In the current study, twenty lambs, aged 4 months, half male and half female, were classified into four groups, with five in each group. The experimental three groups of lambs were given intravenous (IV), intramuscular (IM) and subcutaneous (SC) administrations of recombinant ovine interferon-τ (roIFN-τ). The fourth group (normal control) of lambs was given normal saline injections in the same way. After administrations, blood samples were collected from the tested animals at different time points post injection, and the serum titers of roIFN-τ were measured using cytopathic effect (CPE) inhibition bioassay. The results of calculating pharmacokinetic (PK) parameters using DAS software showed that the PK characteristics of roIFN-τ through IV injection conformed to the two-compartment open model, whose half-life of distribution phases ($T_{1/2\alpha}$) was $0.33\pm0.034$ h and the elimination half-life($T_{1/2\beta}$) was $5.01\pm0.24$ h. However, the PK features of IM injection and SC injection of roIFN-τ conformed to the one compartment open model, whose $T_{max}$ were $3.11\pm0.26$ h and $4.83\pm0.43$ h, respectively, together with an elimination half life($T_{1/2\beta}$) of $9.11\pm0.76$ h and $7.43\pm0.58$ h, and an absorption half-life ($T_{1/2k(a)}$) of $1.13\pm0.31$ h and $1.85\pm0.40$ h, respectively. The bioavailability of roIFN-τ after IM administration reaches $73.57\%$, which is greater than that of SC administration ($53.43\%$). These results indicate that the drug administration effect can be preferably obtained following a single dose IM administration of the roIFN-τ aqueous preparation. This study will facilitate the clinical application of roIFN-τ as a potential antiviral agent in future work.

**Key words:** bioavailability, ovine interferon-τ, cytopathic effect inhibition assay, pharmacokinetic study