**Table 1**. summary of the articles included in the review

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Article | Disorder | Animal | Model name | Control (no) + (♀/♂) | Model (no) + (♀/♂) | Age (months) | Field strength | No shells | B-value(s/mm2) | No. directions | In vivo or ex vivo | Results in model compared to WT ↓ or ↑ |
| Badea et al., 2016 | AD | Mice | CVN-AD | 8(3/4) | 9 (6/3) | 14-18 | 9.4T | 1 | 1595 | 12 | Ex vivo | VBA:  ↓FA:cc, cp, fi-fx, vhpc, dhpc (comm), ic  ROIs: ↓FA:ventral thalamic nucleus, hyp, ic  ↓AD:cp, middle cp ↑RD: vhpc comm, fx ↑e2: vhpc comm, fi  ↑ADC: vhpc comm |
| Thiessen et al., 2010 | AD | Mice | TgCRND8 | 4(4/0) | 7(0/7) | 12-16 | 7T | 8 | 21 84.1 189.1 336.3 525.4 756.6 1029.8 1345 | 8 8 8 8 8 8 8 8 | In vivo | ROIs:  No changes |
| Mueggler et al., 2004 | AD | Mice | APP23 | 5 (0/5)   6 (0/6) | 8 (0/8)   10 (0/10) | 6   25 | 7T | 5 | 0-2000 | N/A | In vivo | ROIs: ↓ADC: nctx |
| Munoz-Moreno et al., 2018 | AD | Rats | TgF344-AD | 9 (0/9) | 9 (0/9) | Control (4.6 - 5.6) AD (4.6 - 7.5) | 7T | 1 | 1000 | 60 | In vivo | ROIs:  ↓FA-weighted nodal efficiency: right medial prefrontal cortex ↓FA-W connectome average strength, global efficiency,  average clustering coefficient ↑FD-W strength: R na |
| Snow et al., 2017 | AD | Mice | 3xTg | 8 (N/A) | 7 (N/A) | 12-14 | 7T | 1 | 1000 | 6 | In vivo | ROIs:  ↓FA: hpc ↓AD: hpc no diff in RD or MD |
| Shu et al., 2013 | AD | Mice | APP/PS1 | 9 (N/A) | 9 (N/A) | 13.75 ± 1.52 | 7T | 1 | 800 | N/A | In vivo | VBA:  ↑FA: thal, str, L hpc, forceps minor of cc, anterior ac, ic ↑AD: str, L hpc, forceps minor of cc, anterior ac, ic, bilateral ctx ↑MD: bilateral ctx ↑RD: bilateral ctx ROIs: ↑FA: forceps minor cc, anterior ac, ic, thal, str, L hpc ↑AD: forceps minor cc, anterior ac, ctx, str ↑MD: ctx ↑RD: ctx |
| Qin et al., 2013 | AD | Mice | APP/PS1 | 9 (N/A) | 9 (N/A) | 14 | 7T | 1 | 800 | 30 | In vivo | VBA:  ↑FA: bilateral nctx, hpc, cpu, ip, fi, right pctx, L cc/ec, bilateral thal, hyp ↑AD: bilateral nctx, hpc, cpu, ip, fi, R pctx, L cc/ec,  bilateral sept, R amg,  ↑MD: no significant differences ↑RD: nctx, hpc  ROIs:  ↑FA: cpu, fi, ot, L thal, L ic ↑AD: bilateral nctx, cc/ec, cing, R fi, R sept  ↑MD: ctx ↑RD: ctx |
| Muller et al., 2013 | AD | Mice | Tg2576 | 5 (N/A) | 7 (N/A) | 23 | 11.7T | 1 | 1000 | 30 | In vivo | VBA:  ↑FA: lateral septal nucleus/ventral ventrocles area, lateral cblm ↓FA: cpu, vhpc, dhpc, entctx, thal, ic, rn ↓AD: dvhc, entctx, hyp, lateral septal nucleus  ↓MD: lateral septal nucleus, ventricles, dvhpc, thal, amg, ic ↓RD: lateral cblm, lateral septal nucleus, thal, dg  ROIs:  ↓FA: thal, entctx |
| Praet et al., 2018 | AD | Mice | APP/PS1 | 20 (0/20) | 19 (0/19) | 2 4 6 8 | 7T | 7 | 400 800 1200 1600 2000 2400 2800 | 20 20 20 20 20 20 20 | In vivo | ↓VBA:  FA: septal nuclei, cc (8mo) ↑RD: cc (8mo) ↑AK: cc (8mo)  ROIs:  ↓FA: pctx (2, 4, 6, 8mo), vc (4, 6, 8mo), cc (genu, body) (2, 4, 8mo),  splenium,  mc (4, 6, 8mo), retrosplenial ctx (4, 6, 8mo), septal nuclei (2, 4, 6, 8mo) ↑RD: mc (8mo), hpc (6,8mo) ↑AD: hpc (6, 8mo)  ↓AD: pctx (4mo), septal nuclei (4, 6, 8mo) ↑MD: hpc (6, 8mo)  ↑AK: mc, cgctx (4, 6, 8mo), prctx (4mo) ↑MK: mc (4, 6, 8mo) ↑RK: mc (8mo) |
| Harms et al., 2006 | AD | Mice | APPsw (Tg2576) | 9-10 (0/9-10) 9-10 (0/9-10) 9-10 (0/9-10) | 9-10 (0/9-10) 9-10 (0/9-10) 9-10 (0/9-10) | 12 15 17 | 7T | 1 | 1890 | 20 | Ex vivo | ROIs:  ↓RA: cc (12mo) |
