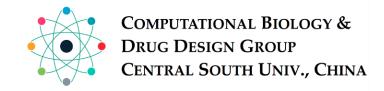


## BioTriangle

--BioCCI, BioPPI, BioDDI



The descriptor calculation of chemical-chemical interaction, protein-protein interaction, and DNA/RNA-DNA/RNA interaction is similar to each other in BioCCI, BioPPI and BioDDI. Next, we will show how to construct an interaction feature by the protein-protein interaction example.

## **Protein-protein interaction descriptors**

Let  $\mathbf{F_a} = \{\mathbf{F_a}(i), i = 1, 2, ..., p\}$  and  $\mathbf{F_b} = \{\mathbf{F_b}(i), i = 1, 2, ..., p\}$  are the two descriptor vectors for interaction protein A and protein B, respectively. There are three methods to construct the interaction descriptor vector  $\mathbf{F}$  for A and B:

- (1) Two vectors  $\mathbf{F_{ab}}$  and  $\mathbf{F_{ba}}$  with dimension of 2p are constructed:  $\mathbf{F_{ab}} = (\mathbf{F_a}, \mathbf{F_b})$  for interaction between protein A and protein B and  $\mathbf{F_{ba}} = (\mathbf{F_b}, \mathbf{F_a})$  for interaction between protein B and protein A.
- (2) One vector  $\mathbf{F}$  with dimension of 2p is constructed:  $\mathbf{F} = \{\mathbf{F_a}(i) + \mathbf{F_b}(i), \mathbf{F_a}(i) \times \mathbf{F_b}(i), i = 1, 2, ..., p\}$ .
- (3) One vector  $\mathbf{F}$  with dimension of  $p^2$  is constructed by the tensor product:  $\mathbf{F} = \{\mathbf{F}(k) = \mathbf{F_a}(i) \times \mathbf{F_b}(j), i = 1, 2, ..., p, j = 1, 2, ..., p, k = (i-1) \times p+j\}.$