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A protocol stack paradigm of gene expression

Yesenia Elizabeth Cevallos Villacrés^{1, 2}, Lorena Molina¹, Deysi Inca¹, Guillermo Machado¹, Alex Santillán³, Floriano De Rango², Ahmad Rushdi⁴ and Jesús B Alonso⁵

¹National University of Chimborazo, Ecuador
²University of Calabria, Italy
³Plymouth University, UK
⁴University of Texas at Austin, USA
⁵University of Las Palmas de Gran Canaria, Spain

In this study, we propose the design of a protocol stack network model to explain gene expression. Gene expression is the process by which information carried by deoxyribonucleic acid (DNA) is transformed into proteins. Proteins are produced in the cell and excreted to perform a biological function. The nucleus of eukaryotic cells is the source of biological information, which must be modified via intracellular communication to reach an adequate cellular or extracellular destination. This process implies that information is transferred through a biological path, and after it is received, a biological function is performed. The transmission of proteins (specifically peptide hormones) to a target organ through blood stream involves the golgi apparatus, which is similar to the digital communication process wherein a transmitter in a network sends information to a destination device in another network through a router. The modeling that we have proposed is supported by very well know theories in communications as Shannon's theorem, and network characteristics (e.g., independent functions of layers in a stack, addressing, flow control, error control, and traffic control). Our analysis is focused in the importance of the addressing in networks applied to biological systems to reduce the incidence of side effects of drugs used to treat disease. The objective is to improve the quality of treatment for patients from health and socio-economic perspectives.

Biography

Yesenia Elizabeth Cevallos Villacrés is an Electronic and Telecommunication Engineer from National Polytechnic in Ecuador, 2001. She has an Information Technology Master's degree from Technical University of Ambato in Ecuador, 2010. She is an Associate Professor at National University of Chimborazo, Ecuador. Currently, she is a PhD student at University of Calabria, Italy. She has articles published in network and digital communications area in journals in Ecuador. Her main publications as PhD student is: A digital communication analysis of gene expression of proteins in biological systems: A layered network model view.

ycevallos@dimes.unical.it.

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