



Technical Report 598: Draft NTP Technical Report on the Toxicology and Carcinogenesis Studies of Perfluorooctanoic Acid (CAS No. 335-67-1) Administered in Feed to Sprague Dawley (Hsd:Sprague Dawley® SD®) Rats

December 12, 2019

Charge

- Review and evaluate the scientific and technical elements of the study and its presentation.
- Determine whether the study's experimental design, conduct, and findings support NTP's conclusions regarding the hypothesis under the conditions of this study.

Study Hypothesis

- Exposure to perfluorooctanoic acid during gestation and lactation (perinatal exposure) combined with postweaning exposure changes the perfluorooctanoic acid carcinogenic response quantitatively (more neoplasms) or qualitatively (different neoplasm types) compared to postweaning exposure alone.

Charge Questions

- *Information presentation.*
 - Comment on the clarity, transparency, and presentation of information in the draft report.
 - Identify any information that should be added or deleted.
 - Identify any areas for improvement.
 - Identify any editorial corrections/comments.
- *Study design and conduct.*
 - Comment on the study design and conduct for addressing the hypothesis including:
 - Appropriateness of the dosing regimen and other considerations of dose selection.
 - Any limitations of the study design and conduct that might impact interpretation of the study results.
- *Study findings and draft conclusions.*
 - Comment on the qualitative and/or quantitative impact of perinatal exposure on the toxicity and carcinogenic activity of perfluorooctanoic acid and whether the study findings support the hypothesis.
 - Comment on whether the study findings support NTP's draft conclusions regarding the toxicity and carcinogenic activity of perfluorooctanoic acid and the impact of perinatal exposure on those findings (presented in bulleted format as will be projected at the meeting for voting on conclusions*):

Hsd:Sprague Dawley SD rats, exposed to perfluorooctanoic acid

- Male
 - *Clear evidence of carcinogenic activity*
 - Increased incidences of hepatocellular neoplasms (predominately hepatocellular adenomas)
 - Increased incidences of acinar cell neoplasms (predominately acinar cell adenomas) of the pancreas



- Exposure to perfluorooctanoic acid resulted in increased incidences of nonneoplastic lesions in the liver and pancreas.
 - The additional effect of combined perinatal and postweaning exposure was limited to a higher incidence of hepatocellular carcinomas compared to postweaning exposure alone.
 - Female
 - *Some evidence of carcinogenic activity*
 - Increased incidences of pancreatic acinar cell adenoma or adenocarcinoma (combined) neoplasms
 - May have been related to perfluorooctanoic acid exposure (*equivocal evidence*)
 - Higher incidence of hepatocellular carcinomas
 - Higher incidence of adenocarcinomas of the uterus
 - Exposure to perfluorooctanoic acid resulted in increased incidences of nonneoplastic lesions in the liver, kidney, forestomach, and thyroid gland.
 - The combined perinatal and postweaning exposure was not observed to change the neoplastic or nonneoplastic response compared to postweaning exposure alone.
- Agree:
- Agree in principle with the exceptions listed below:
- Do not agree with conclusions because:

***Note:** Draft NTP Technical Report conclusion as written in the draft report:

Under the conditions of these 2-year feed studies, there was *clear evidence of carcinogenic activity* of PFOA in male Hsd:Sprague Dawley® SD® rats based on the increased incidence of hepatocellular neoplasms (predominately hepatocellular adenomas) and increased incidence of acinar cell neoplasms (predominately acinar cell adenomas) of the pancreas. The additional effect of combined perinatal and postweaning exposure was limited to a higher incidence of hepatocellular carcinomas in male rats compared to postweaning exposure alone.

There was *some evidence of carcinogenic activity* of PFOA in female Hsd:Sprague Dawley® SD® rats based on the increased incidences of pancreatic acinar cell adenoma or adenocarcinoma (combined) neoplasms. The higher incidence of hepatocellular carcinomas and adenocarcinomas of the uterus may have been related to exposure. The combined perinatal and postweaning exposure was not observed to change the neoplastic or nonneoplastic response compared to the postweaning exposure alone in female rats.

Exposure to PFOA resulted in increased incidences of nonneoplastic lesions in the liver and pancreas of male rats and in the liver, kidney, forestomach, and thyroid gland of female rats.