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Editorial

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We Need New Cancer Biomarkers

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Editorial

Since the end of 2019, the global health emergency related to the spread of Sars-Cov-2 has attracted the interest of researchers, clinicians, pharmaceutical companies, and the media from all over the world.

To date, interest has not diminished due to the spread of multiple variants, typical of RNA viruses. Probably this virus will accompany us from now on and it will not be possible to eradicate it as it was done in the past with smallpox and as we have not been able to do so far with the Human Immunodeficiency Virus (HIV). We will have to live with it as it already happens with many other virus species widely spread around the world.

Without diminishing the importance of this highly current issue, it must be said that it has distracted not a few economic resources, human resources, time, and energy in the search and early diagnosis of other diseases, much more insidious and lethal as they are chronic-degenerative especially cancer.

As is well-known, cancer is a complex, insidious, multifactorial, chronic-degenerative disease and today some cancers, such as lung cancer, are still among the top ten causes of death: in sixth place in the global ranking and at third place in Europe.

Research on new biomarkers is fundamental and imperative. We need new cancer biomarkers to use as diagnostic, prognostic, and progression markers, but not only. We should study and evaluate also new indicators for the risk assessment, screening, differential diagnosis, prediction of response to treatment, and monitoring of metastases.

The family of the Eukaryotic Translation Elongation Factors (EEFs) could answer all of this. It has been studied for over thirty years and data so far collected suggest that EEFs participate actively in tumorigenesis and so they may be useful biomarkers for human cancers. But there is still a lot to study and understand.

EEFs are a large protein family involved in the elongation step of eukaryotic translation, but it has also various moonlight functions inside the cell both in normal and in pathological conditions. The proteins included in this family are into two main subgroups: the Non-Alpha Eukaryotic Translation Elongation Factors (NA-EEFs) and the Alpha Eukaryotic Translation Elongation Factors (A-EEFs).

NA-EEFs include the Eukaryotic Translation Elongation Factor 1 Beta 2 (eEF1B2), the Eukaryotic Translation Elongation Factor 1 Delta (eEF1D), the Eukaryotic Translation Elongation Factor 1 Gamma (eEF1G), and the Eukaryotic Translation Elongation Factor 1 Epsilon 1 (eEF1E1) and their various isoforms.

A-EEFs include the Eukaryotic Translation Elongation Factor 1 Alpha 1 (eEF1A1), Eukaryotic Translation Elongation Factor 1 Alpha 2 (eEF1A2), and their various isoforms of which the most important are the Prostate Tumor-Inducing Gene-1 (PTI-1), more recently renamed Eukaryotic Translation Elongation Factor 1-Alpha 1-Like 14 (EEF1A1L14) and Cervical Cancer Suppressor (CCS-3) [1].

In particular, PTI-1, the most known truncated form of eEF1A, is related to the infection of the cells by mycoplasmas, in particular *Mycoplasma hyorhinis.* The exact role of PTI-1 is unknown, but it has been suggested that it might reduce translational fidelity and so concur or bring to tumorigenesis.

These genes are frequently amplified and overexpressed in cancers as well as are known for their numerous genomic translocations, novel fusion genes, and point mutations. In addition, their numerous pseudogenes are dispersed in the human genome, especially for EEF1A1 and EEF1A2, whose role in tumor transformation is still poorly known. It is known that pseudogenes have a key regulatory role in the cell, especially via non-coding RNAs, and that the aberrant expression of ncRNAs has an important role in cancer development and progression [2].

In conclusion, it is certainly very important to focus attention on acute diseases, such as infections caused by new or emerging pathogens, of which Sars-Cov-2 is the latest in a long series (for example, the Zika virus, Chikungunya virus, Nipah virus, Ebola virus, and antibiotic-resistant pathogens), but at the same time, it is necessary to continue research on chronic-degenerative diseases, such as cancers, and to direct economic and human resources and time to study the molecular mechanisms responsible for cancer transformation, which contribute to it or which allow its progression, metastasis, and response to therapies. EEFs, due to their key role in protein synthesis, could be useful cancer biomarkers in the future.

Keywords:

Cancer; Cancer biomarkers; EEFs; EEF1A; PTI-1

Abbreviations:

A-EEFs: Alpha Eukaryotic Translation Elongation Factors; CCS-3: Cervical Cancer Suppressor; EEF1A1: Eukaryotic translation Elongation Factor 1 Alpha 1; EEF1A1L14, Eukaryotic translation Elongation Factor 1-Alpha 1-Like 14; EEF1A2: Eukaryotic translation Elongation Factor 1 Alpha 2; EEF1B2: Eukaryotic translation Elongation Factor 1 Beta 2; EEF1D Eukaryotic Translation Elongation Factor 1 Delta; EEF1E1: Eukaryotic translation Elongation Factor 1 Epsilon 1; EEF1G: Eukaryotic translation Elongation Factor 1 Gamma; EEFs: Eukaryotic translation Elongation Factors; NA-EEFs: Non-Alpha Eukaryotic translation Elongation Factors; PTI-1: Prostate Tumor-Inducing Gene-1

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