| Sun et al., 2005 | AD | Mice | APPsw (Tg2576) | 8 (N/A) 8 (N/A) 8 (N/A) 8 (N/A) | 8 (N/A) 8 N/A) 8 N/A) 8 N/A) | 8 12 16 18 | 4.7T | 1 | 764 | 6 | In vivo | ROIs:  ↑RD: cc (16, 18mo)  ↓Trace: ctx, hpc (12, 18mo) ↓AD: cc (12, 18mo) ↓RD: cc (12mo) ↓RA: cc (16, 18mo) |
| Kastyak-Ibrahim et al., 2013. | AD | Mice | 3xTg | 3 (N/A) 4 (N/A) 4 (N/A) - | 8(N/A) 8(N/A) 8(N/A) 8(N/A) | 11 13 15 17 | 7T | 1 | 968-1034 | 30  7 | In vivo  ex vivo | ROIs:  No differences at in time point, neither in vivo nor ex vivo |
| Song et al., 2004 | AD | Mice | PDAPP | 20 (N/A)   8 (N/A) | 10 (N/A)   11 (N/A) | 3   15 | 4.7T | 1 | 764 | 6 | In vivo | ROIs: ↓RA: cp, cc, ec, fx (15mo) ↑Tr: ac, cp, cc, ec,fx, on, ot (15mo) ↑RD: ac, cp, cc, ec, fx, on, ot (15mo) ↑AD: cp (15mo) |
| Shen et al., 2018 | AD | Mice | APP/PS1 | 12 (0/12) | 12 (0/12) | 8 | 7T | 1 | 1000 | 30 | In vivo | ROIs:  No differences |
| Colgan et al., 2016 | AD | mice | rTg4510 | 5 (5/0) | 5 (5/0) | 8,5 | 9.4T | 2 | 1000  2000 | 20  30 | In vivo | ROIs:  ↑IsoVF: ctx ↓IsoVF: thal ↑NDI: ctx ↓NDI: hpc, cc  ↑ODI: cc  ↓ODI: ctx, hpc ↑MD: ctx, hpc, cc ↑FA: hpc ↓FA: cc |
| Vanhoutte et al., 2013 | AD | Mice | APP/PS1 | 5 (N/A) | 5 (N/A) | 16 | 9.4T | 7 | 400 800 1200 1600 2000 2400 2800 | 30 30 30 30 30 30 30 | In vivo | ROIs:  ↑rMK: ctx, thal  ↑rRK: ctx, tha ↑rAK: ctx, tha |
| Zerbi et al., 2014 | AD | Mice | apoE4    apoE-KO | 9 (0/9), 10 (0/10)  same  9 (0/9), 10 (0/10) | 8 (0/8), 9 (0/9)    10 (0/10), 9 (0/9) | 12, 18    12, 18 | 11.7T | 1 | 1000 | 30 | In vivo | VBA (apoE4):  ↑MD: ctx, hpc (18mo) ↓FA: hpc, retrosplenial ctx, pctx (12, 18m)  ROIs (apoE4): ↑MD: dhpc, ec, cc (12, 18mo) ↑AD: ec, cc  VBA (apoE-KO): ↑MD: ctx, hpc (18mo) ↓FA: ec (12mo)  ROIs (apoE-KO):  No differences |
| Grandjean et al., 2014 | AD | Mice | arcAβ | 10 (5/5) 8 (6/2) 9 (6/3) 9 (7/2) & 7 (5/2) | 11 (4/7) 8 (6/2) 9 (6/3) 10 (5/5) | 1.5 & 2.6 5.5 8.5 & 11.2 19.2 & 21.8 | 9.4T | 1 | 690 | 36 | In vivo | VBA:  ↓FA: anterior ec, anterior ic (all ages)  ROIs: ↓FA: anterior ec (all ages) |
| Grandjean et al., 2016b | AD | Mice | arcAβ  E22ΔAβ  PSAPP | 12 (6/6)  12 (7/5)  11 (7/4) | 12 (8/4)  12 (6/6)  9 (4/5) | 13,4  12,6  15,7 | 9.4T | 1 | 1000 | 36 | in vivo | VBA (arcAβ):  No differences  ROIs (arcAβ): ↑FA: minor foreceps ↑AD: minor foreceps  ↓RD: minor forceps  VBA (E22ΔAβ):  No differences  ROIs (E22ΔAβ):  No differences  VBA (PSAPP):  No differences  ROIs (PSAPP): ↓FA: ec |
| Zerbi et al., 2013 | AD | Mice | APP/PS1 | 15 (0/15) | 9 (0/9) | 12 | 11.7T | 1 | 1000 | 30 | In vivo | VBA:  ↓FA: cc, ec, fi, vc ↑FA: cp, ic, lateral posterior thal nuclei ↓MD: cc, ec ↑MD: fi, hpc ↓AD: cc, ec, cp, ic, lateral posterior thal nuclei, vc ↑AD: fi, hpc ↓RD: cc, ec, cp, ic, lateral posterior thal nuclei ↑RD: fi, hpc  ROIs:  ↓FA: cc genu, fi, ctx ↓MD: cp, cc body, fx ↑MD: fi, hpc ↓AD: posterior ac, cp, cc body, fx ↑AD: hpc ↑RD: fi, hpc |
| Anckaerts et al., 2019 | AD | Rats | TgF344-AD | 10 (10/0) | 11 (11/0) | 6 10 12 16 18 | 7T | 1 | 800 | 60 | In vivo | VBA:  ↓FA: ec, entctx (10, 12, 16, 18mo) ↑FA: cc, dorsal ec, lateral sctx ↓MD: ventricles (16, 18mo) ↑MD: primary mc, sctx, subgeniculate nucleus (10, 12, 16, 18mo) ↓AD: ventricles, ventral ec  ↑AD: ctx, cc ↓RD: ventricles ↑RD: ctx  ROIs: ↓FA: frontal cgctx (16mo), cg/retrosplenial ctx (16, 18mo), hpc (16mo) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Khairnar et al., 2015 | PD | Mice | TNWT-61 | 7(0/7) | 7(0/7) | 9 | 9.4T | 5 | 500 1000 1500 2000 2500 | 30 30 30 30 30 | In vivo | VBA (TBSS):  ↑MK: bilateral ec ↑AK: L ec ↑RK: bilateral ec, cc, cing, dhpc ↓MD: R mamillothalamic tract, R ic, R nigrostriatal tract,  R zona incerta ↓RD: bilateral ec    ROIs: ↑MK: sn, str, sctx, thal ↑AK: str ↑RK: thal ↓RD: thal  ↓MD: sn, str, sctx  ↓AD: sn, str, smctx, thal ↓RD: str, hpc, thal |
