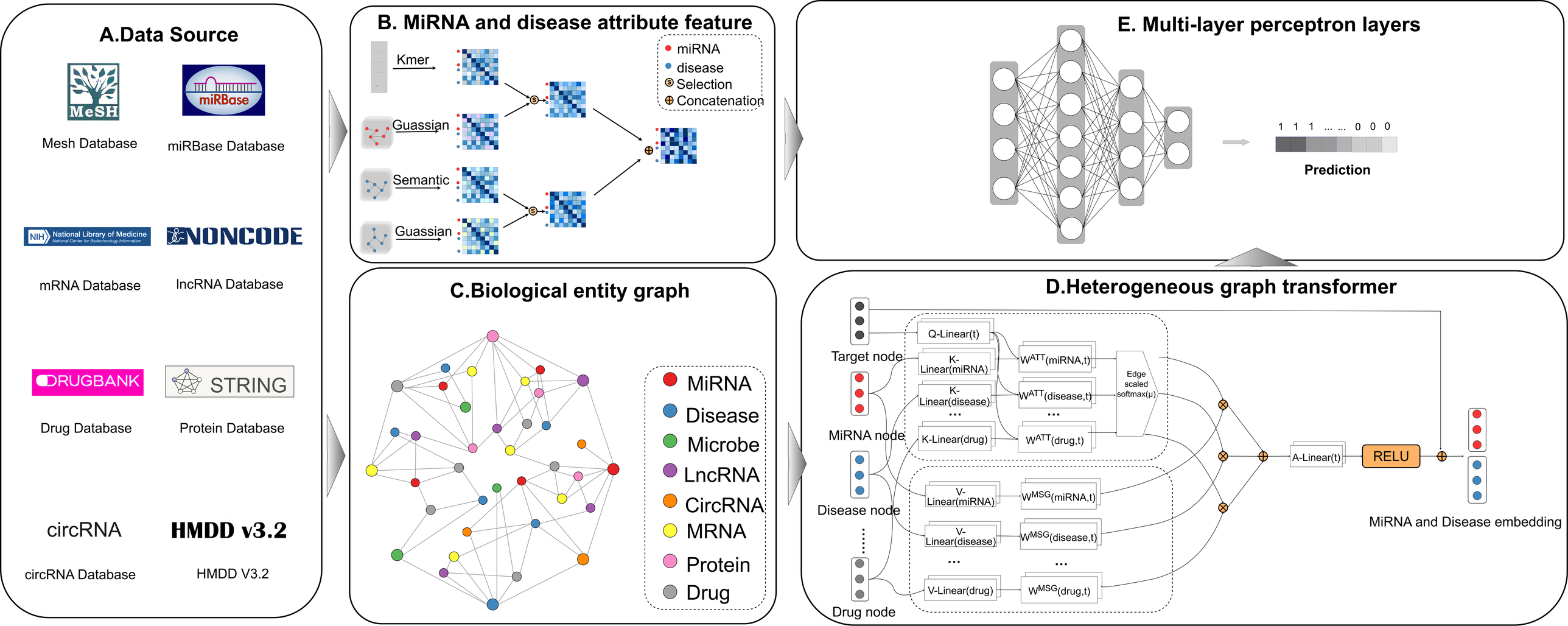
A.Data Source
Mesh Database
miRBase Database
mRNA Database
lncRNA Database
Drug Database
Protein Database
circRNA
circRNA Database
HMDD v3.2
HMDD V3.2
B. MiRNA and disease attribute feature
Kmer
Guassian
Semantic
Guassian
miRNA
disease
Selection
Concatenation
C.Biological entity graph
MiRNA
Disease
Microbe
LncRNA
CircRNA
MRNA
Protein
Drug
E. Multi-layer perceptron layers
1 1 1 ... ... 0 0 0
Prediction
D.Heterogeneous graph transformer
Target node
MiRNA node
Disease node
Drug node
Q-Linear(t)
K-Linear(miRNA)
K-Linear(disease)
K-Linear(drug)
W^ATT(miRNA,t)
W^ATT(disease,t)
W^ATT(drug,t)
Edge scaled softmax(μ)
V-Linear(miRNA)
V-Linear(disease)
V-Linear(drug)
W^MSG(miRNA,t)
W^MSG(disease,t)
W^MSG(drug,t)
A-Linear(t)
RELU
MiRNA and Disease embedding