Fig. S1. TCDD exposure does not change body weight, prostate weight, response to alpha adrenergic agonist, or frequency dose response in bladder. (A) TCDD exposure does not change the peak voiding pressure during anesthetized cystometry. (B) TCDD exposure in the bladder does not significantly change the response to electrical field stimulation at any frequency (0.1-60 Hz) compared to vehicle. (C) TCDD exposure does not significantly shift the dose response to α-adrenergic agonist (phenylephrine), and the EC$_{50}$ is the same for both groups ($p = 0.8031$, EC$_{50}$ = 1.932). The baseline was set to 0.7g so tissues are considered baseline at 70%, shown by the dotted line. (D) In utero and lactational TCDD exposure does not change body weight (grams) at 14 weeks. (E) In utero and lactational TCDD exposure does not change the dorsal, ventral, or anterior prostate weight normalized to body weight. Students t-test was used to assess differences between groups in panel A, D, and E. Panel B an two-way ANOVA was used to analyze differences between groups at various frequencies. Non-linear regression analysis was used to analyze the phenylephrine dose response in panel C.
Fig. S2. TCDD does not change calcitonin gene-related peptide (CGRP+) axon density dorsal prostate.
Pregnant C57BL/6J mice were dosed with TCDD (1 µg/kg maternal dose, po) or vehicle (5 mL/kg, po), and prostates were collected on E17.5, P9, and P90 (Panel A-C). P90 axon density was quantified in three distinct regions: inside the rhabdosphincter (In RS), proximal to the rhabdosphincter, and distal to the rhabdosphincter because sensory axon densities differ along the proximo-distal ductal axis. Prostate tissue sections were stained via immunohistochemistry to identify axons (green) and epithelium (magenta). The density of CGRP+ axons was quantified within a 10 µm band around the prostate ducts. The density of CGRP+ axons does not differ between vehicle and TCDD exposed mice. Results are from 4-7 mice per group belonging to at least three independent litters per group, and differences of \( p \leq 0.05 \) were considered significant. Students t-test was used to assess differences between groups. Scale bars represent 50 µm for P90 and P9 and 100 µm for E17.5.
Fig. S3. TCDD does not change beta 3 tubulin (TUBB3+) axon densities in dorsal prostate. Pregnant C57BL/6J mice were dosed with TCDD (1 µg/kg maternal dose, po) or vehicle (5 mL/kg, po), and prostates were collected on postnatal day E17.5, P9, and P90. Prostate tissue sections were stained via immunohistochemistry to identify TUBB3+ axons (green) and epithelium (magenta). The density of TUBB3+ axons was quantified within a 10 µm band around the prostate ducts. The density of TUBB3+ axons does not differ between vehicle and TCDD exposed mice. Results are from 4-5 mice per group belonging to at least three independent litters per group, and differences of $p < 0.05$ were considered significant. Scale bar is 50 µm for P50 and P9 and 100 µm for E17.5. Student’s t-test was used to assess differences between groups. Scale bars represent 50 µm for P90 and P9 and 100 µm for E17.5.
Fig. S4. TCDD does not change vesicular acetylcholine transporter (VACHT+) axon densities in dorsal prostate. Pregnant C57BL/6J mice were dosed with TCDD (1 µg/kg, po) or vehicle (5 mL/kg, po), and prostates were collected on E17.5, P9, and P90. Prostate tissue sections were stained via immunohistochemistry to identify axons (green) and epithelium (magenta). The density of VACHT+ axons does not differ between vehicle and TCDD exposed mice. Results are from 4-5 mice per group belonging to at least three independent litters per group, and differences of $p \leq 0.05$ were considered significant. Scale bar is 50 µm for P50 and P9 and 100 µm for E17.5. Student's t-test was used to assess differences between groups. Scale bars represent 50 µm for P90 and P9 and 100 µm for E17.5.
Fig. S5. Postnatal day 9 mouse prostatic *Arnt* mRNA abundance no longer differs between mice that were exposed to TCDD (1 µg/kg maternal dose, po) or vehicle (5 mL/kg, po) on E13.5. RT-PCR was performed on isolated P9 urogenital sinuses and normalized to *Ppia* abundance as an internal control. Results are from 6-7 mice deriving from at least three independent litters, and differences of $p < 0.05$ were considered significant. Students t-test was used to assess differences between groups.
| Antibody                                | Vendor/Catalog Number | Antibody registry number (RRID) | Host     | Species          | Dilution | Antibody Characterization                                                                 |
|-----------------------------------------|-----------------------|---------------------------------|----------|------------------|----------|------------------------------------------------------------------------------------------------|
| Tyrosine hydroxylase (TH)               | EMD Millipore/AB152   | AB_390204                       | Rabbit   | Polyclonal       | 1:300    | (Van Kampen et al., 2015)(Johnson et al., 2015)(Bentea et al., 2015)                          |
| Vesicular acetylcholine transporter (VACHT) | EMD Millipore/ABN100 | AB_2630394                      | Goat     | Polyclonal       | 1:250    | (Turco et al., 2019)                                                                         |
| Calcitonin gene-related peptide (CGRP) | Sigma Aldrich/C8198   | AB_259091                       | Rabbit   | Polyclonal       | 1:100    | (Turco et al., 2019)                                                                         |
| βIII tubulin (TUBB3)                    | Abcam/ab78078         | AB_2256751                      | Rabbit   | Polyclonal       | 1:100    | (Turco et al., 2019)                                                                         |
| E-Cadherin (CDH1)                       | Cell Signaling Technology/3195S | AB_2291471                  | Rabbit   | Monoclonal       | 1:200    | (Vasilaki et al., 2018)(Drubay et al., 2018)(Lloyd-Lewis et al., 2018)                       |
| E-Cadherin (CDH1)                       | BD Transduction Labs/610181 | AB_39580                      | Mouse    | Monoclonal       | 1:100    | (Wegner et al., 2017)                                                                        |
| Alexa Fluor 488-AffiniPure Anti-mouse IgG | Jackson                | AB_2340846                      | Donkey   | 1:250            |          |                                                                                               |
| Rhodamine-red-X AffiniPure Anti-Rabbit IgG | Jackson               | AB_2340613                      | Donkey   | 1:250            |          |                                                                                               |
| Alexa Fluor 647-AffiniPure Anti-Rabbit IgG | Jackson                | AB_2492288                      | Donkey   | 1:250            |          |                                                                                               |
| Alexa Fluor 488-AffiniPure Anti-Goat IgG | Jackson                | AB_2340428                      | Donkey   | 1:250            |          |                                                                                               |
Table S2. FASTA sequences used in Mouse_Adapters.fa for Skewer adapter trimming

