

# References - PFAS/2023/03

## In this guide

### [In this guide](#)

1. [Introduction and Background - PFAS/2023/03](#)
2. [PFASs](#)
3. [PFOS](#)
4. [PFCAs](#)
5. [PFOA](#)
6. [PFNA](#)
7. [PFDA](#)
8. [Summary and Abbreviations](#)
9. [References - PFAS/2023/03](#)
10. [Annex A - PFAS/2023/03](#)

Butenhoff, J. L., Chang, S.-C., Ehresman, D. J., & York, R. G. (2009).

Evaluation of potential reproductive and developmental toxicity of potassium perfluorohexanesulfonate in Sprague Dawley rats. *Reproductive Toxicology*, 27(3-4), 331-341. <https://doi.org/10.1016/j.reprotox.2009.01.004>

Butenhoff, J. L., Chang, S. C., Olsen, G. W., & Thomford, P. J. (2012). Chronic dietary toxicity and carcinogenicity study with potassium perfluorooctanesulfonate in Sprague Dawley rats [Article]. *Toxicology*, 293(1-3), 1-15. <https://doi.org/10.1016/j.tox.2012.01.003>

Chang, S., Allen, B. C., Andres, K. L., Ehresman, D. J., Falvo, R., Provencher, A., Olsen, G. W., & Butenhoff, J. L. (2017). Evaluation of serum lipid, thyroid, and hepatic clinical chemistries in association with serum perfluorooctanesulfonate (PFOS) in cynomolgus monkeys after oral dosing with potassium PFOS [Article]. *Toxicological Sciences*, 156(2), 387-401, Article kfw267. <https://doi.org/10.1093/toxsci/kfw267>

Chang, S. C., Ehresman, D. J., Bjork, J. A., Wallace, K. B., Parker, G. A., Stump, D. G., & Butenhoff, J. L. (2009). Gestational and lactational exposure to potassium perfluorooctanesulfonate (K+PFOS) in rats: Toxicokinetics, thyroid hormone status, and related gene expression [Article]. *Reproductive Toxicology*, 27(3-4), 387-399. <https://doi.org/10.1016/j.reprotox.2009.01.005>

Chang, S. C., Thibodeaux, J. R., Eastvold, M. L., Ehresman, D. J., Bjork, J. A., Froehlich, J. W., Lau, C., Singh, R. J., Wallace, K. B., & Butenhoff,

J. L. (2008). Thyroid hormone status and pituitary function in adult rats given oral doses of perfluorooctanesulfonate (PFOS) [Article]. *Toxicology*, 243(3), 330-339. <https://doi.org/10.1016/j.tox.2007.10.014>

Conley, J. M., Lambright, C. S., Evans, N., Medlock-Kakaley, E., Dixon, A., Hill, D., McCord, J., Strynar, M. J., Ford, J., & Gray, L. E., Jr. (2022). Cumulative maternal and neonatal effects of combined exposure to a mixture of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) during pregnancy in the Sprague-Dawley rat [Article]. *Environment International*, 170, 107631. <https://doi.org/10.1016/j.envint.2022.107631>

Curran, I., Hierlihy, S. L., Liston, V., Pantazopoulos, P., Nunnikhoven, A., Tittlemier, S., Barker, M., Trick, K., & Bondy, G. (2008). Altered fatty acid homeostasis and related toxicologic sequelae in rats exposed to dietary potassium perfluorooctanesulfonate (PFOS) [Article]. *Journal of Toxicology and Environmental Health - Part A: Current Issues*, 71(23), 1526-1541. <https://doi.org/10.1080/15287390802361763>

EFSA. (2012). Guidance on selected default values to be used by the EFSA Scientific Committee, Scientific Panels and Units in the absence of actual measured data. *EFSA Journal*, 10(3), 2579. <https://doi.org/https://doi.org/10.2903/j.efsa.2012.2579>

