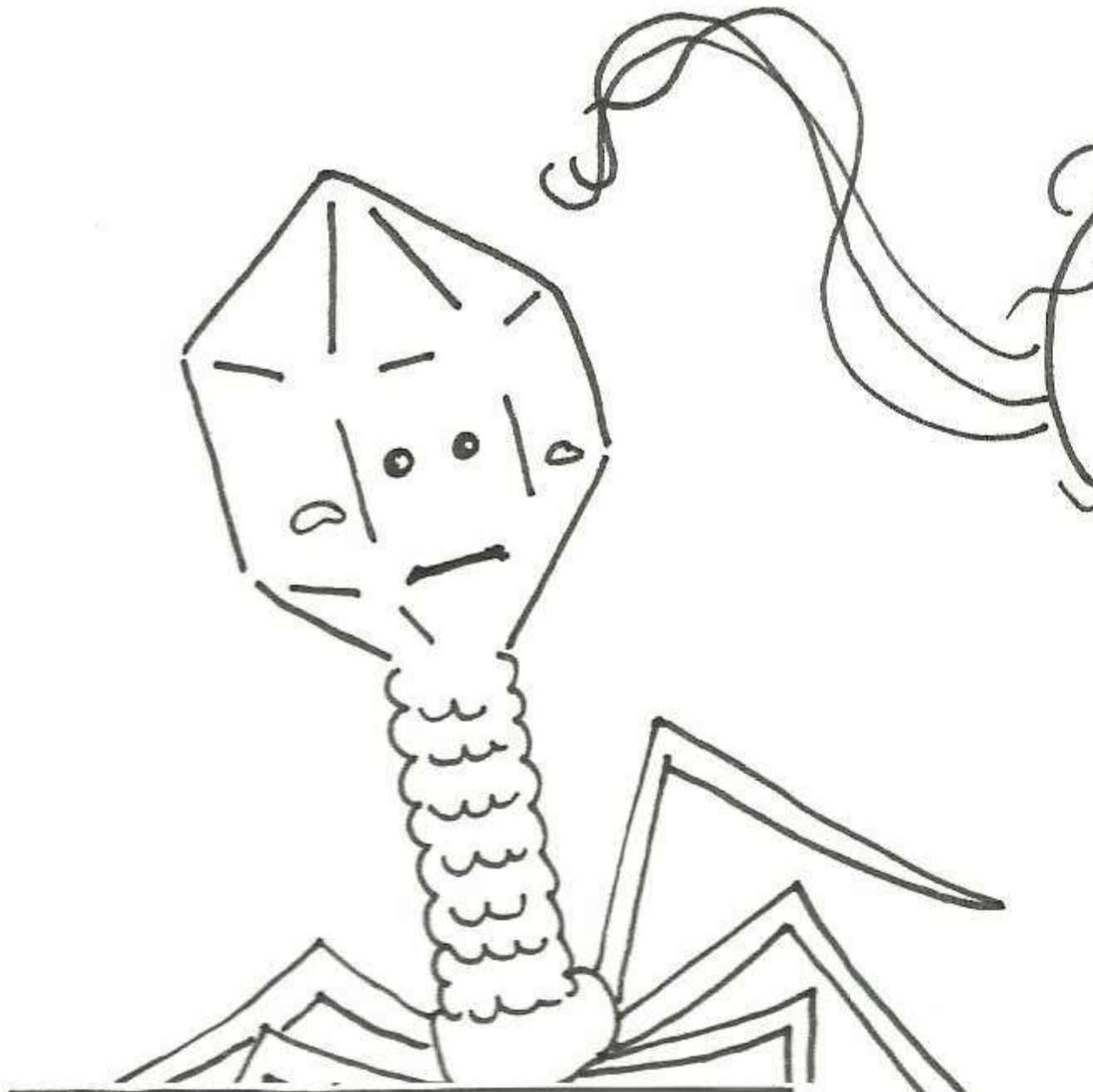
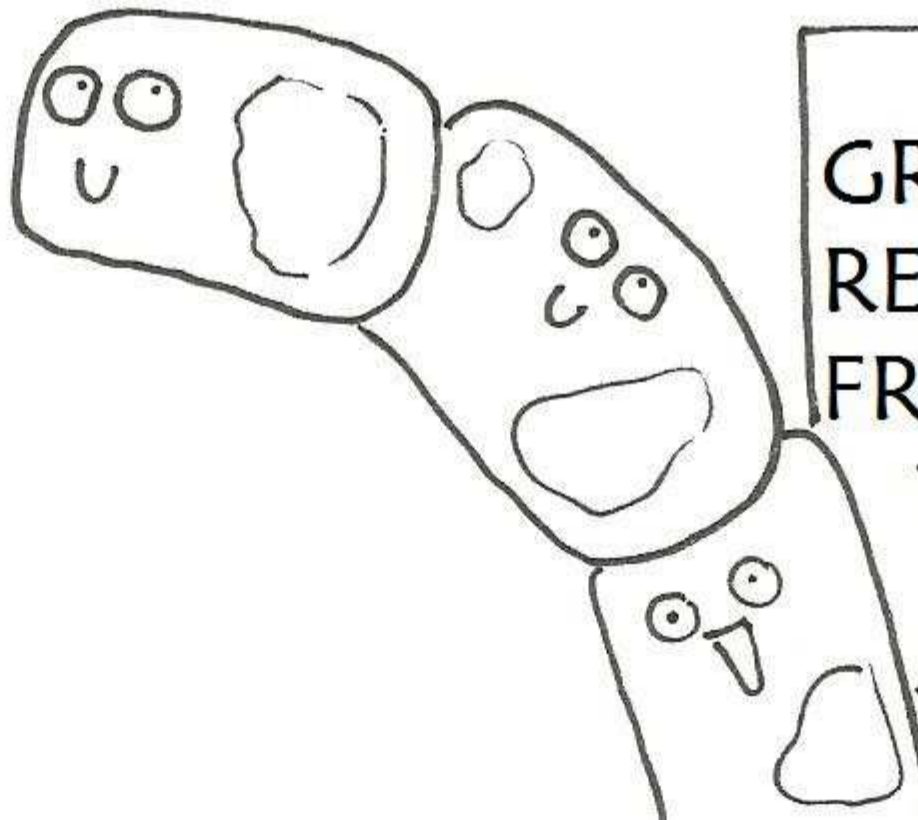


PROJECT 2011

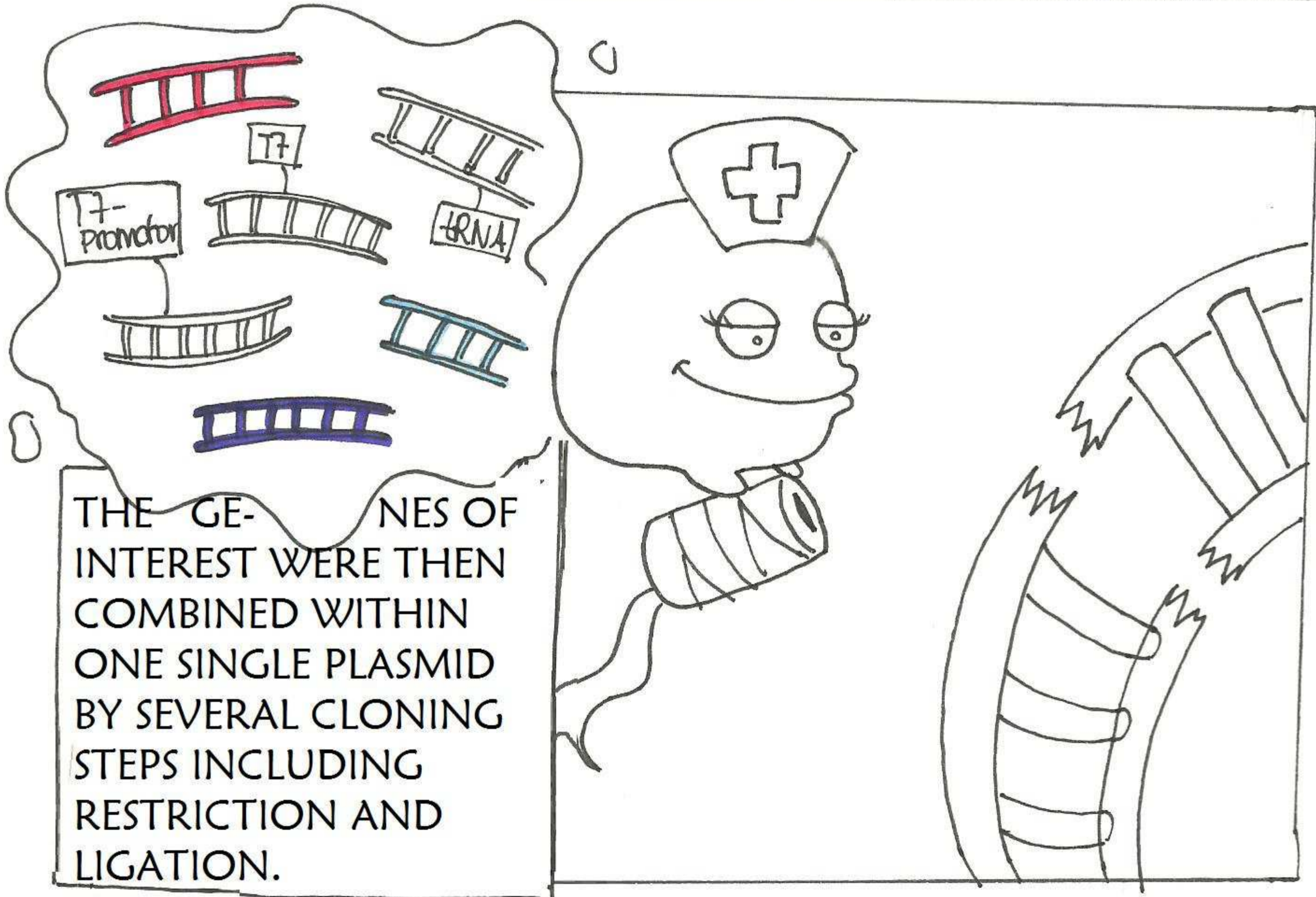
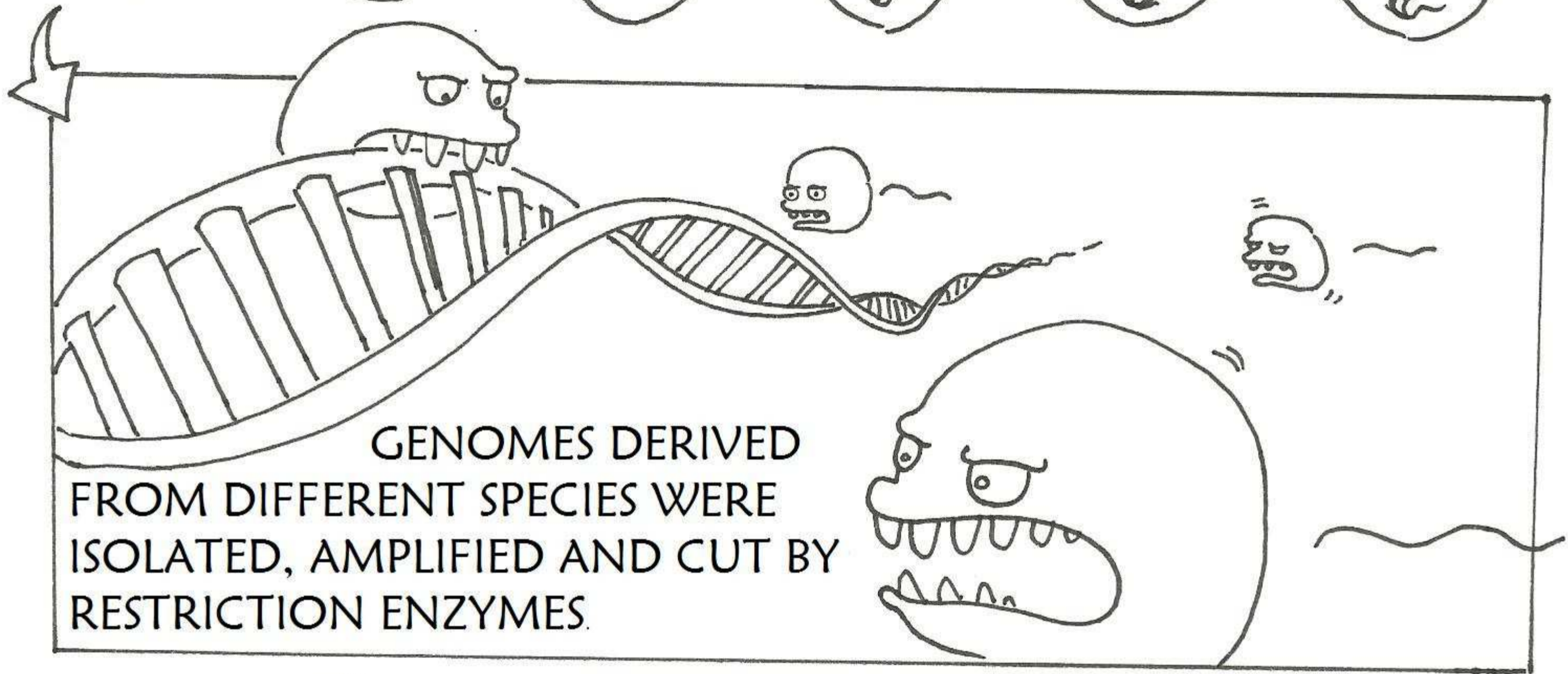
