

High-throughput screening and identification of novel chemicals enhancing plant defense against pathogens/pests.

Prof. Dr. Kazuyuki KUCHITSU

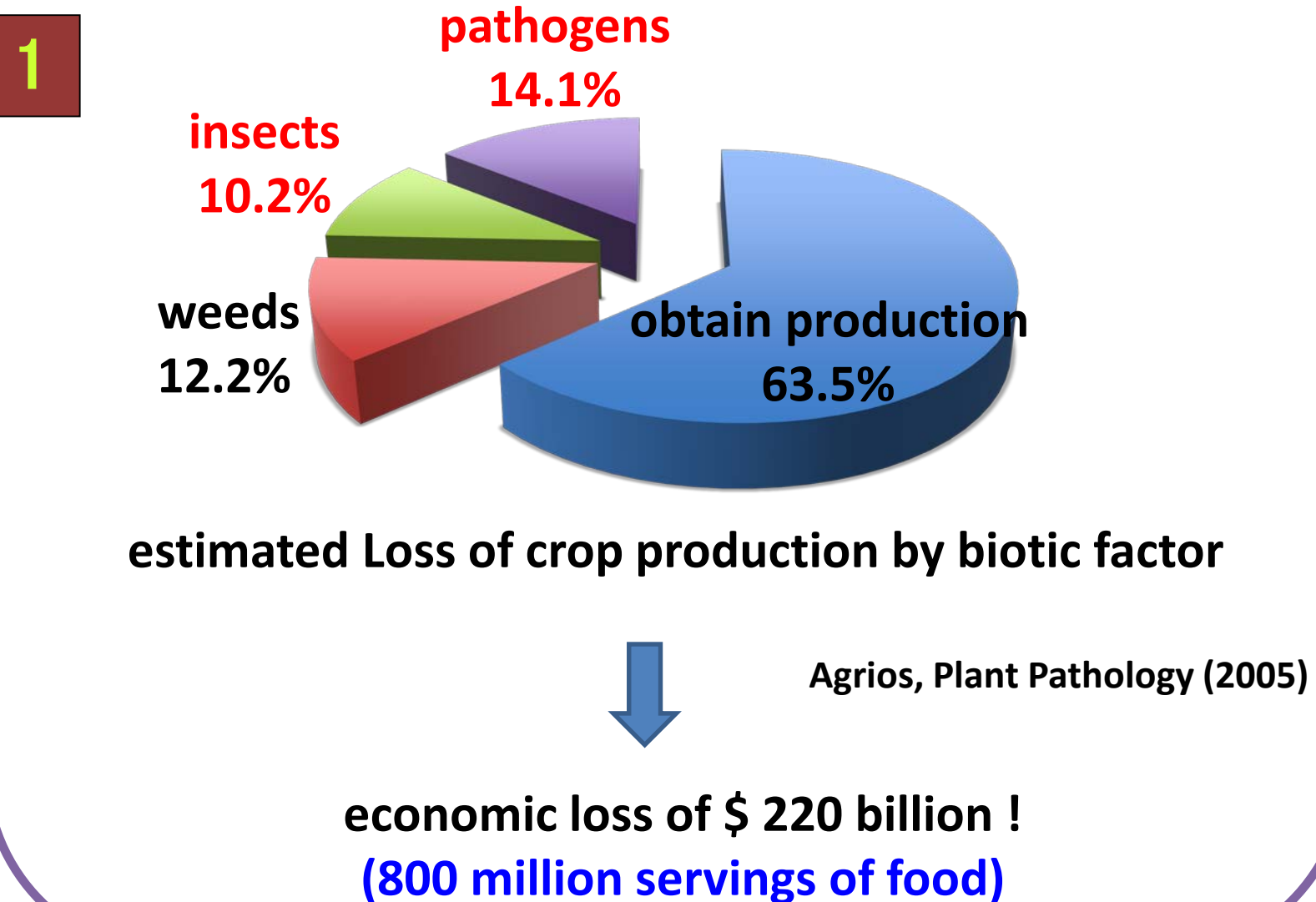
Department of Applied Biological Science, Faculty of Science and Technology, Tokyo University of Science

Control of pests and diseases is a critical issue in crop production since estimated loss by biotic factors cause economic loss of \$220 billion. Traditional chemical pesticides which have still major counter measure against crop loss have disadvantages of toxicity to beneficial symbiotic microorganisms and insects, as well as disturbance of eco-system.

