RNA interference tools for crop improvement
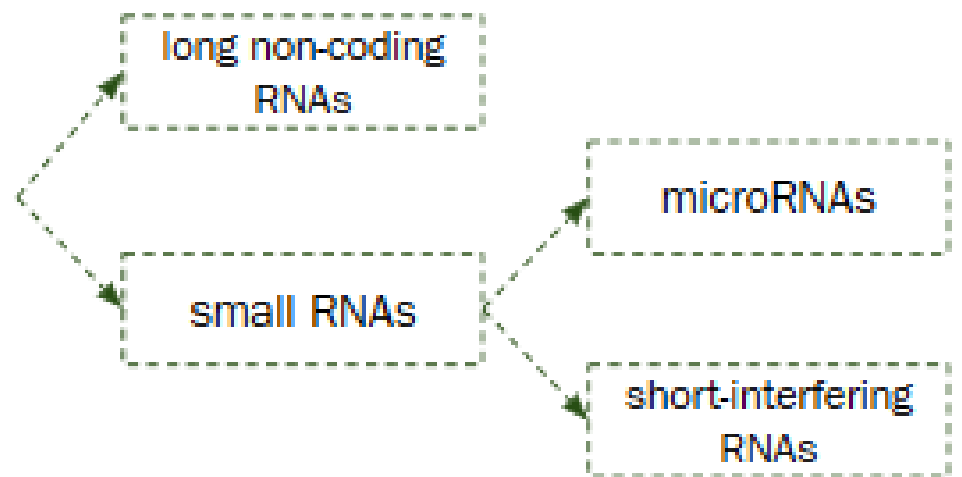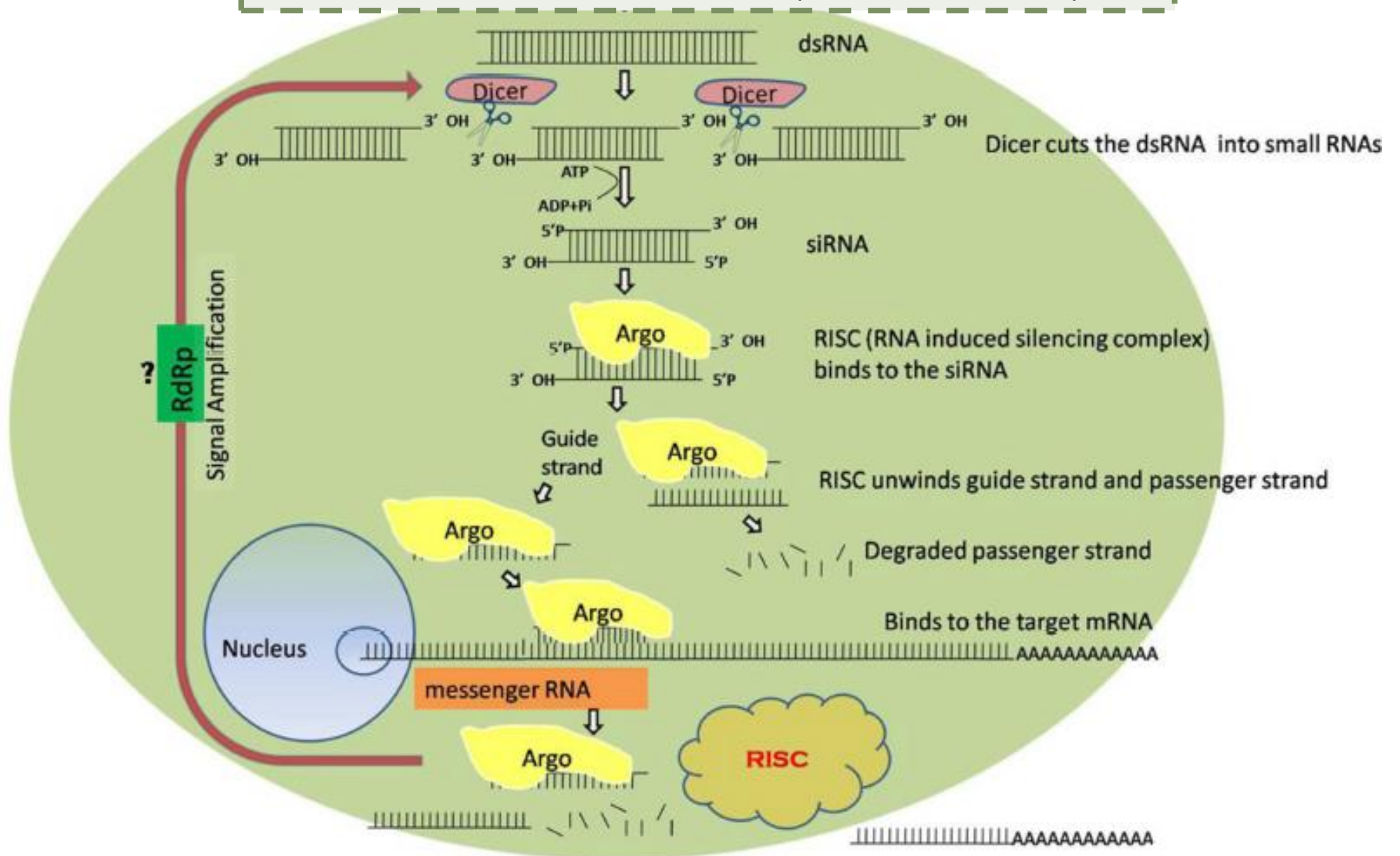
Objectives

❖ To acquire knowledge about the basis of the RNA interference and its classification.

❖ To have knowledge about the potential RNA interference applications related with food technology, specifically, insect resistance and Flavr Savr.

❖ To know of social opinion on genetically modified foods.

Classification

long non-coding RNAs

small RNAs → microRNAs

small RNAs → short-interfering RNAs

RNA interference mechanics (*V.Sudhakara et al, 2015*)

dsRNA

Dicer   Dicer

Dicer cuts the dsRNA into small RNAs

ATP
ADP+Pi

siRNA

RISC (RNA induced silencing complex) binds to the siRNA

Argo

Guide strand

RISC unwinds guide strand and passenger strand

Degraded passenger strand

Binds to the target mRNA

Nucleus

messenger RNA

RISC

RdRp

Signal Amplification

AAAAAAAAAAAA

Benefits vs disadvantages

🟢 Efficient, user friendly, high-throughput, stable, flexible, better than antisense.

🟤 Off-targeting.

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June 2017

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Conclusions

❖ RNAi is a post-transcriptional phenomenon to regulate genes present in plants and mammals.

❖ There are many applications of RNAi but at laboratory level. However, there is the possibility to extrapolate to commercial level.

❖ Due to the benefits, RNAi could be a good alternative to solve the chemical insecticides resistance.

❖ The society is scared about genetically modified organisms due to a lack of awareness.