The gut is a hot spot for transfer of antibiotic resistance genes from ingested exogenous bacteria to the indigenous microbiota. The objective of this study was to determine the fate of two nearly identical bla CMY-2-harboring plasmids introduced into the human fecal microbiota by two Escherichia coli strains isolated from human and poultry meat, respectively. The chromosome and the CMY-2-encoding plasmid of both strains were labeled with distinct fluorescent markers (mCherry and GFP), allowing Fluorescence Activated Cell Sorting (FACS)-based tracking of the strain and the resident bacteria that have acquired its plasmid. Each strain was introduced into an established in vitro gut model (CoMiniGut) inoculated with individual feces from ten healthy volunteers. Fecal samples collected 2, 6 and 24 h after strain inoculation were analyzed by FACS and plate counts. Although the human strain survived better than the poultry meat strain, both strains transferred their plasmids to the fecal microbiota at concentrations as low as $10^2$ CFU/mL. Strain survival and plasmid transfer varied significantly depending on inoculum concentration and individual fecal microbiota. Identification of transconjugants by 16S rRNA gene sequencing and MALDI-TOF mass spectrometry revealed that the plasmids were predominantly acquired by Enterobacteriaceae such as E. coli and Hafnia alvei. Our experimental data demonstrate that exogenous E. coli of human or animal origin can readily transfer CMY-2-encoding IncI1 plasmids to the human fecal microbiota. Low amounts of exogenous strain are sufficient to ensure plasmid transfer if the strain is able to survive the gastric environment.