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Multi-agent modeling of the immune system: the situated cellular agents approach. (English)

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Summary: The Immune System (IS) is the main defense mechanism of higher level organisms to antigens (microscopic threats, such as viruses and bacteria). It is a very complex system, genuinely distributed and providing mechanisms of adaptation to unknown threats. The most relevant characteristics of the IS, such as learning capabilities and the possibility to tackle unknown threats in any part of the body, are a consequence of interactions among its composing parts. This paper describes a Multi-Agent Systems modeling approach to the study of interactions in the IS, adopting the Situated Cellular Agents (SCA) model.

After a brief description of the IS, an overview of current modeling and simulation approaches will be given. The SCA model will be then introduced and exploited in order to model some relevant elements and mechanisms of the IS. This work is one of the results of an interdisciplinary research that has involved immunologists of the Advanced Biotechnology Center of Genova and computer scientists of the University of Milan-Bicocca.

MSC:

92C50 Medical applications (general)
93A30 Mathematical modelling of systems (MSC2010)
68U20 Simulation (MSC2010)
92C30 Physiology (general)

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