Plant defense activators, chemicals that boost defense/immune responses of plants, have excellent advantages as new type of pesticides to avoid emergence of drug resistant organisms. The plant immune system consists of two major pathways involving salicylic acid (SA) and jasmonic acid (JA)/ethylene (ET). Only a few plant defense activators that activate only SA pathway with narrow application mostly limited to rice pests are available in market.

We have developed a novel high throughput screening system for plant defense activators (PCT filed), and have discovered novel putative plant defense activators that activate the JA/ET pathway or both of the two pathways, which are expected to enhance defense responses against necrotrophic pathogens and pests.

Pest control of crop is a crucial issue



Advantage of plant activator as pesticide

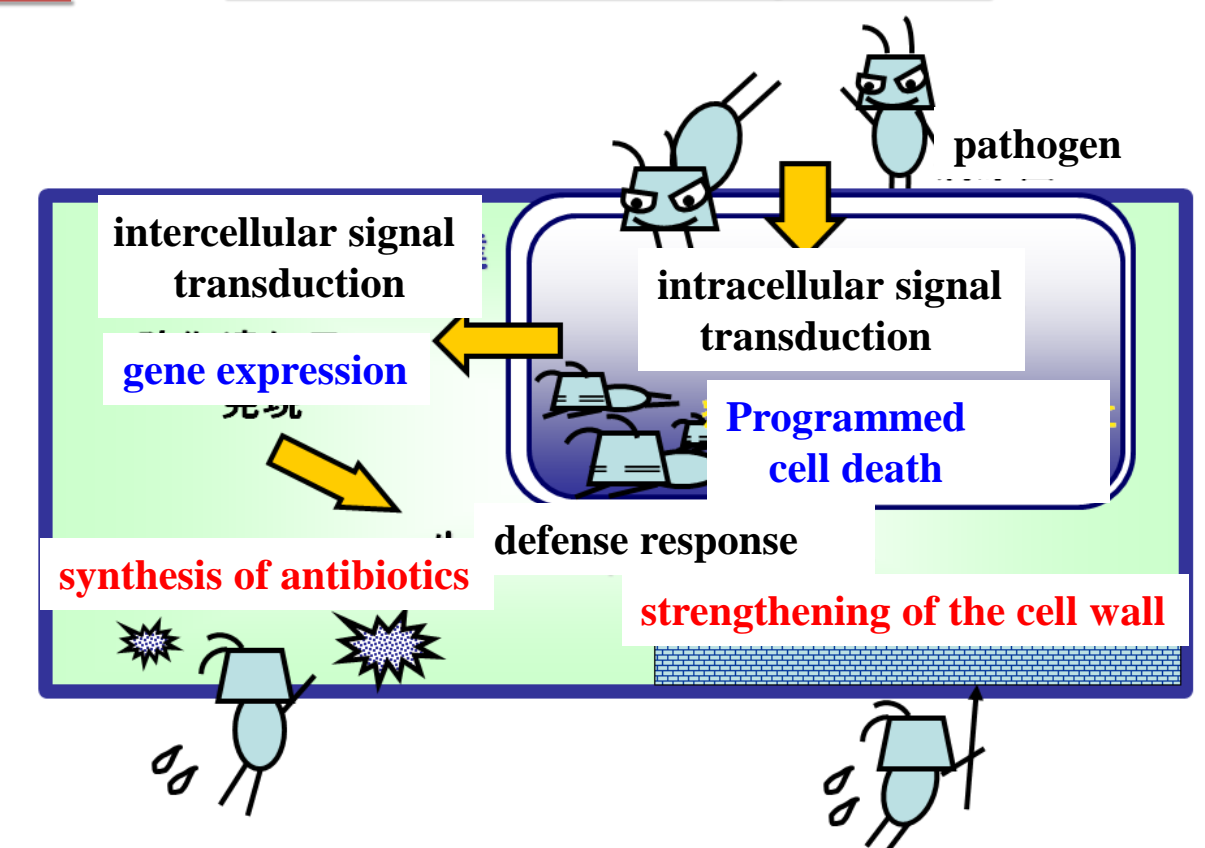
2

fungicides / insecticides
chemicals directly kill pathogens or pests

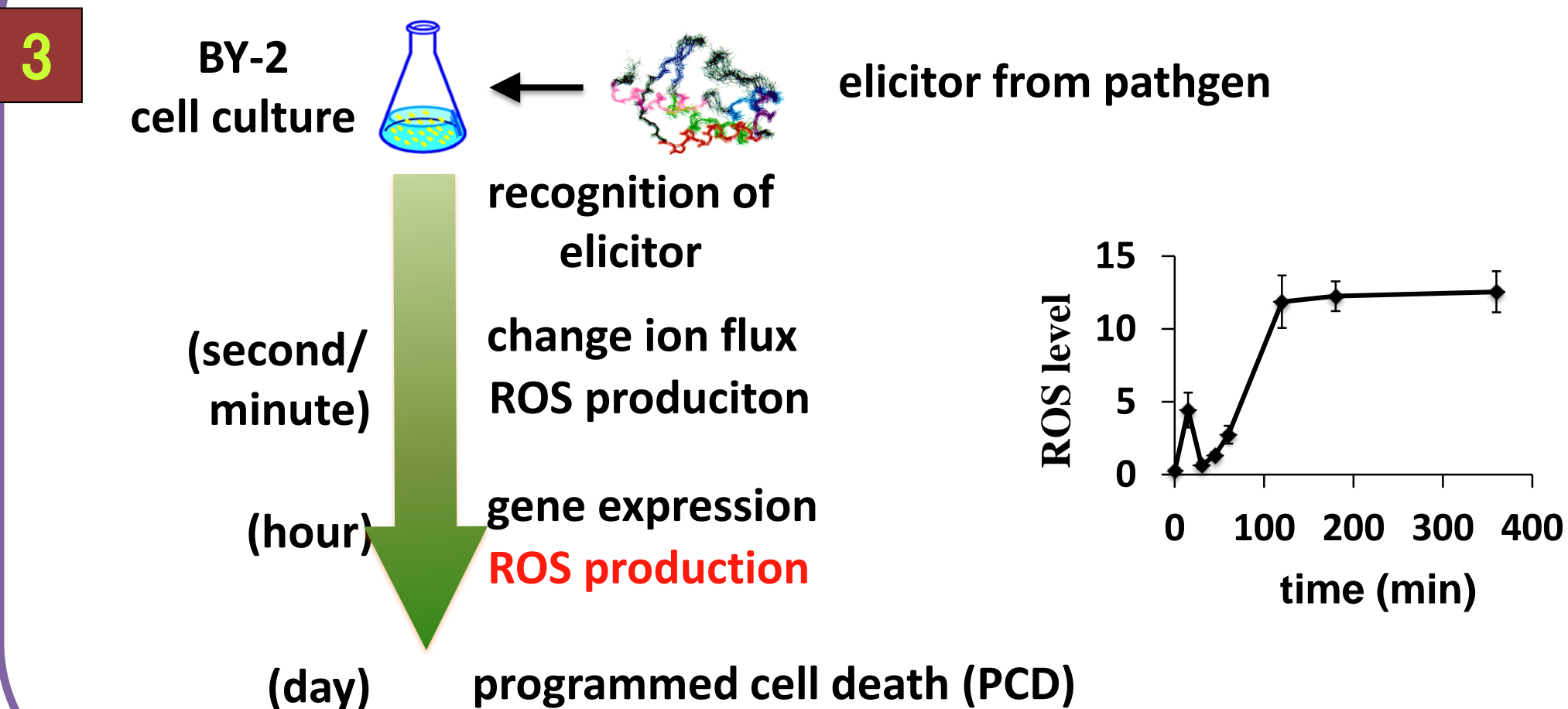
plant defense activators
chemicals activate plant's immune system

