In vivo liver toxicity studies

In this guide

This is a paper for discussion. This does not represent the views of the Committee and should not be cited.

6. The current paper considers effects in adult animals following exposure to PFAS by gavage, intraperitoneal (i.p) injection, diet or drinking water.

7. From the 53 published sources, 50 studies were carried out on 10 perfluoroalkyl carboxylic acids (PFCAs) and 27 studies were carried out on three perfluoroalkyl sulphonic acids (PFSAs). Table 3 to Table 16 present no observed adverse effect levels (NOAELs) and lowest observed adverse effect levels (LOAELs) for PFCAs based on liver effects and Table 17 to Table 19 present data for PFSAs.

8. In vivo acute toxicity studies are available for perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), and perfluorodecanoic acid (PFDA) (Table 3 to Table 5) and perfluorooctane sulfonic acid (PFOS) (Table 6).

9. Repeated dose studies are available for perfluorobutanoic acid (PFBA), perfluorohexanoate (PFHxA), PFOA, PFNA, PFDA, perfluoroundecanoic acid (PFUnDA), perfluorododecanoic Acid (PFDoDA), perfluorotetradecanoic acid (PFTeDA) and perfluorohexadecanoic acid (PFHxDA), perfluorooctadecanoic acid (PFODA) (Table 7 to Table 16) and perfluorobutane sulfonic acid (PFBS), perfluorohexanesulfonic acid (PFHxS) and PFOS (Table 17 to Table 19).

10. Developmental toxicity studies are available for PFBA and PFOA (Table 20 and Table 21).

11. Of the 12 acute studies identified, four were carried out with PFOA, one with PFNA, five with PFDA and two with PFOS.

12. Of the 62 repeated dose studies identified, two were carried out with PFDoDA, three with PFBA, PFHxA and PFDA, four with PFNA, six with PFHxS, seven were carried out with PFBS, 12 with PFOS and 18 with PFOA. Only one study was carried out with PFUnDA, PFTeDA, PFHxDA and PFPDA.

13. Of the three development toxicity studies identified, one was carried out with PFBA and two with PFOA. Only effects in the dam are discussed in the endpoint summaries below as developmental effects in offspring, as a result of exposure during gestation and/or lactation, will be evaluated in subsequent papers.

14. The majority of acute and repeated dose studies were conducted with rats and mice, with the exception of one repeated dose study with PFOS and PFOA, which was carried out in Cynomolgus monkeys.

15. An overview of the PFAS chemical structure and molecular weight is presented in Annex C to this paper. Depending on the PFAS, studies have investigated the acid form, or a sodium, ammonium or potassium salt.