| Khairnar et al., 2017 | PD | Mice | TNWT-61 | 15 (0/15)     15 (0/15) | 15 (0/15)     15 (0/15) | 3     6 | 9.4T | 5 | 500 1000 1500 2000 2500 | 30 30 30 30 30 | In vivo | VBA (TBSS):  ↑MK: anterior and posterior ac, ip, L habenular capsule, medial lemniscus,  mammillothalamic tract, ec, reticular formation (6mo) ↑AK: R ec (6mo) ↓AD: vhpc comm, cc, ec, fx (6mo) - No differences at 3 months      ROIs: ↑MK: str, thal (3mo) ↑RK: str (3mo) ↑MK: sn, str, thal (6mo) ↑RK: str, thal (6mo) ↓RD: str, thal (6mo) ↑FA: sn, hpc, (6mo) |
| Khairnar et al., 2016 | PD | Mice | TNWT-61 | 12 (0/12) | 9 (0/9) | 14 | 9.4T | 5 | 500 1000 1500 2000 2500 | 30 30 30 30 30 | In vivo | VBA (TBSS):  ↑MK: bilateral ec, bilateral ic, ac, str, fx, cp, medial lemniscus, cing, cc,  ↑AK: bilateral ec, thal, medial lemniscus, L ac, forceps major cc, cing ↑FA: L ec ↓MD: bilateral ic, R ec, L ac ↓AD: ec,fi  ↓RD: L ec, cp    ROIs: ↑MK: sn, str, hpc, sctx, thal  ↑AK: sctx, thal ↑RK: sctx, thal ↓MD: sctx, thal ↓AD: sctx, thal ↓RD: thal  FA: no differences |
| Arab et al., 2019 | PD | Mice | METH | 5 (0/5),  5 days after inj    6 (0/6) 1 month after inj | 11 (0/11) 5 days after inj    9 (0/9) 1 month after inj | 12-14 | 9,4 | 5 | 500 1000 1500 2000 2500 | 30 30 30 30 30 | In vivo | VBA (TBSS):  No differences after 5 days ↑FA: unilateral sctx, fx  ↑RK: unilateral in ventral nucleus of the lateral lemniscus,  lateral thalamic nuclei ↓MD: cing, ec, lateral thalamic nuclei ↓AD: cgctx, ec ↓RD: cgctx, sctx, ece, lateral thalamic nuclei,  ventral nucleus lateral lemniscus       ROIs: after 5 days: ↓MK: sn, str  ↓RK: sn ↑AD: ctx ↑RD: sn after 1 month ↑MK: ctx, hpc, str ↓MD: hpc, str ↓RD: sn ↑FA: ctx, hpc, sn, str |
| Cong et al., 2016 | PD | Mice | MitoPark | 9 (0/9) | 6 (3/3) | 7,5 | 7T | 1 | 1200 | 30 | In vivo | ROIs:  ↓ADC: sn, mc, thal, sctx ↓FA: cc, sn, |
| Perlbarg et al., 2018 | PD | Rats | 6-OHDA unilateral str | 5 (N/A) | 10 (N/A) | N/A  3 weeks after inj 6 weeks after inj | 11.7T | 1 | 1500 | 81 | In vivo | ROIs:  ↑FA: ipsi and contra striatum (3wks) ↑MD: ipsi str (6wks)  ↑AD: ipsi str (6wks) |
| Cai et al., 2019 | PD | Rats | PINK1-/- | 10 (0/10) | 10 (0/10) | 6-8 | 7T | 1 | 1000 | 10 | In vivo | ROIs:  ↓ADC: vhpc CA3, str, thal, dg, sctx, lateral sept, hypo  ↓AD: cblm, str, vhpc CA3, sctx, thal, vdg ↓RD: str, cblm, vhpc CA3, vdg, thal, hypo ↓FA: Zona incerta, paraventricular nucleus, ventral tegemntal area,  dorsal medial nucleus |
| Liu et al., 2018a | PD | Rats | Rotenone Injections in the  right SN  6-OHDA Injections in the  right SN | 6(0/6)   6(0/6) | 12 (0/12)   12 (0/12) | 2 scanned  1, 2, 3, and 4 weeks after inj | 3T | 1 | 1000 | 15 | in vivo | Rotenone (ROIs): ↓FA: R sn (6wks vs control)  6-OHDA (ROIs): ↓FA: R sn (1wk vs control) ↑FA: R sn (6wks vs control) |
| Boska et al., 2007 | PD | Mice | MPTP scanned before and  2, 5, 7 days after i.p inj in SN | 5 (0/5) | 5 (0/5) | 1.5-4.5 | 7T | 1 | 800 | 12 | In vivo | ROIs:  ↓FA: sn (5, 7days vs sham or prior scanning) ↑MD: sn (5, 7days vs sham or prior scanning) ↑AD: sn (5, 7days vs sham or prior scanning) ↑RD: sn (5, 7days vs sham or prior scanning) |
