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Diffusive transport through the myocardium of pharmacological agents placed in the pericardial space XIANFENG SONG, Indiana University, KEITH L. MARCH, Indiana University Medical School, SIMA SETAYESHGAR, Indiana University — The classical understanding of the pericardial sac is as a fluid-filled space surrounding the heart. Since it is a self-contained space, it can be viewed as a reservoir and therapeutically used as a drug container to deliver agents to the myocardium. It is only recently that experimental techniques for safe delivery of agents to the pericardial space have been developed. In this work, we present a quantitative model of the key biophysical processes affecting the distribution through the myocardium of a substrate delivered to the pericardial sac. By direct analysis of experimental data on pericardial delivery of agents to the porcine heart and comparison with computational results, we determine quantitatively for the first time values for fundamental physical parameters, such as effective diffusion constant and washout rate, for small and large molecular weight test agents in the myocardium. We comment on the efficacy of this mode of drug delivery to the myocardium, thereby aiding in the development of agents and methods of delivery that achieve various therapeutic goals.

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