| >Illumina Multiplexing Adapter 1 | GATCGGAAGAGCACACGTCT |
| >Illumina_TrueSeq_Adapter_Index_1 | GATCGGAAGAGCACACGTCTGCTGAACCTCCAGTCACATCACG |
| >Illumina_TrueSeq_Adapter_Index_2 | GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGGATGT |
| >Illumina_TrueSeq_Adapter_Index_3 | GATCGGAAGAGCACACGTCTGAACTCCAGTCACCTTAGGC |
| >Illumina_TrueSeq_Adapter_Index_3a | GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGATGT |
| >Illumina_TrueSeq_Adapter_Index_4 | GATCGGAAGAGCACACGTCTGAACTCCAGTCACCTTAGGC |
| >Illumina_TrueSeq_Adapter_Index_5 | GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGGATGT |
| >Illumina_TrueSeq_Adapter_Index_6 | GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGGATGT |
| >Illumina_TrueSeq_Adapter_Index_7 | GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGGATGT |
| >Illumina_TrueSeq_Adapter_Index_8 | GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGGATGT |
| >Illumina_read2_adapter_segment | AGATCGGAAGAGCGTCGTGTAGGGAAAGAGTGTAGATTCGTTAGGCGTGGC |
| >Illumina_read2_adapter_segment01 | AGATCGGAAGAGCGTCGTGTAGGGAAAGAGTGTAGATTCGTTAGGCGTGGC |
| >Illumina_Multiplexing Index Read Sequencing Primer | GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGGATGT |
| >Illumina_read_adapter_segment_1 | GATCGGAAGAGCACACGTCTGAACTCCAGTCACCGGATGT |
| >Illumina_read_adapter_segment_2 | GATCGGAAGAGCGTCGTGTAGGGAAAGAGTGTAGATTCGTTAGGCGTGGC |

Table S3. RT-PCR primers

| Target | NM Number | Left Primer | Right Primer |
|--------|-----------|-------------|--------------|
| Artn   | NM_011037.4 | CTGGACCCAATGTCCCGCAG | AGTGTGTCCCCTACCAGGC |
| Ppia   | NM_008907.2 | TCTCCGATGGGACCTG | ATCAGCGCCGATGACGAGCC |
Movie 1. Vehicle-exposed prostate tissue stimulated with 0.1 Hz and 60 V for 10 seconds and imaged at 20X. Video is pseudocolored, with yellow showing maximal contraction and blue showing minimal.
Movie 2. TCDD-exposed prostate tissue stimulated with 0.1 Hz and 60 V for 10 seconds and imaged at 20X. Video is pseudocolored, with yellow showing maximal contraction and blue showing minimal.

Dataset 1. Differential gene expression results as determined by edgeR.
Click here to download Dataset 1

Dataset 2. Differential gene expression R script.
Click here to download Dataset 2