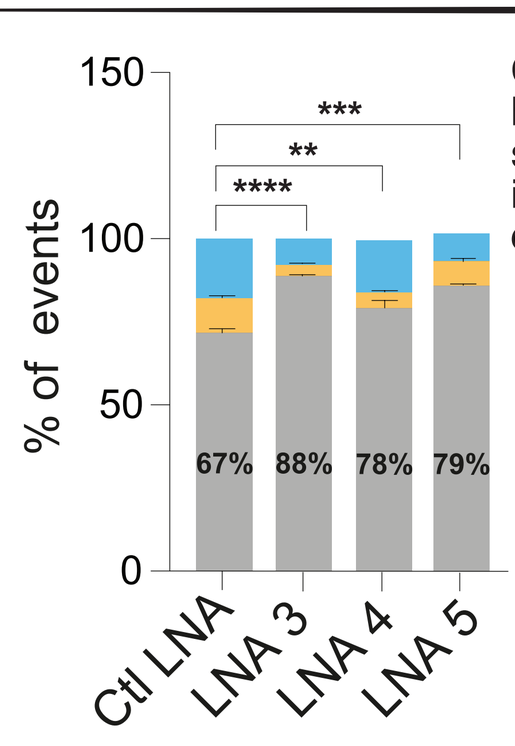
a) CHERR genomic locus. LNA Gapmers used in the loss-of-function studies are mapped in green. **b)** LNA depletion efficiency in hTert-RPE1 cells for CHERR short (orange) and long (blue) transcripts. **c)** Live cell imaging in hTert-RPE1-H2B-GFP cells showing chromosome mis-segregation in CHERR depleted samples.





3. CHERR affects cell cycle progression

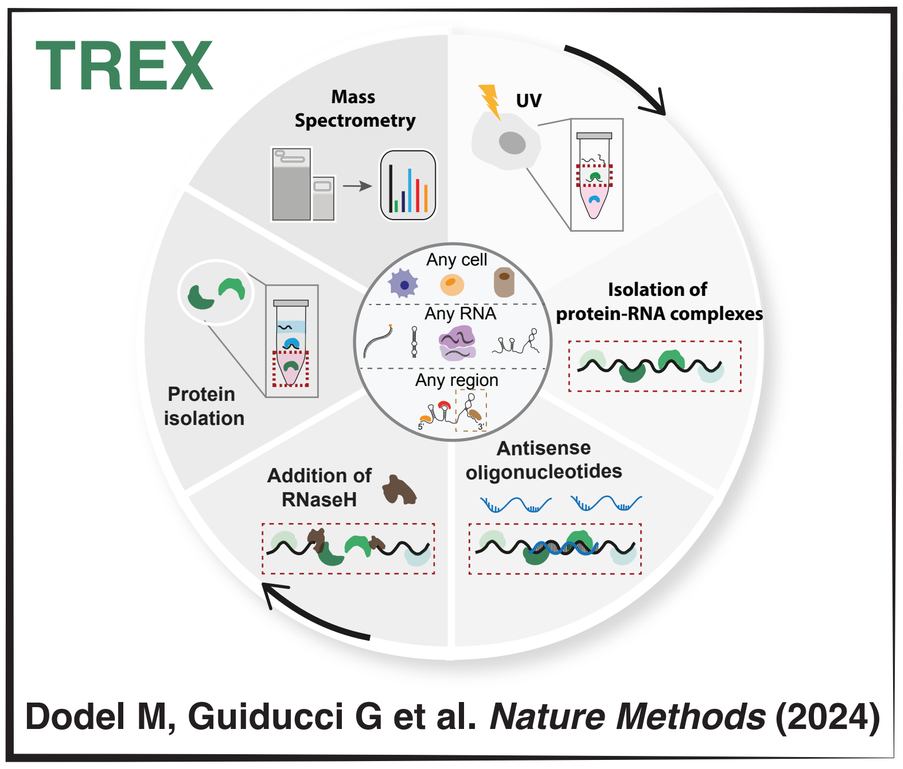




Cell cycle profile: hTert-RPE1 cells showing G1 arrest in CHERR long depleted samples.

G1
S
G2/M

4. Novel RNA technologies



Dodel M, Guiducci G et al. *Nature Methods* (2024)

To take home

CHERR emerges as a long non-coding RNA controlling **chromosome segregation** and cell **cycle progession** in human cells.

TREX, our novel RNA-centric method to study protein-RNA interactions, will elucidate the molecular mechanism by which CHERR is involved in cell division.

Long non-coding RNAs represent **novel regulators of cell division**, going beyond the traditional protein-centric perspectives.

REFERENCES

Djebali S et al. *Nature* (2012); Mattick JS et al. *Nat Rev Mol Cell Biol* (2023).

CONTACTS

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