Purpose: Combination therapy of fenofibrate and statins is highly recommended by the current clinical guidelines for the treatment of mixed dyslipidemia. In this study, we formulated an innovative delayed-release preparation of fenofibrate designed to achieve the following: to reduce the risk of muscle toxicity, caused by simultaneous administration of this combination therapy, by altering the pharmacokinetic profile of fenofibrate, as well as to improve the oral bioavailability of the modified-release formulation.

Methods: Micronized fenofibrate was used to prepare drug-loaded cores via a powder layering process before performing multiparticulate pellet coating. Different coating formulations were screened, and their in vitro release profiles were compared with those of the commercial sustained-release pellets Lipilfen®. Two optimized formulations were evaluated in Beagle dogs using and compared with two reference commercial preparations of fenofibrate (the immediate-release preparation Lipanthyl® and the sustained-release pellets Lipilfen®) as references.

Results: The in vivo release of fenofibrate from R1 and R2 selected from in vitro tests exhibited a lag phase, and then followed by rapid and complete drug release. The relative bioavailabilities of R1 and R2 were 100.4% and 201.1%, respectively, which were higher than that of Lipilfen® (67.2%).

Conclusion: The modified fenofibrate pellets developed showed enhanced bioavailability and delayed-release properties, and they have the potential to improve safety and compliance when co-administered with statins. To the best of our knowledge, this is the first report of a delayed-release preparation of fenofibrate.