Cross-region network analysis in brain development

DW

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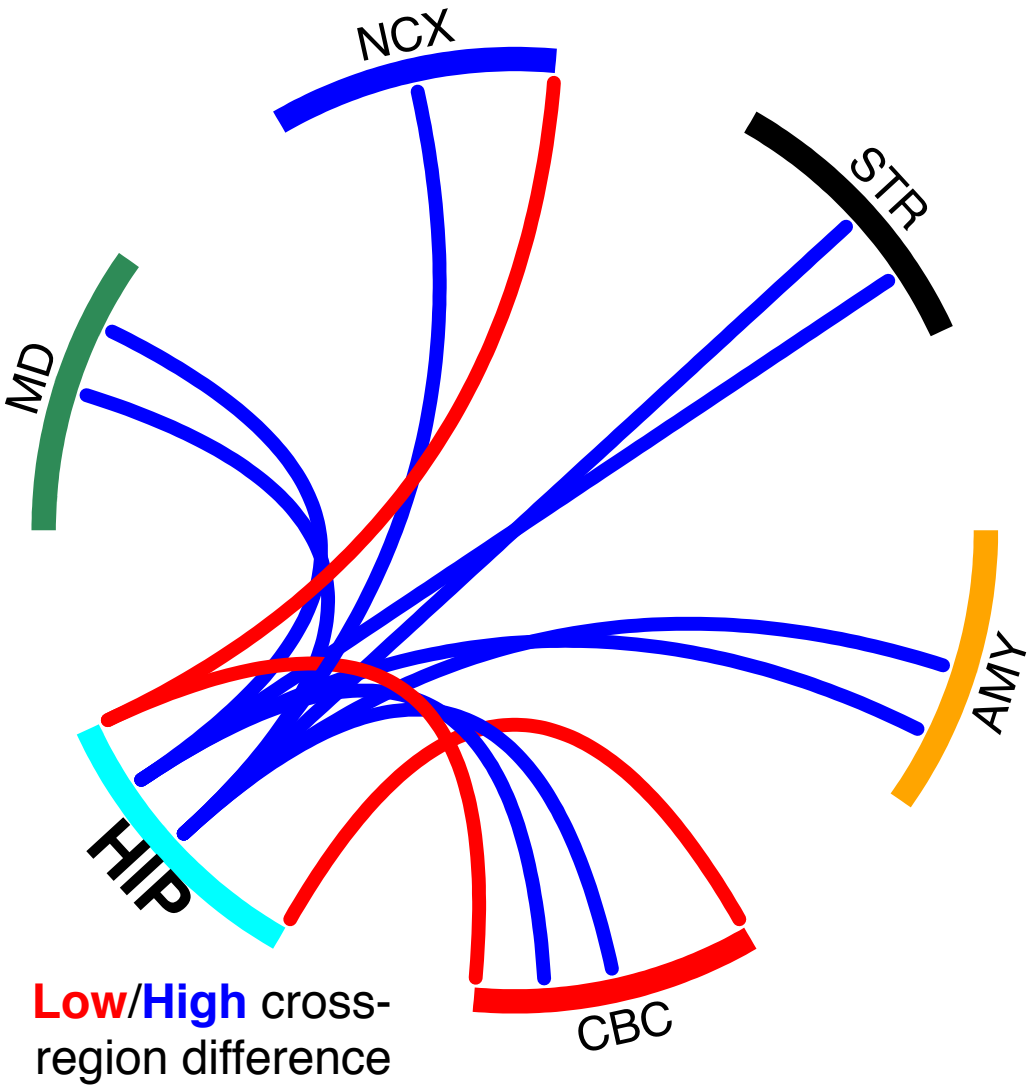
Cross-region Difference Expression Network (CDEN)

Given a gene module, m and a period, t=1, ..., T, the modular difference between Region i and Region j is defined as follows:

