In this study, production routes of $^{125, 123}$Xe and $^{133, 131, 129, 128}$Ba medical isotopes produced by $^{127}$I($p,3n$)$^{125}$Xe, $^{127}$I($p,5n$)$^{123}$Xe, $^{133}$Cs($p,n$)$^{133}$Ba, $^{133}$Cs($p,3n$)$^{131}$Ba, $^{133}$Cs($p,5n$)$^{129}$Ba and $^{133}$Cs($p,6n$)$^{128}$Ba reactions have been investigated up to 100 MeV incident proton energy. The pre–equilibrium calculations involve the hybrid model, the geometry dependent hybrid model and the cascade exciton model. The calculated results are compared with the experimental data taken from the literature.