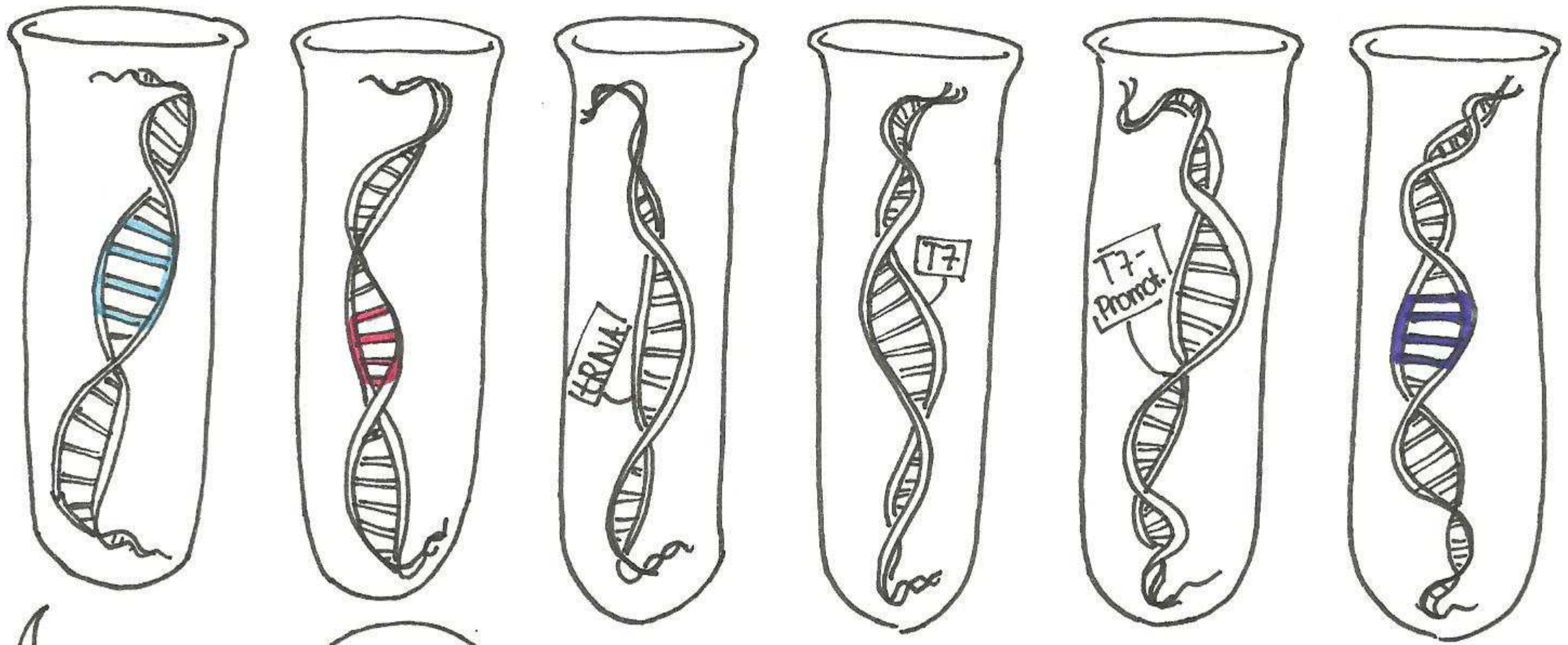
SUPD TRNA
FROM
E.COLI

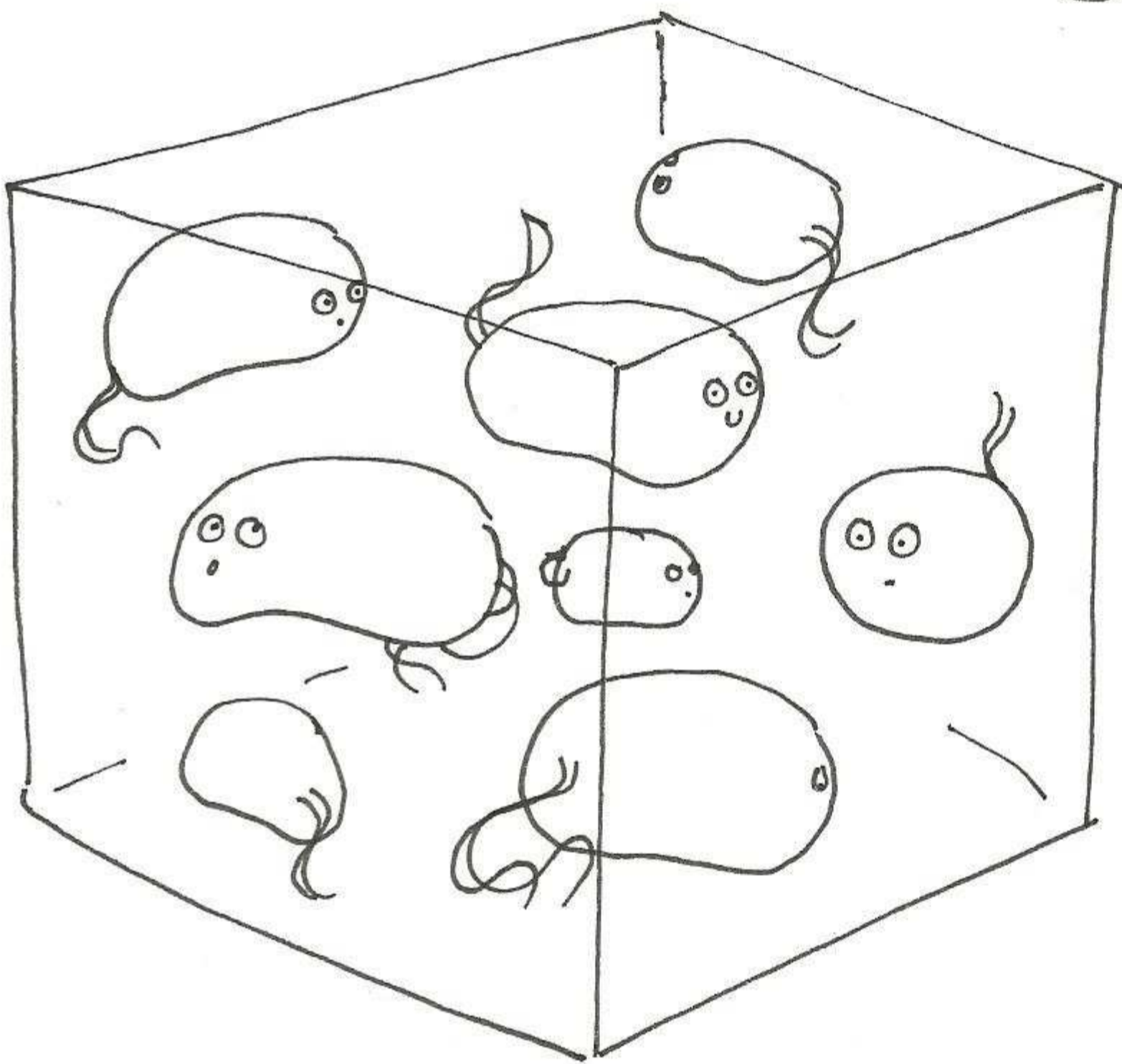
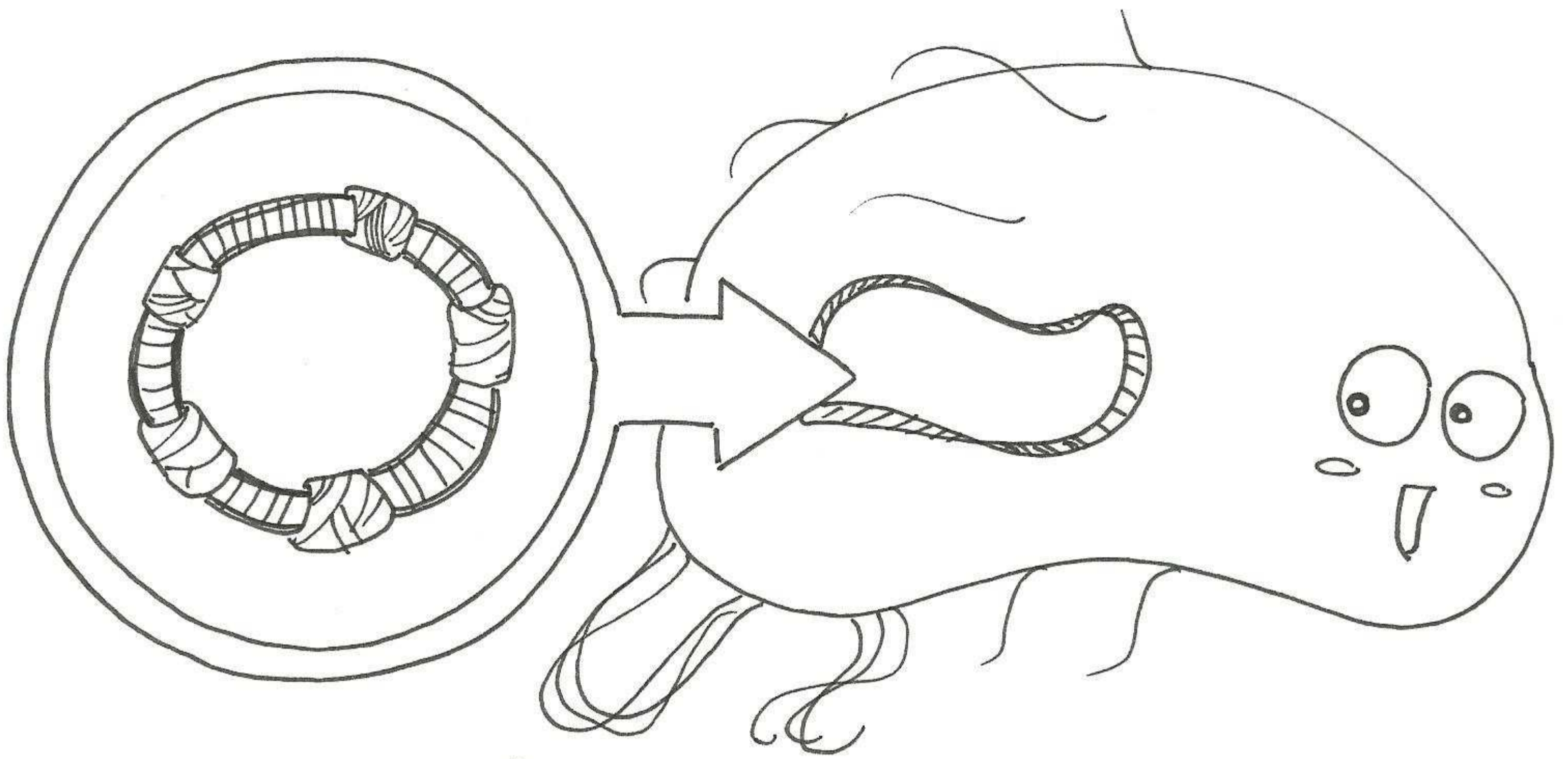


T7-RNA POLYMERASE
AND T7 PROMOTOR
FROM T7
