

**S4** Fig. A diagram illustrating matrix factorization method for gene co-expression subnetwork identification. (A and B) The projection of each attribute distribution over each principal component distribution. (C) A binary matrix composed of 1 or 0 after rule mapping. (D and E) Associate rules were obtained from the sub-tables of binary matrix whose all elements are no-zero. For the domain of "-1", we translated "-1" to "1" by increasing an additional column.