Modified I_{K1} Magnesium Blockade Model

In a ventricular model by Takeuchi et al.[1], open probability of magnesium block of I_{K1} is defined with a steady-state expression as

$$f_{O} = \frac{\lambda}{\mu + \lambda},$$

where λ and μ are rate constants depending on the membrane potential.

For analysis with taking into account effects of magnesium blockade of I_{K1}, the above equation is replaced by the following equation.

$$\frac{df_{O}}{dt} = \lambda \left(1 - f_{O}\right) - \mu f_{O}.$$

References

[1] Takeuchi A, Tatsumi S, Sarai N, Terashima K, Matsuoka S, Noma A. Ionic Mechanisms of Cardiac Cell Swelling Induced by Blocking Na^{+}/K^{+} Pump As Revealed by Experiments and Simulation. Journal of General Physiology. 2006 Nov;128(5):495–507.