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Title: Adaptation of organisms by resonance of RNA transcription with the cellular redox cycle

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Abstract: Sequence variation in organisms differs across the genome and the majority of mutations are caused by oxidation, yet its origin is not fully understood. It has also been shown that the reduction–oxidation reaction cycle is the fundamental biochemical cycle that coordinates the timing of all biochemical processes in the cell, including energy production, DNA replication, and RNA transcription. It is shown that the temporal resonance of transcriptome biosynthesis with the oscillating binary state of the reduction–oxidation reaction cycle serves as a basis for non–random sequence variation at specific genomewide coordinates that change faster than by accumulation of chance mutations. This work demonstrates evidence for a universal, persistent and iterative feedback mechanism between the environment and heredity, whereby acquired variation between cell divisions can outweigh inherited variation.