THE ENDOCRINE DISRUPTION EXCHANGE
Partners in Science

There are currently 30 PFAS chemicals listed on the TEDX List of Potential Endocrine Disruptors. Endocrine disrupting activity for these chemicals was identified in more than 50 peer reviewed studies. These chemicals are associated with a variety of endocrine effects from disrupting thyroid hormones important for proper neurodevelopment to activating hormone receptors that impact obesity and lipid metabolism. Some are associated with altered development.

PFBA

• Increased liver weight and hypertrophy in mice	Foreman et al. 2009
• PPARα activator *in vitro*	Rosenmai et al. 2016 Ishibashi et al. 2011

PFPeA

• Cord blood levels associated with cord blood thyroid hormone, which is important for neurodevelopment	Shah-Kulkarni et al. 2016
• Positively associated with thyroglobulin antibody and microsomal antibody	Li et al. 2017
• PPARα activator *in vitro* in many cell systems	Wolf et al. 2012 Rosenmai et al. 2017 Ishibashi et al. 2011

PFHxA

• Positively associated with thyroglobulin antibody and microsomal antibody	Li et al. 2017
• Disrupted thyroid hormone responsive gene expression in neuronal cells from two bird species	Vongphachan et al. 2011
• PPARα activator *in vitro*	Wolf et al. 2012 Rosenmai et al. 2016

6:2 FTOH

• Activate estrogen-responsive gene expression in male fish	Ishibashi et al. 2008
• Increased production of estradiol *in vitro*	Rosenmai et al. 2016
• Increased proliferation of estrogen responsive cells and altered estrogen responsive gene expression *in vitro*	Maras et al. 2006

Importantly, a lack of evidence does not indicate a lack of effect. Rather it indicates that not all of these chemicals have been tested for important biological activity yet.

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PFBA

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PFHxA

- Positively associated with thyroglobulin antibody and microsomal antibody — Li et al. 2017
- Disrupted thyroid hormone responsive gene expression in neuronal cells from two bird species — Vongphachan et al. 2011
- PPARα activator *in vitro* — Wolf et al. 2012; Rosenmai et al. 2016

PFHpA

- PPARα and PPARγ activator *in vitro* in multiple cell systems — Rosenmai et al. 2016; Rosenmai et al. 2017; Wolf et al. 2012
- Disrupted thyroid hormone responsive gene expression in neuronal cells from two bird species — Vongphachan et al. 2011

PFBS

- Hypothyroxinemia, developmental abnormalities, and altered puberty after fetal exposure in mice — Feng et al. 2017
- Inhibited aromatase activity *in vitro* — Gorrochategui et al. 2014
- Altered expression of estrogen and androgen receptor in tadpoles — Lou et al. 2013
- PPARα activator *in vitro* — Rosenmai et al. 2017
- Disrupted thyroid hormone responsive gene expression in neuronal cells from chicken — Vongphachan et al. 2011

4:2 FTOH

- Estrogen receptor activator *in vitro* — Rosenmai et al. 2016

6:2 FTOH

- Activate estrogen-responsive gene expression in male fish — Ishibashi et al. 2008
- Increased production of estradiol *in vitro* — Rosenmai et al. 2016
- Increased proliferation of estrogen responsive cells and altered estrogen responsive gene expression *in vitro* — Maras et al. 2006