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Low-Density Lipoprotein Transport through an Arterial Wall under Hyperthermia and Hypertension Conditions – An Analytical Solution

Marcello Iasiello [(a, b)], Kambiz Vafai [(a),*], Assunta Andreozzi [(b)] and Nicola Bianco [(b)]

(a) Department of Mechanical Engineering, University of California, Riverside, CA 92521, USA

(b) Dipartimento di Ingegneria Industriale, Università degli Studi di Napoli Federico II, P.le Tecchio, 80, Napoli 80125, Italy

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Abstract. An analytical solution for Low-Density Lipoprotein transport through an arterial wall under hyperthermia conditions is established in this work. A four-layer model is used to characterize the arterial wall. Transport governing equations are obtained as a combination between Staverman-Kedem-Katchalsky membrane equations and volume-averaged porous media equations. Temperature and solute transport fields are coupled by means of Ludwig-Soret effect. Results are in excellent agreement with numerical and analytical literature data under isothermal conditions, and with numerical literature data for the hyperthermia case. Effects of hypertension combined with hyperthermia, are also analyzed in this work.

Keywords: Hyperthermia, Hypertension, Low-Density Lipoprotein, Analytical Solution

*corresponding author: vafai@engr.ucr.edu

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