We studied absorption, distribution, metabolism, and excretion of polyamines in the gastrointestinal tract using $^{15}$N-labeled polyamines as tracers and ionspray ionization mass spectrometry. The relatively simple protocol using rats bearing solid tumors provided useful information. Three $^{15}$N-labeled polyamines that were simultaneously administered were absorbed equally from gastrointestinal tract, and distributed within tissues at various concentrations. The uptake of $^{15}$N-spermidine seemed preferential to that of $^{15}$N-spermine since the concentrations of $^{15}$N-spermidine in the liver and tumors were higher, whereas those of $^{15}$N-spermine were higher in the kidney, probably due to the excretion of excess extracellular spermine. Most of the absorbed $^{15}$N-putrescine seemed to be lost, suggesting blood and tissue diamine oxidase degradation. Concentrations of $^{15}$N-spermidine and $^{15}$N-spermine in the tumor were low. We also describe the findings from two rats that were administered with $^{15}$N-spermine. The tissue concentrations of $^{15}$N-spermine were unusually high, and significant levels of $^{15}$N-spermidine were derived from $^{15}$N-spermine in these animals.