Initial/boundary-value problems of tumor growth in mixture theory

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Resorting to the theory of deformable porous media, we consider models for the growth of tumor masses within healthy host tissues based on the macroscopic mass balance equation. In these models, the velocities of the constituents are derived taking into account the mechanical responses to mutual interactions, and cell birth and death are accounted for in connection with the dynamics of some nutrients. Such models normally feature a few phenomenological terms, for which "first principles" are at present not available as modeling guidelines. We discuss therefore possible modeling choices, having in mind both biological consistency and (some aspects of) well-posedness of the resulting mathematical problems.