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Comparison of cationic myocardial perfusion agents: Characteristics of accumulation in cultured smooth muscle cells

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The uptake and washout kinetics of two cationic lipophilic ^{99m}Tc-labeled myocardial perfusion agents, ^{99m}Tc-methoxyisobutylisonitrile (^{99m}Tc-MIBI) and ^{99m}Tc-1,2-bis[bis-(2-ethoxyethyl)-phosphino]ethane (^{99m}Tc-Tetrofosmin), were studied in cultured smooth muscle cells and compared to the conventional myocardial perfusion agent, ^{201}Tl. Both ^{99m}Tc-MIBI and ^{99m}Tc-Tetrofosmin had a 4-fold greater uptake than ^{201}Tl, and they were washed out of cells through similar kinetics which had slower rates than ^{201}Tl. Incubation with metabolism inhibitors had a modest influence on the uptake of these two ^{99m}Tc-labeled agents, although their extent and inhibited sites were slightly different. Ion transport inhibitors did not affect the uptake of ^{99m}Tc-MIBI, although the ^{99m}Tc-Tetrofosmin uptake was slightly inhibited when the Ca^{2+} channel was blocked. Our studies indicate that ^{99m}Tc-MIBI and ^{99m}Tc-Tetrofosmin were taken up by smooth muscle cells in similar pharmacokinetic patterns, but their accumulation reflected a different meaning for cell viability.

Key words: ^{99m}Tc-MIBI; ^{99m}Tc-tetrofosmin; ^{201}Tl, smooth muscle cells