BAKTERIOPHAGE



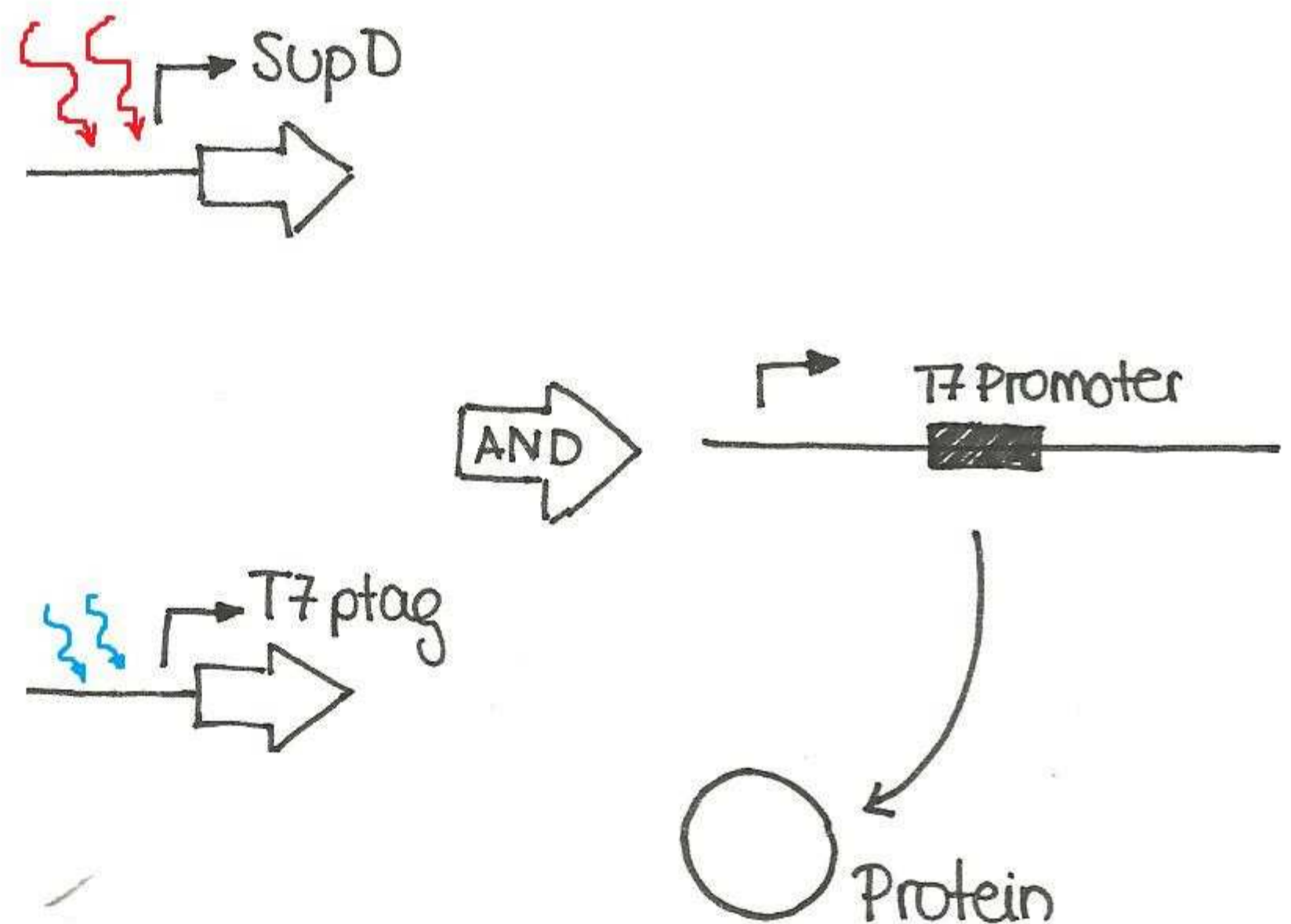
GREEN LIGHT AND
RED LIGHT SENSOR
FROM CYANOBAC-
TERIUM

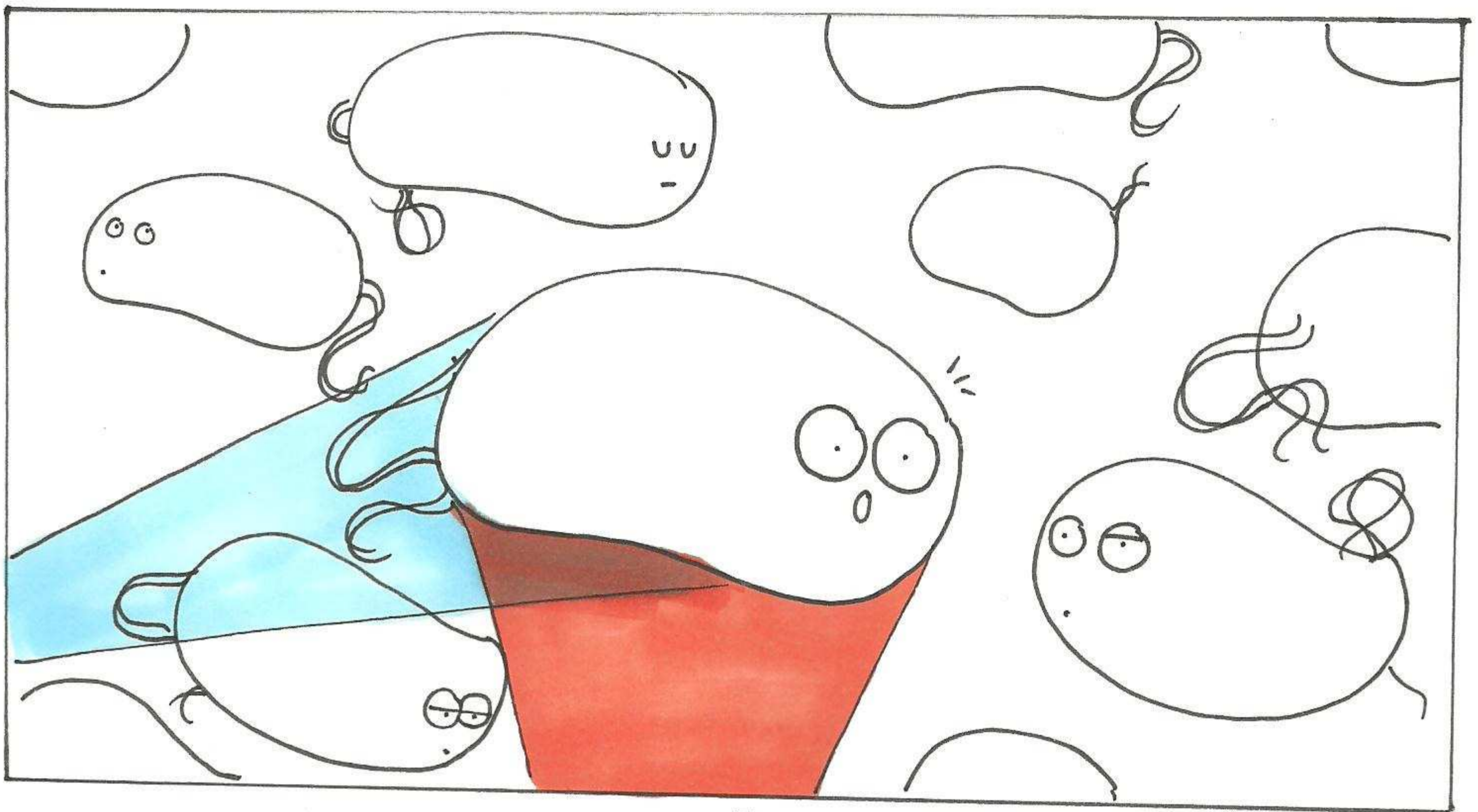




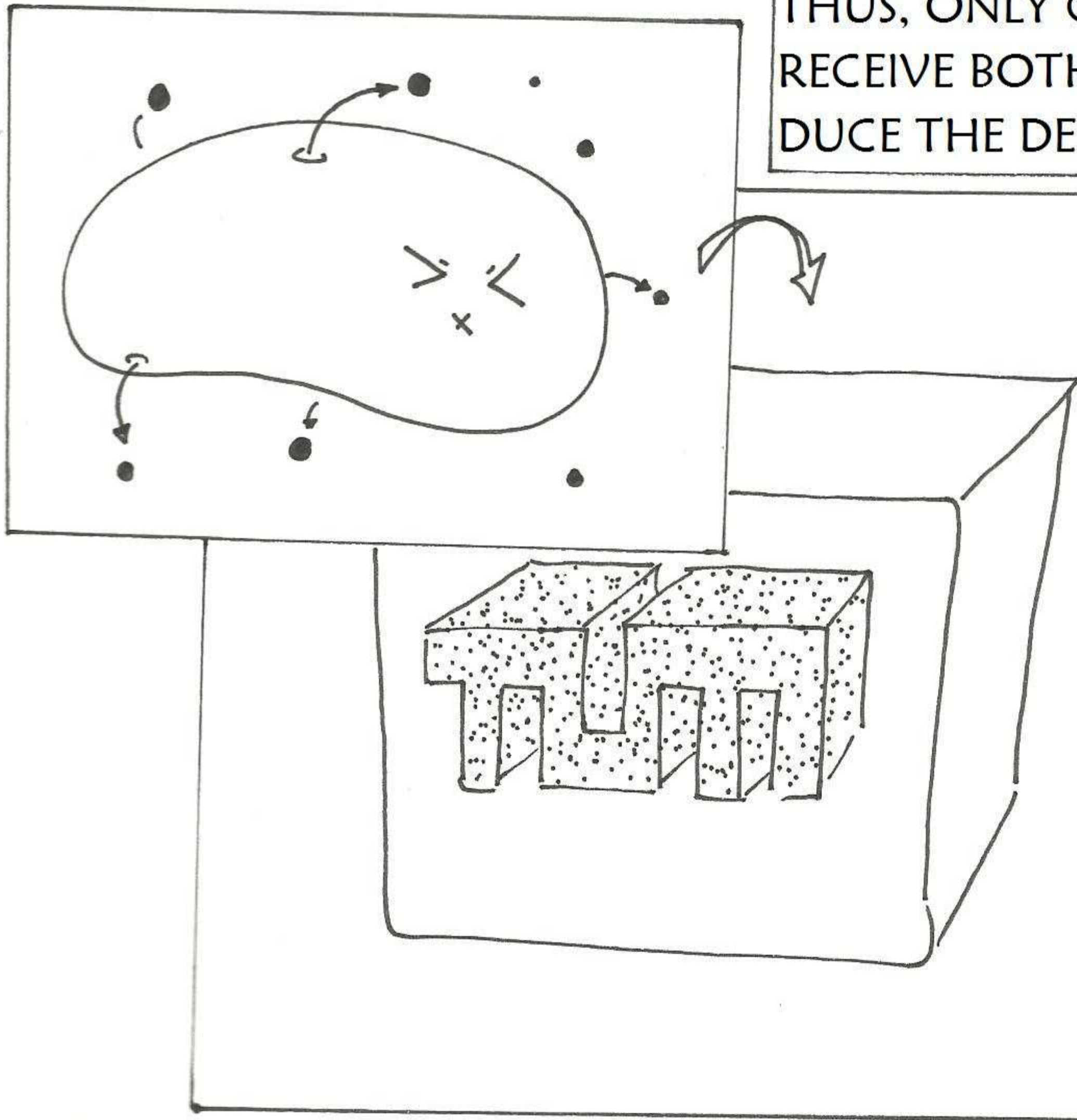
