

iGEM 2013 Team Tokyo Tech Project: Mutant Ninja Coli

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International Genetically Engineered Machine competition (iGEM) is an international synthetic biology competition in which undergraduate teams from around the world compete one another. The participating teams design and construct the original genetic circuits by assembling various gene parts inside living cells during summer. The teams perform the presentation about their work on the Jamboree held at MIT. Our Tokyo Tech iGEM team has been participating iGEM since 2006 and getting bright results such as the acquisition of gold medal and track prizes.

In this year, we proposed to create E. coli that mimics some of the characteristics of ‘ninja’ warrior-spies. A ninja must receive and pass on correct information at all times. A mistake will be fatal. We have designed an artificial genetic circuit that avoids crosstalk between two signals used in bacterial cell-cell communication. Ninjas are also known for their star-shaped ‘shuriken’ throwing knives. Our E. coli ninja has a similar weapon, an M13 phage which is released to infect other E. coli, injecting plasmid DNA into them. Moreover, ninjas must harmonize with the natural environment, so that their relationship with nature is very important. Plant hormones help plants to grow efficiently, and we attempted to construct a circuit that synthesizes two plant hormones depending on the soil environment.