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Research Interests:

1. Bioluminescence Imaging System for *Escherichia coli* Protoplast

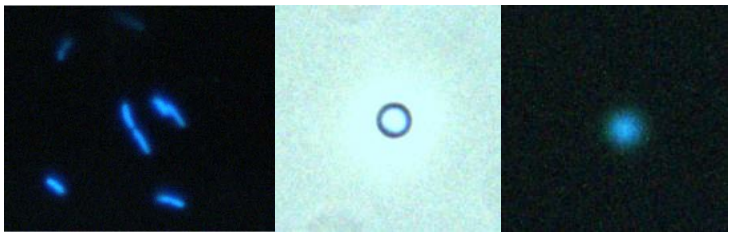

Fig. 1

The expression of Vibrio vulnificus gene encoding blue fluorescence protein (bfpvv) by Escherichia coli XL1-Blue giant protoplast was investigated for determining the method for quantifying the intensity of fluorescence emitted by the blue fluorescence protein by means of fluorescence microscopy and digital image analysis.

The result indicated that fluorescence could be emitted by the giant protoplast containing bfpvv gene, which showed complete cell function. However, the viability of the bfpvv gene-carrying protoplast was lower than the bfpvv gene-free protoplast because the expression of bfpvv gene posed a metabolic burden on the cells. As compared with normal cells contain bfpvv gene, the fluorescence emitted by the giant protoplast containing bfpvv gene was more intense and permanent. It was shown that the plasmid containing bfpvv gene was maintained in the cells during the formation of giant protoplast produced more fluorescence protein than the normal cells. The giant protoplast of E.coli is potential for bioimaging system.

2. Fuzzy Neural Network

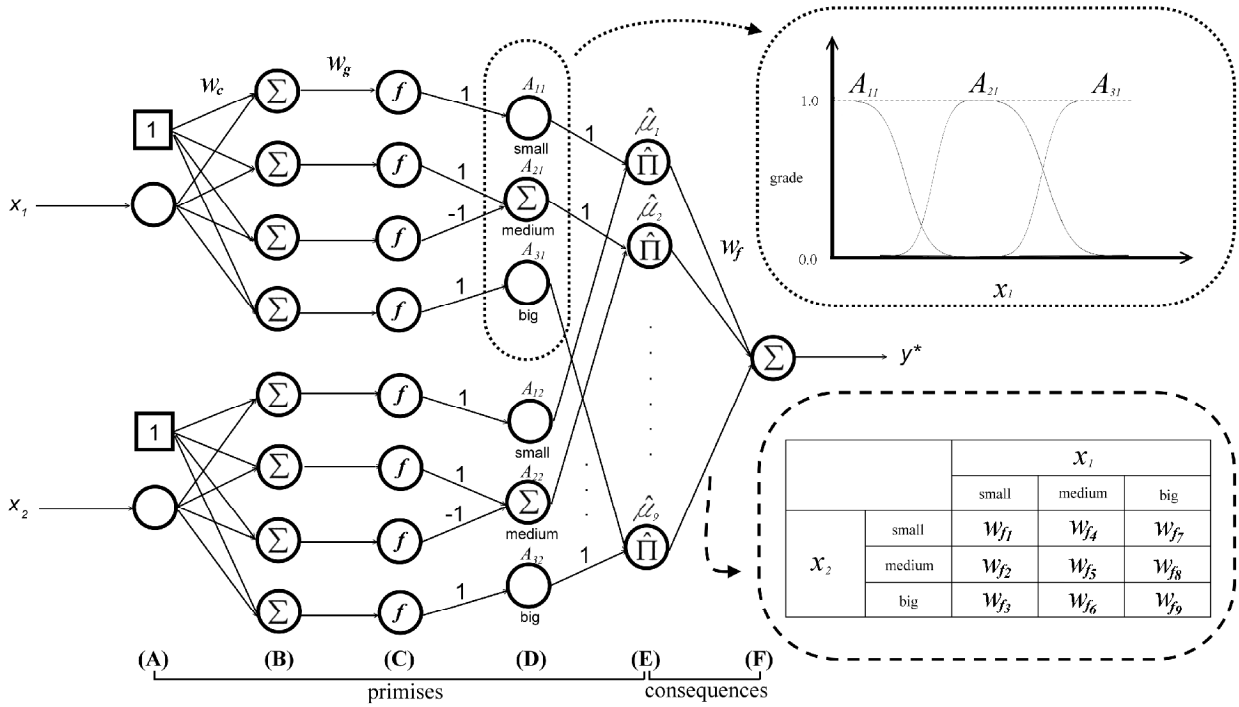

Fig. 2

A fuzzy neural network (FNN) is a model simulated from simplified combining fuzzy reasoning and artificial neural network (ANN) and applied to nonlinear system modeling or controls in lots of field. Fig. 2 is a simple structure of FNN named type-I FNN (Horikawa *et al.*, 1991). In the premise parts, the numerical values of input variables are altered to the grade of fuzzy variables by a membership function. The consequence parts represent the fuzzy rules. The connection weights of the network correspond to the fuzzy reasoning parameters; the relationships between input and output are automatically identified by learning through an error back propagation algorithm (BP), and are represented as linguistic IF-THEN rules. We are trying to apply FNN to complex system such as microarray data.