| Liu et al., 2017 | PD | Rats | Rotenone inj in right SN scanned 1, 2, 4,  and 6 weeks  after injection | 6 (0/6) | 12 (0/12) | 2-3 | 3T | 1 | 1000 | 15 | In vivo | ROIs (Combined value of all time points):  ↓FA: R sn  ↑MD: R sn  ↓FA: R sn (4wks vs 6wks) ↑MD: R sn (1wk vs 6wks  ↓FA: R sn (1, 2, 4, 6wks) ↑MD: R sn (1wk), R cc (1wk) |
| Soria et al., 2011 | PD | Rats | 6-OHDA inj into Left medial forebrain bundle scanned  before and 3 and 14 days after inj | 4 (0/4) | 8 (0/8) | N/A | 7T | 1 | 1000 | 30 | In vivo | ROIs:  ↓FA: ipsi snpr (3, 14days)  ↓AD: bilateral snpr (3days) ↑RD: bilateral ctx (3, 14days) |
| Van Camp et al., 2009 | PD | Rats | 6-OHDA inj in the R striatum 6 weeks after inj | 4 (4/0) sham 4 (4/0) no surgery | 5 (5/0) | N/A | 7T | 1 | 800 | 7 | In vivo | VBA:  ↑FA: sn  ROIs:  No sig differences  VBA-guided ROIs: ↑FA: ipsi sn |
| Monnot et al., 2017 | PD | Rats | 6-OHDA inj in the  R medial forebrain bundle, 4 weeks  after inj | 4 (0/4) | 4 (0/4) | N/A | 9.4T | 1 | 1250 | 30 | Ex vivo | VBA:  ↓FA: snpr  ↑RD: snpc  ROIs:  No differences |
| Fang et al., 2018 | PD | Rats | 6-OHDA inj in R SN scanned 1, 2, 4,  and 6 weeks after inj | 8 (0/8) | 8 (0/8) | 2 | 3T | 1 | 1000 | 15 | In vivo | ROIs:  ↓FA: R sn (1, 6wks ), R cc (4wks) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Liska et al., 2017 | ASD | Mice | Cntnap2-/- | 13 (0/13) | 10 (0/10) | 3-4 | 7T | 1 | 3000 | 81 | Ex vivo | Tractography:  No significant differences in number of streamlines |
| Zerbi et al., 2019 | ASD | Mice | Fmr1-/y | 23(0/23) | 26(0/26) | 2 | 7T | 2 | 1000 2000 | 90 90 | Ex vivo | ROIs:  ↓FA: ac, cc, cing, fi, vhpc comm, ic ↑RD: ac, cc, cing, fi, vhpc comm |
| Wilkes et al., 2019 | ASD | Mice | C58/J | 10 (5/5) | 17 (8/9) | 2 | 17.6T | 2 | 600 3000 | 8 52 | Ex vivo | ROIs:  ↓FA: cblm ↓AD: cblm |
| Kumar et al., 2012 | ASD | Mice | BALB/cJ | 12 (0/12) 11 (0/11) 7 (0/7) | 28 (0/28) 27 (0/27) 28 (0/28) | 1 1.67 2.3 | 9.4T | 1 | 786,73 | 6 | In vivo | ROIs (cross-sectional differences): ↓FA: ec (30, 70days),  ↑FA: cc (70days) ↑MD: cc (30, 50days), hpc (50days) ↓FA: amg (50days) ↑FA: hpc (70days)  ROIs (longitudinal differences): ↑FA: cc and ec (BALB/cJ: 50, 70days vs 30days)  ↑FA: ctx and frontal mc (BALB/cJ: 30days vs 50, 70days) ↑FA: frontal mc (BALB/cJ: 50days vs 70days) |
| Ellegood et al., 2013 | ASD | Mice | BTBR T+tf/J (BTBR) | 12 (0/12) | 12 (0/12) | 2,5 | 7T | 1 | 1917 | 30 | Ex vivo | VBA:  ↓FA: cc, ec (BTBR vs B6 and vs FVB) ↑FA: hpc (BTBR vs B6 and vs FVB)   ROIs: ↓FA: cc (BTBR vs B6) ↓FA: ac, cc, fx (BTBR vs FVB) |
| Kumar et al., 2014 | ASD | Mice | NL-3 R451C  knock-in  (NL-3) | 7 (3/4) 9 (3/6) 8 (2/6) | 10 (5/5) 10 (4/6) 5 (1/4) | 1 1.6 2.3 | 9.4T | 1 | 902 | 6 | Ex vivo | ROIs:  No differences |
| Ellegood et al., 2011 | ASD | Mice | NL-3 | 8 (0/8) | 8 (0/8) | 3,6 | 7T | 1 | 1956 | 6 | Ex vivo | VBA:  ↓FA: gp ↑RD: cc, cblm, hpc, thal  ROIs: No differences |
| Dodero et al., 2013 | ASD | Mice | BTBR T+tf/J (BTBR) | 9 (0/9) | 9 (0/9) | 3.75-6.5 | 7T | 1 | 1262 | 81 | Ex vivo | VBA (TBSS):  ↓FA: cc, dhpc     ROIs ↓FA: cc, dhpc comm |
| Haberl et al., 2015 | ASD | Mice | Fmr1-/y | 12 (0/12) | 7 (0/7) | 2.25-3 | 11.7T | 1 | 1000 | 30 | In vivo | ROIs:  ↓FA: cc (splenium/forceps major), forceps minor cc |
| Kumar et al., 2018 | ASD | Mice | 16p11.2  hemideletion (del/+) | 12 (6/6) | 9 (5/4) | 2,3 | 9.4/ | 1 | 902 | 6 | Ex vivo | VBA (TBSS):  ↓FA: cc ec (male and females) ↑FA: cblm (females) ↑FA: medial and peristriatal fiber tracts (males) |
