

## Natural Genome-Editing Competences of Viruses

### *Abstract*

It is becoming increasingly evident that the driving forces of evolutionary novelty are not randomly derived chance mutations of the genetic text, but a precise genome editing by omnipresent viral agents. These competences integrate the whole toolbox of natural genetic engineering, replication, transcription, translation, genomic imprinting, genomic creativity, enzymatic inventions and all types of genetic repair patterns. Even the non-coding, repetitive DNA sequences which were interpreted as being ancient remnants of former evolutionary stages are now recognized as being of viral descent and crucial for higher-order regulatory and constitutional functions of protein structural vocabulary. In this article I argue that non-randomly derived natural genome editing can be envisioned as (a) combinatorial (syntactic), (b) context-specific (pragmatic) and (c) content-sensitive (semantic) competences of viral agents. These three-leveled biosemiotic competences could explain the emergence of complex new phenotypes in single evolutionary events. After short descriptions of the non-coding regulatory networks, major viral life strategies and pre-cellular viral life three of the major steps in evolution serve as examples: There is growing evidence that natural genome-editing competences of viruses are essential (1) for the evolution of the eukaryotic nucleus, (2) the adaptive immune system and (3) the placental mammals.

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