EFSA. (2018). EFSA CONTAM Panel (Panel on Contaminants in the Food Chain). Risk to human health related to the presence of perfluorooctane sulfonic acid and perfluorooctanoic acid in food. *EFSA Journal*, 16(12), e05194. <https://doi.org/10.2903/j.efsa.2018.5194>

EFSA. (2020). EFSA Panel on Contaminants in the Food Chain (EFSA CONTAM Panel). Risk to human health related to the presence of perfluoroalkyl substances in food. *EFSA Journal*, 18(9), e06223. <https://doi.org/https://doi.org/10.2903/j.efsa.2020.6223>

EFSA. (2012). Guidance on selected default values to be used by the EFSA Scientific Committee, Scientific Panels and Units in the absence of actual measured data. *EFSA Journal*, 10(30), 2579.

<https://doi.org/https://doi.org/10.2903/j.efsa.2012.2579>

EFSA. (2018). Risk to human health related to the presence of perfluorooctane sulfonic acid and perfluorooctanoic acid in food. *EFSA Journal*, 16(12), 5194.

<https://doi.org/https://doi.org/10.2903/j.efsa.2018.5194>

EFSA. (2020). Risk to human health related to the presence of perfluoroalkyl substances in food. *EFSA Journal*, 18(9), 6223.

<https://doi.org/https://doi.org/10.2903/j.efsa.2020.6223>

Elcombe, C. R., Elcombe, B. M., Foster, J. R., Chang, S. C., Ehresman, D. J., Noker, P. E., & Butenhoff, J. L. (2012). Evaluation of hepatic and thyroid responses in male Sprague Dawley rats for up to eighty-four days following seven days of dietary exposure to potassium perfluorooctanesulfonate [Article]. *Toxicology*, 293(1-3), 30-40. <https://doi.org/10.1016/j.tox.2011.12.015>

Feng, X., Cao, X., Zhao, S., Wang, X., Hua, X., Chen, L., & Chen, L. (2017).

Exposure of pregnant mice to perfluorobutanesulfonate causes hypothyroxinemia and developmental abnormalities in female offspring [Article]. *Toxicological Sciences*, 155(2), 409-419. <https://doi.org/10.1093/toxsci/kfw219>

Gilbert, M. E., O'Shaughnessy, K. L., Thomas, S. E., Riutta, C., Wood, C. R.,

Smith, A., Oshiro, W. O., Ford, R. L., Hotchkiss, M. G., Hassan, I., & Ford, J. L. (2021). Thyroid Disruptors: Extrathyroidal Sites of Chemical Action and Neurodevelopmental Outcome-An Examination Using Triclosan and Perfluorohexane Sulfonate [Article]. *Toxicological Sciences*, 183(1), 195-213. <https://doi.org/10.1093/toxsci/kfab080>

Langley, A. E., & Pilcher, G. D. (1985). Thyroid, bradycardic and hypothermic effects of perfluoro-n-decanoic acid in rats [Article]. *Journal of Toxicology and Environmental Health*, 15(3-4), 485-491.

<https://doi.org/10.1080/15287398509530675>

Lau, C., Thibodeaux, J. R., Hanson, R. G., Rogers, J. M., Grey, B. E., Stanton, M. E., Butenhoff, J. L., & Stevenson, L. A. (2003). Exposure to perfluorooctane sulfonate during pregnancy in rat and mouse. II: postnatal evaluation. *Toxicol Sci*, 74(2), 382-392. <https://doi.org/10.1093/toxsci/kfg122>

Loveless, S. E., Slezak, B., Serex, T., Lewis, J., Mukerji, P., O'Connor, J. C., Donner, E. M., Frame, S. R., Korzeniowski, S. H., & Buck, R. C. (2009). Toxicological evaluation of sodium perfluorohexanoate [Article]. *Toxicology*, 264(1-2), 32-44. <https://doi.org/10.1016/j.tox.2009.07.011>