| Pervolaraki et al., 2019 | ASD | Mice | Nrxn2α KO | 6 (0/6) | 6 (0/6) | 2,3 | 9.4T | 1 | 1200 | 6 | Ex vivo | ROIs:  ↑FA; amg, ofc, acc, hpc, cc ↓FA: amg,  ↑AD: ofc, acc, hpc ↓RD: ofc, hpc, cc ↓ADC: cc |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Blockx et al., 2012a | HD | Rats | TgHD | 6 (3/3)   5 (4/1) | 6 (2/4)   6 (3/3) | P15   P30 | 9.4T | 7 | 400 800 1200 1600 2000 2400 2800 | 15 15 15 15 15 15 15 | In vivo | ROIs:  ↓FA: cc (P30 vs P15), cc (P15 vs WT and P30 vs WT),  ec (P15 vs WT and P30 vs WT), anterior ac (P15 vs WT and P30 vs WT) ↓MD: ctx (P30 vs P15), cpu (P30 vs P15), cc (P30 vs P15),  ec (P30 vs WT), ec (P30 vs P15), anterior ac (P30 vs P15)  ↓AD: ctx (P30 vs P15), cpu (P30 vs P15), cc (P15 vs WT and P30 vs WT),  ec (P30 vs WT), anterior ac (P30 vs P15),  anterior ac (P15 vs WT and P30 vs WT) ↓RD: ctx (P30 vs P15), cpu (P30 vs P15), cc (P30 vs P15), ec (P30 vs P15),  anterior ac (P30 vs P15) ↑FA: cpu (P30 vs P15), anterior ac (P30 vs P15) ↑MD: ctx (P15 vs WT), ec (P15 vs WT) ↑RD: ctx (P15 vs WT), ,anterior ac (P15 vs WT and P30 vs WT) ↑MK: ctx (P30 vs P15), cpu (P30 vs P15), cpu ( TgHD vs WT),  cc (P30 vs P15), ec (P30 vs P15), anterior ac (P30 vs P15) ↑AK: ctx (P30 vs P15), cpu (P30 vs P15), cpu ( TgHD P30 vs WT),  cc (P30 vs P15), anterior ac (P30 vs P15) ↑RK: ctx (P30 vs P15), cpu (P30 vs P15), cc (P30 vs P15),  ec (P30 vs P15), anterior ac (P30 vs P15)  ↑KA: cc (P30 vs P15), ec (P30 vs P15), anterior ac (P30 vs P15),  anterior ac (TgHD P15 vs WT and TgHD P30 vs WT) |
| Blockx et al., 2012b | HD | Rats | TgHD | 7 (N/A) | 7 (N/A9 | 16 | 9.4T | 7 | 400 800 1200 1600 2000 2400 2800 | 15 15 15 15 15 15 15 | In vivo | ROIs:  ↑FA: str  ↑MD: pfc ↑AD: pfc  ↑RD: pfc ↑KA: ec, str  ↑RK: ec, str |
| Gatto et al., 2019 | HD | Mice | R6/2 | 3 (N/A) | 3 (N/A) | 1 | 17,6 | 1 | 1500 | 12 | Ex vivp | ROIs:  ↓FA: cc ↑MD: cc ↑AD: cc ↑RD: cc |
| Garcia-Miralles et al., 2016 | HD | Mice | YAC128 | 7 (N/A) | 8 (N/A) | 8 | 7T | 1 | 1500 | 30 | In vivo | VBA:  ↓FA: anterior, posterior cc   ROIs: ↓FA: anterior, posterior cc |
| Teo et al., 2016 | HD | Mice        Rats | YAC128       BACHD | 8 (4/4)     13 (0/13) for ec 10 (0/10) for remaining same animals | 8 (4/4)     14 (0/14)for ec 11 (0/11)for remaining same animals | 1.5, 3, 6, 9, and 12      12 | 7T | 1 | 1500       1000 | 30        256 | In vivo | VBA (YAC128):  ↓FA: ac (1.5mo), cc (1.5mo), ic (1.5mo), ec (1.5mo), cing (3mo), cp (3mo)    ROIS (YAC128):  ↓FA: anterior cc (1.5, 3, 6, 9mo), posterior cc (6mo), cing (3, 9 mo),  ac (1.5, 6, 9 mo), ec (9 mo)  ROIs (BACHD): ↓FA: anterior cc, ec, cing |
| Xiang et al., 2011 | HD | Mice | R6/2 | 3 (N/A) | 3 (N/A) | 3 | 11.7T | 1 | 1500 | 6 | Ex vivo | ROIs:  ↓FA: genu cc, spl cc |
| Gatto et al., 2015 | HD | Mice | YFP, R6/2 | 3 (N/A) | 3 (N/A) | 1 | 9.4T | 1 | 1000 | 12 | Ex vivo | ROIs:  ↓FA: cc |
| Antonsen et al., 2013 | HD | Rats | TgHD | 4 (N/A) | 5 (N/A) | 18 | 7T | 1 | 800 | 12 | Ex vivo | VBA:  ↑FA: vstr, dstr, gp, sn, hpc CA2, entopeduncular nucleus ↓MD: vstr, dstr, gp, sn, hpc CA2, entopeduncular nucleus ↓AD: vstr, dstr, gp, sn, hpc CA2, entopeduncular nucleus ↓RD: vstr, dstr, gp, sn, hpc CA2, entopeduncular nucleus ↑RD: vstr, ctx   ROIs: ↑FA: vstr, gp, sn  ↓MD: gp, entopeduncular nucleus ↓AD: gp, entopeduncular nucleus ↓RD: entopeduncular nucleus, sn |
| Blockx et al., 2011 | HD | Rats | TgHD | 10 (0/10) | 10 (0/10) | 2, 6, and 12 | 9.4T | 1 | 800 | 6 | In vivo | ROIs:  No differences |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Vetreno et al., 2016 | Alcoholism | Rats | intragastric ethanol 4 weeks | 7 (0/7) | 7 (0/7) | 7,3 | 9.4T | 1 | N/A | 12 | Ex vivo | ROIs:  ↑FA: cblm (P220 vs control) ↓MD: cblm (P220 vs control), nctx (P220 vs control) ↓AD: cblm (P220 vs control), hpc (P220 vs control), nctx (P220 vs control) |
