**Supplementary Material**

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| genes | $$r$$ | $p$-value (uncorrected) |
| ADRA2A | 0.031410985 | 0.469306139 |
| CHRM2 | 0.029524546 | 0.422315537 |
| CNR1 | 0.118925944 | \*\*0.00219956 |
| CRH | 0.063823402 | 0.093381324 |
| CUX2 | 0.000116716 | 0.99780044 |
| GAD2 | 0.041099705 | 0.285342931 |
| HTR1A | 0.066349268 | 0.051789642 |
| HTR5A | 0.077173553 | 0.071185763 |
| MAOA | -0.069314644 | 0.163367327 |
| PDE1A | 0.039605018 | 0.323335333 |
| SST | 0.146992296 | \*\*0.00679864 |
| TAC1 | 0.042117663 | 0.304939012 |

**Table S1.** The association between gene expression distribution and the statistical map depicting the correlation of alterations in LC functional connectivity with clinical outcomes. \*\* $p$ <0.01.

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| PET receptor/neurotransmitter/activity maps | $$r$$ | $p$-value (uncorrected) | Source Templates |
| 5HT1a (cumi) | 0.047367208 | 0.082783443 | 5HT1a\_cumi\_hc8\_beliveau |
| 5HT1a (WAY) | 0.080682509 | \*0.023395321 | 5HT1a\_WAY\_HC36 |
| 5HT1b (az) | 0.015623954 | 0.579484103 | 5HT1b\_az\_hc36\_beliveau |
| 5HT1b (P943) | 0.016538652 | 0.641071786 | 5HT1b\_P943\_HC22 |
| 5HT2a (ALT) | 0.055052698 | 0.088782244 | 5HT2a\_ALT\_HC19 |
| 5HT2a (cimbi) | 0.04100189 | 0.132973405 | 5HT2a\_cimbi\_hc29\_beliveau |
| 5HT4 (sb20) | 0.045648362 | 0.083183363 | 5HT4\_sb20\_hc59\_beliveau |
| CB1 (FMPEPd2) | 0.080069304 | \*0.020395921 | CB1\_FMPEPd2\_hc22\_laurikainen |
| CBF (ASL) | 0.084757373 | \*0.014197161 | CBF\_ASL\_MRI |
| D1 (SCH23390) | 0.144061252 | \*\*\*0.00079984 | D1\_SCH23390\_c11 |
| D2 (fallypride) | -0.040132873 | 0.292341532 | D2\_fallypride\_hc49\_jaworska |
| D2 (RACLOPRIDE) | -0.045975335 | 0.106378724 | D2\_RACLOPRIDE\_c11 |
| DAT (DATSPECT) | -0.035763737 | 0.326334733 | DAT\_DATSPECT |
| FDOPA (f18) | 0.056100518 | 0.073785243 | FDOPA\_f18 |
| GABAa (FLUMAZENIL) | 0.069642022 | 0.071985603 | GABAa\_FLUMAZENIL\_c11 |
| GABAa (flumazenil) | -0.019784924 | 0.48970206 | GABAa\_flumazenil\_hc16\_norgaard |
| KappaOp (LY2795050) | 0.013076677 | 0.684463107 | KappaOp\_LY2795050\_hc10\_ShokriKojori |
| mGluR5 (abp) | 0.078526437 | \*0.037792442 | mGluR5\_abp\_hc22\_rosaneto |
| mGluR5 (abp) | 0.079778358 | \*0.031793641 | mGluR5\_abp\_hc28\_dubois |
| mGluR5 (abp) | 0.084672965 | \*0.025994801 | mGluR5\_abp\_hc73\_smart |
| MU (CARFENTANIL) | 0.093284428 | \*\*0.00919816 | MU\_CARFENTANIL\_c11 |
| MU (carfentanil) | 0.07361906 | 0.050789842 | MU\_carfentanil\_hc39\_turtonen |
| NAT (MRB) | 0.001189831 | 0.968606279 | NAT\_MRB\_c11 |
| NMDA (ge179) | 0.073026888 | \*0.038192362 | NMDA\_ge179\_29hc\_galovic2021 |
| SERT (dasb) | 0.018071169 | 0.547090582 | SERT\_dasb\_hc100\_beliveau |
| SERT (DASB) | 0.001959552 | 0.950209958 | SERT\_DASB\_HC30 |
| SERT (MADAM) | 0.004981164 | 0.881223755 | SERT\_MADAM\_c11 |
| VAChT (feobv) | 0.014978179 | 0.677464507 | VAChT\_feobv\_hc18\_aghourian |
| VAChT (feobv) | -0.031722113 | 0.383323335 | VAChT\_feobv\_hc4\_tuominen |
| VAChT (feobv) | 0.009252691 | 0.778044391 | VAChT\_feobv\_hc5\_bedard |

**Table S2**. The association between neurotransmitter distribution and the statistical map depicting the correlation of alterations in LC functional connectivity with clinical outcomes. .\* $p$<0.05, \*\* $p$ <0.01, \*\*\* $p$ <0.001.



**Figure S1.** Spatial distribution of T-values (demonstrating the correlation between changes in LC functional connectivity and clinical improvement), gene expression, and neurotransmitter maps.