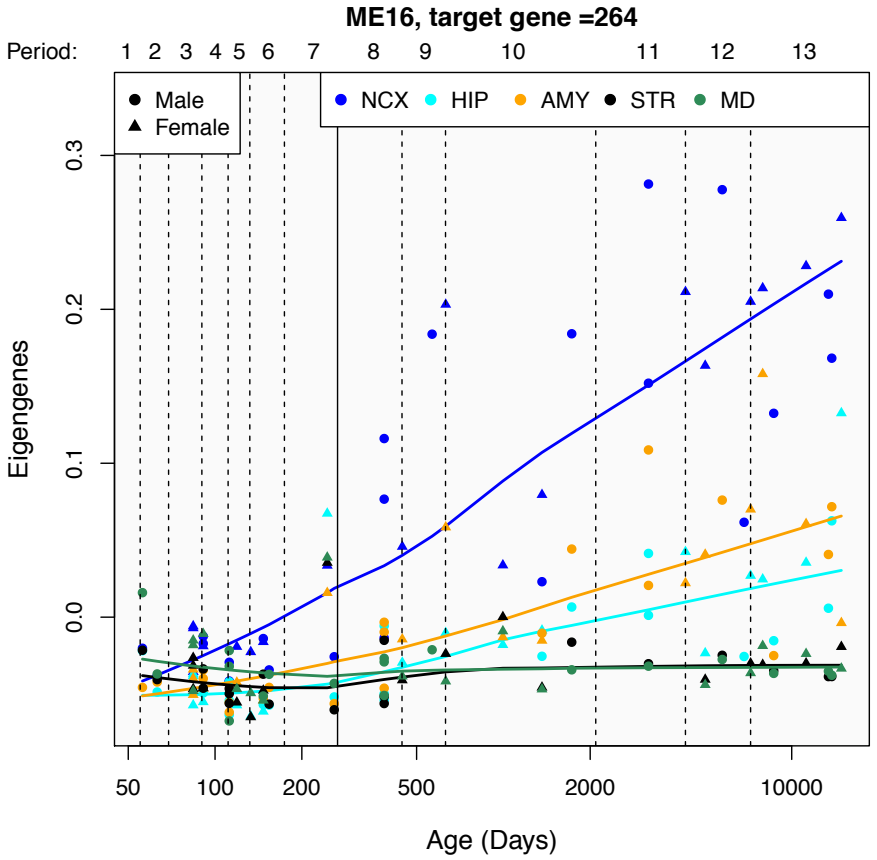
$$d_m(i,j) = \frac{1}{T}\sqrt{\sum_{t=1}^{T}\left\|m_i(t) - m_j(t)\right\|^2}$$

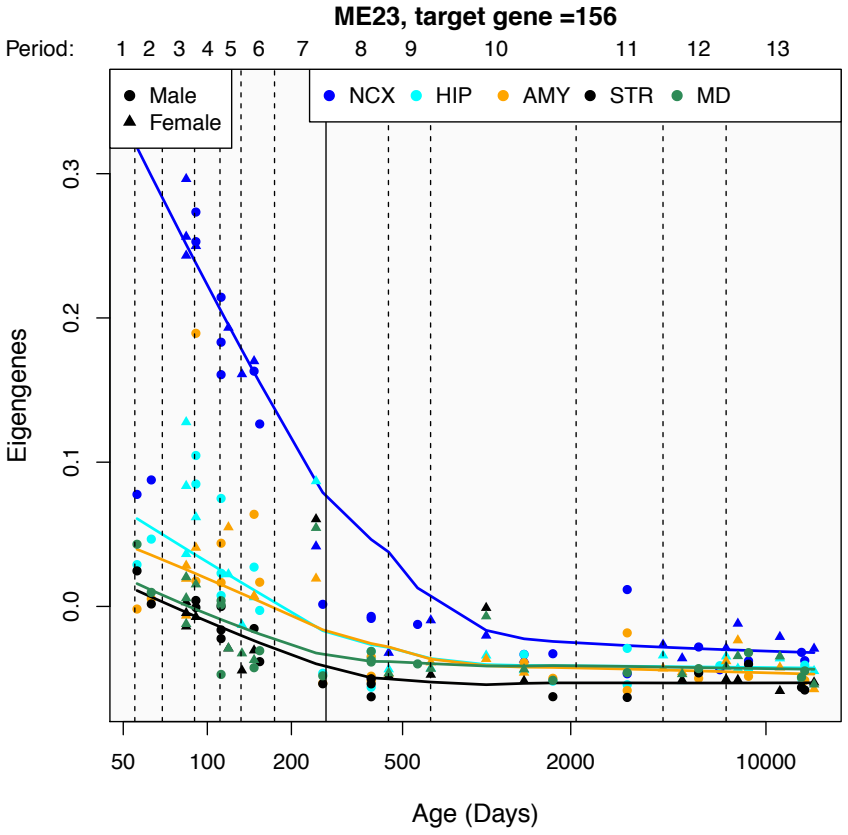
, where $m_i(t)$ is the modular eigengene expression level from Region i dataset at time t.