| Luo et al., 2017 | Alcoholism | Rats | intragastric wine 4 weeks | 10 (0/10) | 10 (0/10) | N/A | 7T | 1 | 1031,7 | 6 | In vivo | ROIs:  ↓FA: pontine |
| Chen et al., 2017 | Alcoholism | Rats | Acute itragastric 15 ml/kg | 5 (0/5) | 10 (0/10), 30m after 10 (0/10), 2h after 10 (0/10), 6h after | 2-2.5 | 7T | 2 | 1000 2000 | 30 30 | In vivo | ROIs:  ↓MK: frontal lobe (30m vs control), thal (30m vs control) ↑MK: frontal lobe (6h vs control, 2h vs 30m, 6h vs 30 min),  thal (6h vs control, 2h vs control, 6h vs control, 2h vs 30m, 6h vs 30 min)  ↓FA: frontal lobe (30m vs control), ↑FA: thal (2h vs 30m) ↓MD: frontal lobe (30m vs control, 2h vs control, 6h vs control),  thal (30m vs control, 6h vs control),  ↑MD: thal (2h vs 30m) |
| Pfefferbaum et al., 2015 | Alcoholism | Rats | 5g/kg 25%, then 3g/kg every 8h for 4d (binge drinking) | 9 (0/9) | 10 (0/10) | N/A scanned before,  4d, and 1w | 3T | 1 | 1464 | 6 | In vivo | VBA (TBSS):  ↓FA: genu and lateral extent cc, fi-fx, frontal forceps |
| De Santis et al., 2019 | Alcoholism | Rats | Marchigian Sardinian  alcohol-preferring 30 days access to  alcohol | 9 (0/9) | 18 (0/18), longitudinal  scanned before, 1m, 6w of abstinence    9 (0/9), longitudinal  scanned 1m, 2w of abstinence | 2 | 7T | 1 | 1000 | 30 | in vivo | VBA (TBSS), Longitudinal (18 rats after 1 month of consumption): ↓FA: cc, fx ↑MD: cc ↓AD: cc, fx ↑RD: cc, fx  Fiber tracts (Longitudinal (18 rats after 1 month of consumption)): ↓FA: cc, fx  ↑MD: cc ↑RD: cc  VBA (TBSS):  Longitudinal abstinence:  (2 weeks of abstinence n=9 after  1 month of alcoholic vs after 2wks of abstinence): ↓FA: cc ↓AD: cc VBA (TBSS): Longitudinal abstinence:  (2 weeks of abstinence n=18 after  1 month of alcoholic vs after 6wks of abstinence): ↓FA: cc, fx ↓AD: cc, fx ↑RD: cc, fx |
| Tang et al., 2018 | Alcoholism | Ferrets | 3.5 g/kg intraperitoneal  EtOH or saline every  other day bet P10 and P30 | 6 (3/3) | 6 (2/4) | N/A | 7T | 2 | 2000 4000 | 64 64 | Ex vivo | ROIs:  ↑FA: ppc ↓MK: ppc, ppr  ↓AK: ppc, ppr,  ↓RK: ppc, ppr |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Nishioka et al., 2017 | MS | Mice | EAE | 5 (5/0) | 5 (5/0) | 5m control  model induced at 2 and scanned 5 | 11.7T | 1 | 850 | 21 | In vivo | ROIs:  ↓FA: on, ot ↑RD: on, ot |
| Atkinson et al., 2019 | MS | Mice | CPZ 9wks of cuprizone or normal diet | 5 (N/A)   6 (N/A) | 6 (N/A)   8 (N/A) | 2 | 7T       9.4T | 1 | 1000       3000 | 30       30 | In vivo     ex vivo | ROIs (in vivo):  ↓FA: center cc, R cc ↑RD: L cc, R cc   VBA (TBSS), in vivo: ↓FA: cc ↑MD: cc ↑RD: cc ↑AD: cc  ROIs (ex vivo): ↓FA: L cc, C cc, R cc |
| Crombe et al., 2018 | MS | Mice | EAE 20 days after immunization | 15 (15/0) | 16 (16/0) | 2 | 4.7T | 2 | 1000 2700 | 22 43 | In vivo | ROIs: ↓MD: molecular layer of dg ↓AD: molecular layer of dg |
| Sun et al., 2007 | MS | Mice | EAE 3m after immunization | 16 (16/0) | 16 (16/0) | 2 | 4.7T | 1 | 847 | 6 | In vivo | ROIs:  ↓AD: on, ot ↑RD: on, ot |
| Planche et al., 2017 | MS | Mice | EAE 20 days after induction | 12 (12/0) | 12 (12/0) | 2 | 4.7T | 1 | 2000 | 30 | In vivo | ROIs:  ↓FA: molecular layer of dg  ↑AD: molecular layer of dg |