Luebker, D. J., York, R. G., Hansen, K. J., Moore, J. A., & Butenhoff, J. L. (2005). Neonatal mortality from in utero exposure to perfluorooctanesulfonate (PFOS) in Sprague-Dawley rats: dose- response, and biochemical and pharmacokinetic parameters. *Toxicology*, 215(1-2), 149-169. <https://doi.org/10.1016/j.tox.2005.07.019>

NTP. (2022a). NTP Technical Report on the Toxicity Studies of Perfluoroalkyl Carboxylates (Perfluorohexanoic Acid, Perfluorooctanoic Acid, Perfluorononanoic Acid, and Perfluorodecanoic Acid) Administered by Gavage to Sprague Dawley (Hsd:Sprague Dawley SD) Rats (Revised). NTP TOX 97. August 2019. Revised July 2022.

NTP. (2022b). NTP Technical Report on the Toxicity Studies of Perfluoroalkyl Sulfonates (Perfluorobutane Sulfonic Acid, Perfluorohexane Sulfonate Potassium Salt, and Perfluorooctane Sulfonic Acid) Administered by Gavage to Sprague Dawley (Hsd:Sprague Dawley SD) Rats (Revised). NTP TOX 96. August 2019. Revised July 2022.

Ramhøj, L., Hass, U., Boberg, J., Scholze, M., Christiansen, S., Nielsen, F., & Axelstad, M. (2018). Perfluorohexane sulfonate (PFHxS) and a mixture of endocrine disruptors reduce thyroxine levels and cause antiandrogenic effects in rats [Article]. *Toxicological Sciences*, 163(2), 579-591. <https://doi.org/10.1093/toxsci/kfy055>

Ramhøj, L., Hass, U., Gilbert, M. E., Wood, C., Svingen, T., Usai, D., Vinggaard, A. M., Mandrup, K., & Axelstad, M. (2020). Evaluating thyroid hormone disruption: investigations of long-term neurodevelopmental effects in rats after perinatal exposure to perfluorohexane sulfonate (PFHxS) [Article]. *Scientific Reports*, 10(1), Article 2672. <https://doi.org/10.1038/s41598-020-59354-z>

Seacat, A. M., Thomford, P. J., Hansen, K. J., Olsen, G. W., Case, M. T., & Butenhoff, J. L. (2002). Subchronic toxicity studies on perfluorooctanesulfonate potassium salt in cynomolgus monkeys [Article]. *Toxicological Sciences*, 68(1), 249-264. <https://doi.org/10.1093/toxsci/68.1.249>

Thibodeaux, J. R., Hanson, R. G., Rogers, J. M., Grey, B. E., Barbee, B. D., Richards, J. H., Butenhoff, J. L., Stevenson, L. A., & Lau, C. (2003). Exposure to

perfluorooctane sulfonate during pregnancy in rat and mouse. I: Maternal and prenatal evaluations [Review]. *Toxicological Sciences*, 74(2), 369-381.

<https://doi.org/10.1093/toxsci/kfg121>

Van Rafelghem, M. J., Inhorn, S. L., & Peterson, R. E. (1987). Effects of perfluorodecanoic acid on thyroid status in rats [Article]. *Toxicology and Applied Pharmacology*, 87(3), 430-439. [https://doi.org/10.1016/0041-008X\(87\)90248-1](https://doi.org/10.1016/0041-008X(87)90248-1)

Wang, F., Liu, W., Jin, Y., Dai, J., Zhao, H., Xie, Q., Liu, X., Yu, W., & Ma, J. (2011). Interaction of PFOS and BDE-47 co-exposure on thyroid hormone levels and TH-related gene and protein expression in developing rat brains [Article].

*Toxicological Sciences*, 121(2), 279-291. <https://doi.org/10.1093/toxsci/kfr068>

Yu, W.-G., Liu, W., Jin, Y.-H., Liu, X.-H., Wang, F.-Q., Liu, L., & Nakayama, S.

F. (2009). Prenatal and postnatal impact of perfluorooctane sulfonate (PFOS) on rat development: a cross-foster study on chemical burden and thyroid hormone system. *Environ Sci Technol*, 43(21), 8416-8422.