THIS PLASMID WAS THEN TRANSFORMED INTO E.COLI. THE BACTERIA ARE THEN IMMOBILIZED IN A TRANSPARENT GEL MATRIX, WHERE THEY CAN BE PRECISELY ACTUATED WHEN HIT BY BOTH BLUE AND RED LIGHT AT THE SAME TIME.

TO ADDRESS SOME DEFINED CELLS WE REQUIRE TWO SIGNALS FROM TWO DIFFERENT DIRECTIONS. THIS IS ARCHIEVED BY INTRODUCING AN OPTOGENETICAL AND-GATE INTO THE BACTERIA WHICH IS BASED ON AMBER STOP-CODON SUPPRESSION VIA THE NON-CANONICAL TRNA SUPD. A LIGHT SENSITIVE PROMOTER INDUCES THE EXPRESSION OF A MRNA CODING FOR A T7-POLYMERASE, WHICH CAN ONLY BE TRANSLATED BY RIBOSOMES IF THE CORRECT AMBER TRNA IS PRESENT. THE TRNA IS EXPRESSED BY A SECOND LIGHT-SENSITIVE PROMOTER.





THUS, ONLY CELLS WHICH RECEIVE BOTH SIGNALS PRODUCE THE DESIRED SUBSTANCES.



THIS WAY, A SIMPLE COLORED PIGMENT WILL ALLOW US TO CREATE COLORED THREE DIMENSIONAL OBJECTS.

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**THE
END**