| Nishioka et al., 2019 | MS | Mice | EAE scanned after 2, 4, 8 wks | 8 (8/0) 5m at the point of  scan | after 2wks (4/0) after 4wks (7/0) after 8wks (7/0) | 3 | 11.7T | 1 | 850 | 21 | In vivo | ROIs:  ↓TR: on (2wks) ↓FA: on (4wks, 8wks) ↓AD: on (2wks, 4wks, 8wks) ↑RD: on (4wks, 8wks) |
| Boretius et al., 2012 | MS | Mice | CPZ CPZ + EAE | 5 (5/0) | 5 (5/0) 5 (5/0) | 1.5-2 | 9.4T | 1 | 1000 | 12 | In vivo | ROIs:  ↓FA: cc (cuprizone vs control, cuprizone-EAE vs control) ↓AD: cc (cuprizone-EAE vs control)  ↑RD: cc (cuprizone vs control) |
| Song et al., 2005 | MS | Mice | CPZ, animal fed for 3wks 6wks 12wks | 8 (0/8) | 8 (0/8) 6 (0/6) 12 (0/12) | 2 | 4.7T | 1 | 1600 | 6 | Ex vivo | ROIs:  ↓RA: cc (6, 12wks vs control), ac (6wks) ↑RD: cc (6, 12wks),  ↑Tr: cc (12wks) |
|  | MS |  |  |  |  |  |  |  |  |  |  |  |
| Missault et al., 2019 | SCZ | Rats | Poly I:C on GD15 | 11 (0/11) | 10 (0/10) WG 15 (0/15) WL | 3 | 7T | 1 | 800 | 60 | In vivo | VBA:  No differences |
| Zhang et al., 2019 | SCZ | Mice | ErbB4-KO (ErbB4-/-) | 27(N/A) | 23 (N/A) | 3 | 7T | 1 | 800 | 30 | In vivo | VBA:  ↓FA: right parasubiculum, R lateral str |
| Corcoba et al., 2015 | SCZ | Mice | Gclm KO scanned longitudinaly P40, P97, P180 | 16 (0/16) | 15 (0/15) | P40 P97 P180 | 14.1T | 1 | 1000 | 6 | In vivo | ROIs:  ↓FA: fi-fx, ac ↑RD: fi-fx |
| Ma et al., 2015 | SCZ | Rats | EGR3 infected hpc bilat +  resperidone (2wks)  EGR3 infected hpc bilat +  saline (2wks)   sham (GFP) +  saline (2wks)  Normal +  saline (2wks) | 6 (0/6)    6 (0/6) | 6 (0/6)   6 (0/6) | 1 | 3T | 1 | 1000 | 32 | In vivo | ROIs:  No differences  Fiber tracts:  No differences |
| Chin et al., 2011 | SCZ | Rats | MAM GD17 25 mg/kg | 7 (7/0) | 4 (4/0) | 3 | 7T | 1 | 730 | 30 | In vivo | ROIs:  ↓FA: cc, cing |
| Di Biase et al., 2020 | SCZ | Rats | Poly I:C GD15 4mg/kg | 8 (0/8) | 9 (0/9) | 3 | 7T | 1 | 100 500 800 1000 1400 | 10 10 10 10 10 | In vivo | VBA (TBSS): ↑FW: cc, ec, str |
| Gimenez et al., 2017 | SCZ | Mice | MAP6-KO | 8 (N/A) | 8 (N/A) | 3-6 | 7T | 1 | 1500 | 6 | Ex vivo | Fiber tracts:  No differences |
| Wu et al., 2016 | SCZ | Rats | MK801 14 days of MK801 I.P (0.2 mg/kg) | 11 (0/11) | 12 (0/12) | 2 | 7T | 1 | 800 | 60 | In vivo | VBA:  ↓FA: genu and body cc  ROIs: ↓FA: genu and body cc ↑MD: genu and body cc ↑AD: body cc ↑RD: genu and body cc |
|  | MS |  |  |  |  |  |  |  |  |  |  |  |
| Liu et al., 2018b | Stress | Mice | CSDS  10 days exposure  to aggressor | 7 (0/7) | 10 susceptible (0/10)  7 resilient (0/7) | 1.5 | 7T | 1 | 1000 | 30 | In vivo | ROIs:  ↓FA: R vhpc (suscpetible vs resilient (pre)) ↑MD: R dhpc (resilient vs susceptible (after)) ↑RD: R dhpc (resilient vs susceptible (after)) |
| Grandjean et al., 2016a | Stress | Mice | CPS 15 days exposure to aggressor | 27 (0/27) | 26 (0/26) | N/A | 9.4T | 1 | 1000 | 36 | in vivo | VBA:  No differences  ROIs: ↑FA: cing (post vs pre in CPS mice) |
| Zalsman et al., 2017 | Stress | Rats | WKY  3 days of  stressors | 20 (0/20) | 20 (0/20) | 2 | 7T | 1 | 1000 | 15 | In vivo | VBA: ↓FA: cc (2 clusters), fx (1 cluster), L cing ↑FA: cc (1 cluster), fx (1 cluster) ↑MD: cc ↑AD: cc, fi-fx  ↓AD: cc (1 cluster) ↑RD: cc, fi-fx, R cing  Fiber tracts: ↓FA: cc, ac  ↑MD: cc, fi-fx ↑AD: cc, fi-fx ↑RD: cc, fi-fx |
| Zalsman et al., 2015 | Stress | Rats | WKY  3 days of  stressors at different  stages | 22 (0/22) | 19(0/19) | ES: PD27 LS: PD44 | 7T | 1 | 1000 | 15 | in vivo | VBA:  ↑ADC: amg (ES WKY vs control WKY),  cgctx (ES WKY vs control WKY),  ec (ES WKY vs control WKY), fi (LS vs control)  ↓FA: ec (ES wister vs wister control,  LS wister vs wister control, ES vs control, LS vs control),  ac (ES vs control, LS vs control) ↑FA: dg (WKY ES vs WKY control), cc (ES vs control) |
