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LARGE-TIME BEHAVIORS OF SOLUTIONS TO CHEMOTAXIS TUMOR INVASION WITH QUASI-VARIATIONAL DIFFUSION

In honor of the seventy-seventh birthday of Prof. Nobuyuki Kenmochi

Akio Ito *

(E-mail: ito.akio.2015@gmail.com)

Abstract. A tumor invasion system, which is proposed in [2] as a modified tumor invasion system of Chaplain-Anderson type in [1], is considered in this paper. The system consists of three PDEs and one ODE. As a main characteristic, it is given that one of the PDEs has not only a quasi-variational structural degenerate diffusion but also a chemotaxis effect. Moreover, two kinds of quasi-variational structures are mixed in the diffusion. One is in the permeability of the tissue, which is regarded as a porous medium, and the other is in the constraint condition, which plays a role as double obstacles for the density of tumor cells. Actually, these quasi-variational structures depend on the density of extracellular matrix, which is also unknown in the system. The main purpose of this paper is to investigate the large-time behavior of a strong global-in-time solution to the tumor invasion system. In order to do this, it is a key point to find a suitable function space so that we can repeatedly apply the Ascoli-Arzelà compactness theorem for each component of the orbit associated with the strong global-in-time solution to the system under consideration.

*11678-1 Node, Sosashi, Chiba, 289-3181, Japan
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