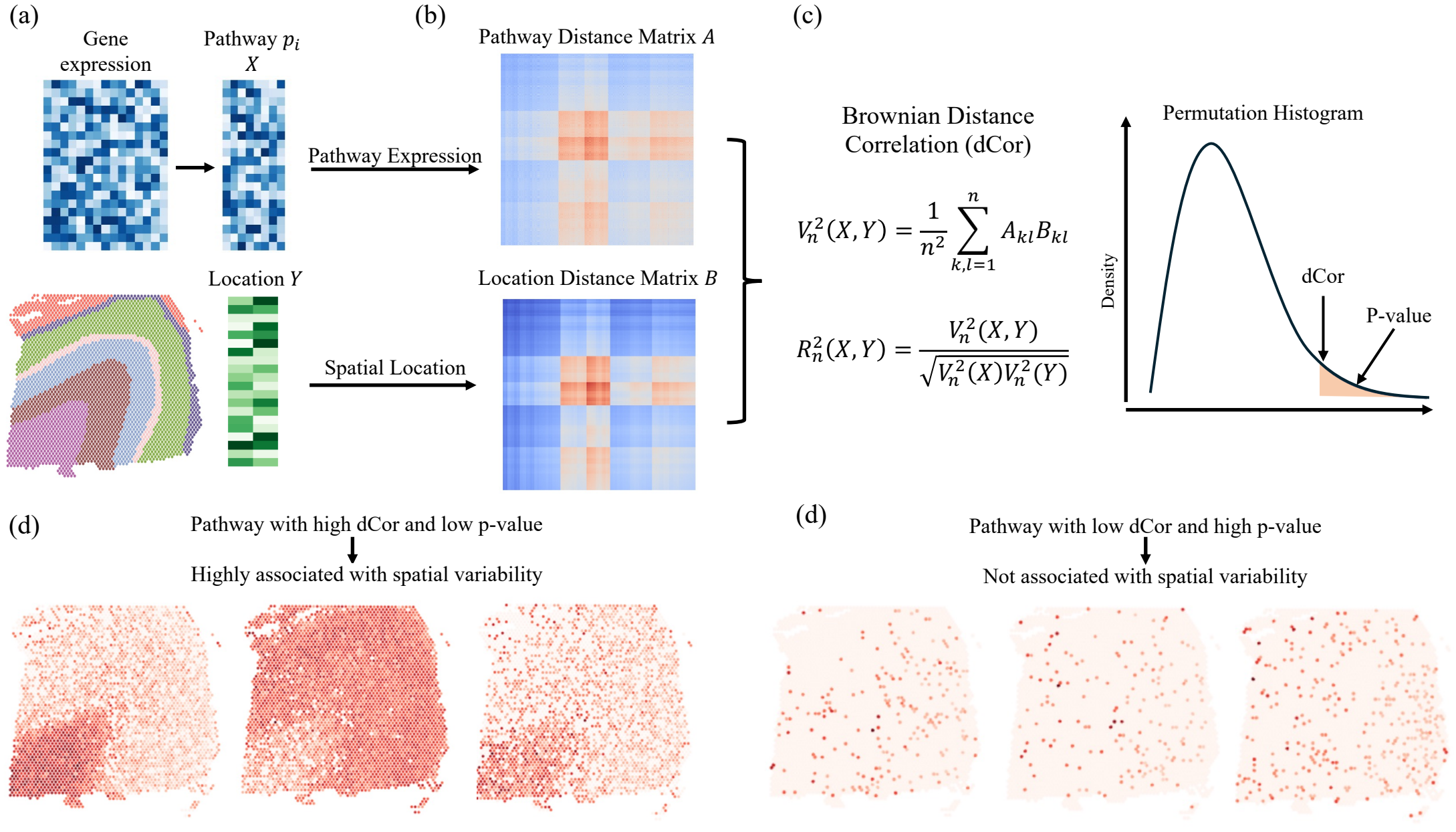
(a)
Gene expression
Pathway p_i
X
Pathway Expression
Location Y
Spatial Location
(b)
Pathway Distance Matrix A
Location Distance Matrix B
(c)
Brownian Distance Correlation (dCor)
$V_n^2(X,Y) = \frac{1}{n^2}\sum_{k,l=1}^{n} A_{kl}B_{kl}$
$R_n^2(X,Y) = \frac{V_n^2(X,Y)}{\sqrt{V_n^2(X)V_n^2(Y)}}$
Permutation Histogram
Density
dCor
P-value
(d)
Pathway with high dCor and low p-value
Highly associated with spatial variability
(d)
Pathway with low dCor and high p-value
Not associated with spatial variability