| Hemanth Kumar et al., 2014 | Stress | Rats | CMS  6 weeks exposure to stressors | 10 (0/10) | 10 (0/10) | 3-4 | 7T | 1 | 700 | 46 | in vivo | ROIs:  ↓FA: frontal ctx, hyp, cc  ↑FA: thal ↑MD: frontal ctx, cc, L hpc, R cp, L hyp ↓MD: cing, R thal  ↑AD: frontal ctx, L hpc,  ↑RD: frontal ctx, hyp, cc, L hpc, L cpu |
| Khan et al., 2018a | Stress | Rats | CMS  8 weeks exposure to stressors | 8 (0/8) | 8 (0/8) | 2 | 9.4T | 2 | 1000 2500 | 9 9 | In vivo | ROIs:  ↑FA: hpc (anhedonic 20 weeks vs anhedonic 25wks ),  amg (anhedonic 20wks vs control mean of (20 & 25wks)) ↑AD: hpc (anhedonic mean (20 and 25wks) vs  control (week 22)) ↑AK: pfc (anhedonic 18wks vs control 18wks),  hpc (anhedonic 18wks vs anhedonic 25wks),  amg (anhedonic 18wks vs anhedonic 25wks),  vhpc (anhedonic 20wks vs control meanof (18 & 22wks)) ↑RK: hpc (anhedonic 18wks vs control 18wks) |
| van der Marel et al., 2013 | Depression | Rats | 5-HTT-/- | 11 (0/11) | 14 (0/14) | N/A | 4.7T | 1 | 1250 | 50 | In vivo | VBA (TBSS):  No differences  ROIs:  ↓FA: genu cc |
| Delgado y Palacios et al., 2011 | Stress | Rats | CMS  8 weeks of  stressors | 7 (0/7) | 7 (0/7) anhedonic  7 (0/7) resilient | 1.5 | 9.4T | 7 | 400-2800 | 30 30 30 30 30 30 30 | In vivo | ROIs:  ↓MK: hpc (resilient vs control, anhedonic vs control) ↓RK: hpc (resilient vs control, anhedonic vs control) |
| Khan et al., 2016  Khan et al., 2018b | Stress | Rats | CMS  8 weeks of stressors | 8 (0/89 | 8 (0/8) anhedonic  8 (0/8) resilient | N/A | 9.4 | 13 | 500  1000  1500  2000 2500  3000 3500 4000 4500 5000  6000 7000 8000 | 12  12  12  12  12  12  12  12  12  12  12  12  12 | Ex vivo | ROIs:  ↑NDI: amg (resilient vs control, anhedonic vs control) ↓MD: amg (resilient vs control, anhedonic vs control) ↓Deff: Amg (resilient vs control, anhedonic vs control),  hpc (resilient vs control,  anhedonic vs control), cpu (reilient vs control) ↓DL: amg (resilient vs control, anhedonic vs control) |

**Abbreviations:** ac, anterior commissure; acc, anterior cingulate cortex; amg, amygdala; cc, corpus callosum; cgctx, cingulate cortex; cing, cingulum; comm, commissure; contra, contralateral; cp, cerebral peduncle; cpu, caudate putamen; ctx, cortex; Deff, extracellular diffusivity; dg, dentate gyrus; dhpc, dorsal hpc; DL, intraneurite diffusivity; dstr, dorsal str; ec, external capsule; ES, early stress; fi, fimbria; Fw, extracellular water fraction; fx, fornix; gp, globus pallidus; h, hour; hpc, hippocampus; hyp, hypothalamus; ic, internal capsule; inj, injection; ip, intraperitonal; ipsi, ipsilateral; KA, kurtosis anisotropy; L, left; LS, late stress; mc, motor cortex; mo, month; N/A, not aplicable; na, nucleus accumbens; nctx, neocortex; NDI, neurite density; ODI, orientation dispersion index; ofc, orbitofrontal cortex; on, optic nerve; ot, optic tract; P, postnatal day; pctx, piriform cortex; pfc, prefrontal cortex; ppc, caudal parietal cortex; ppr, rostral parietal cortex; R, right; RA, relative anisotropy; rn, raphe nucleus; ROI, region of interest; sctx, somatosensory cortex; sept, septum; sn, substantia nigra; snpc, sn pars comacta; snpr, sn pars reticulata; spl, splenium; str, striatum; T, Tesla; TBSS, Tract-based spatial statistics; thal, thalamus; Tr, trace; VBA, Voxel-based analysis; vc, visual cortex; vhpc, ventral hpc; vstr, ventral str; wk, week; WT, wild type.

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