Implementing Fuzzy Sets and Processing Fuzzy Logic Information by molecules.

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Fuzzy logic is a good model of the human ability to compute with words [1]. It has been defined as a rigorous logic of vague and approximate reasoning. It is based on the theory of Fuzzy sets proposed by the engineer Lotfi Zadeh in 1965 [2]. Fuzzy logic is a valid model of the human capacity to make decisions using natural language because there are structural and functional analogies between the human nervous system and Fuzzy logic systems[3, 4]. Fuzzy logic is widely used in the field of Artificial Intelligence [5]. In our research, we are blazing the new trail of Chemical Artificial Intelligence because we propose the use of molecular, supramolecular, and systems chemistries as innovative strategies for implementing Fuzzy logic systems [4]. We demonstrate that Fuzzy logic can be processed not only through electronic circuits and software, but also through molecules and chemical reactions in wetware [6]. Chemical Artificial Intelligence development will promote the design of a new generation of computational machines, more similar to the brain rather than to the electronic computers, both in terms of composition and performances.Finally, this research field could spark new ideas about the origin of life on Earth. The appearance of the life on Earthwas like a "phase transition" [7, 8]. Roughly 3.5 billion years ago, there was a transition from inanimate chemical systems, unable to encode, process, communicate and store information, to the living chemical systems, able to exploit the matter and energy to encode, process, send, and store information. The development of Chemical Artificial Intelligence could unveil how that unique "phase transition" happened.

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