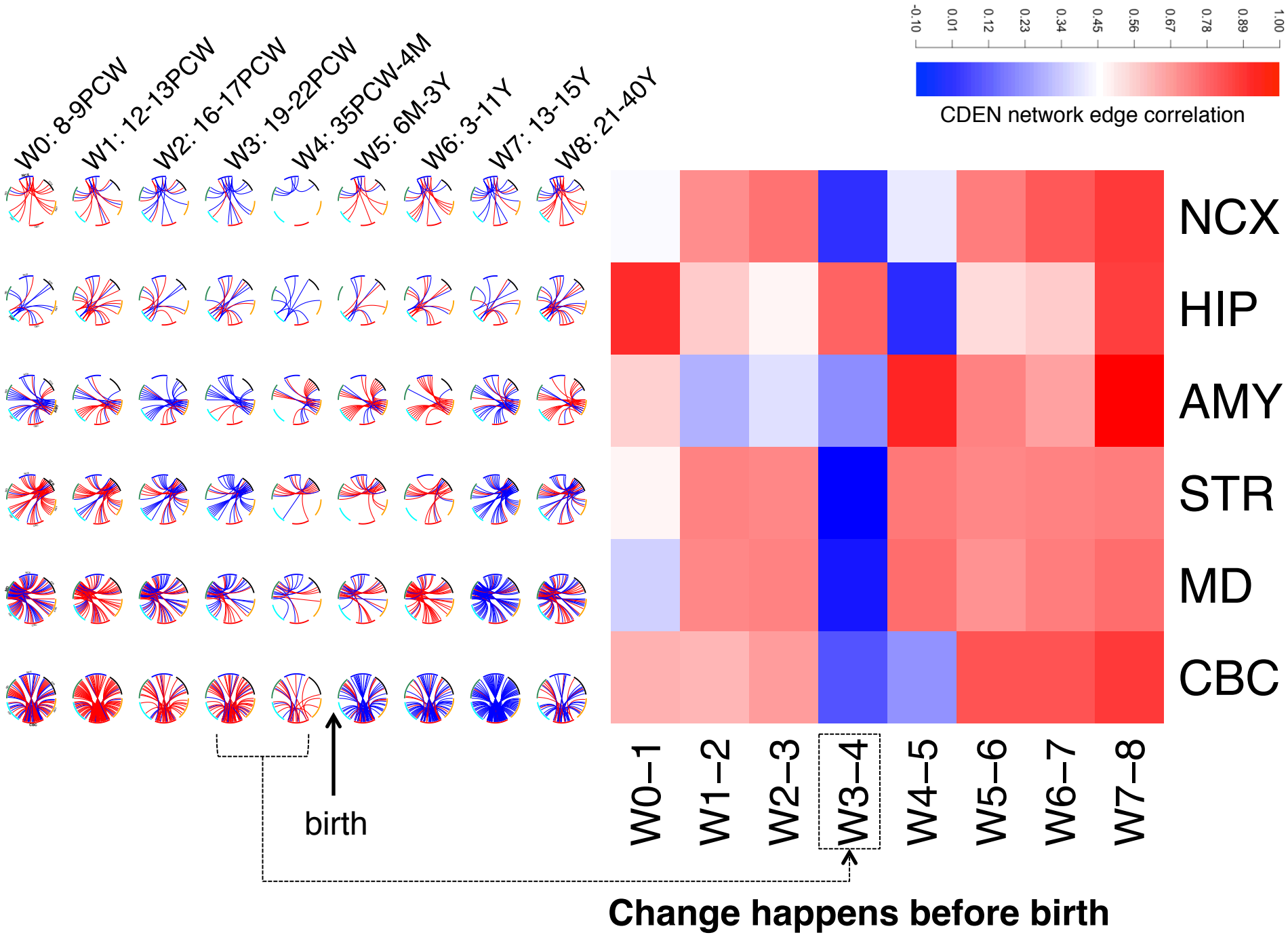
Region-specific gene modules via WGCNA

two NCX-specific gene modules





Region	NCX	HIP	AMY	STR	MD	CBC
# of specific modules	5	5	8	10	16	21


W0: 8-9PCW
W1: 12-13PCW
W2: 16-17PCW
W3: 19-22PCW
W4: 35PCW-4M
W5: 6M-3Y
W6: 3-11Y
W7: 13-15Y
W8: 21-40Y
-0.10
0.01
0.12
0.23
0.34
0.45
0.56
0.67
0.78
0.89
1.00
CDEN network edge correlation
NCX
HIP
AMY
STR
MD
CBC
W0–1
W1–2
W2–3
W3–4
W4–5
W5–6
W6–7
W7–8
birth
Change happens before birth

CDEN network correlations cluster developmental period windows into prenatal and postnatal groups