- Protection of microbes in the field
- Avoidance of drug-resistance pathogen

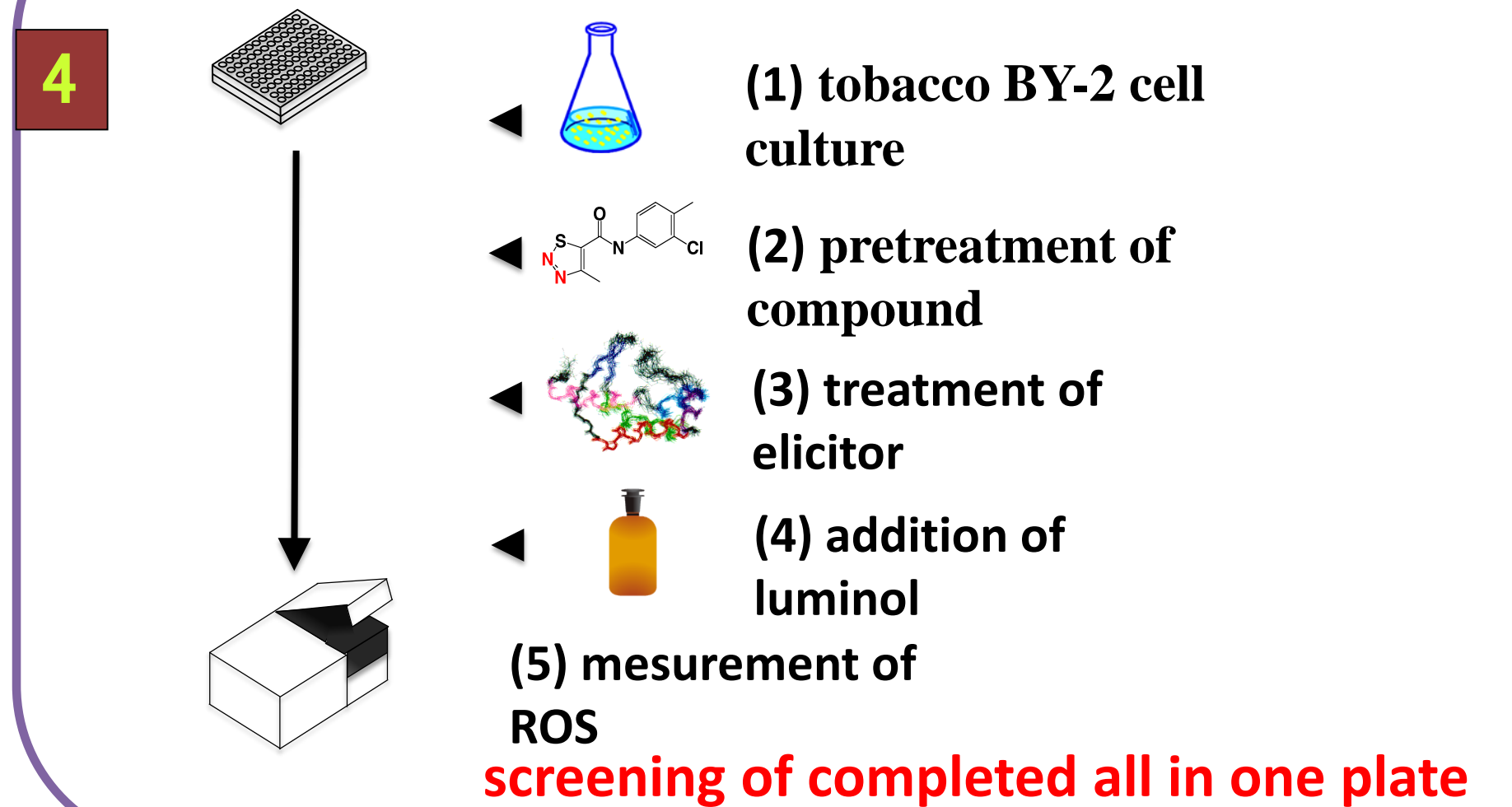
Plant immune responses



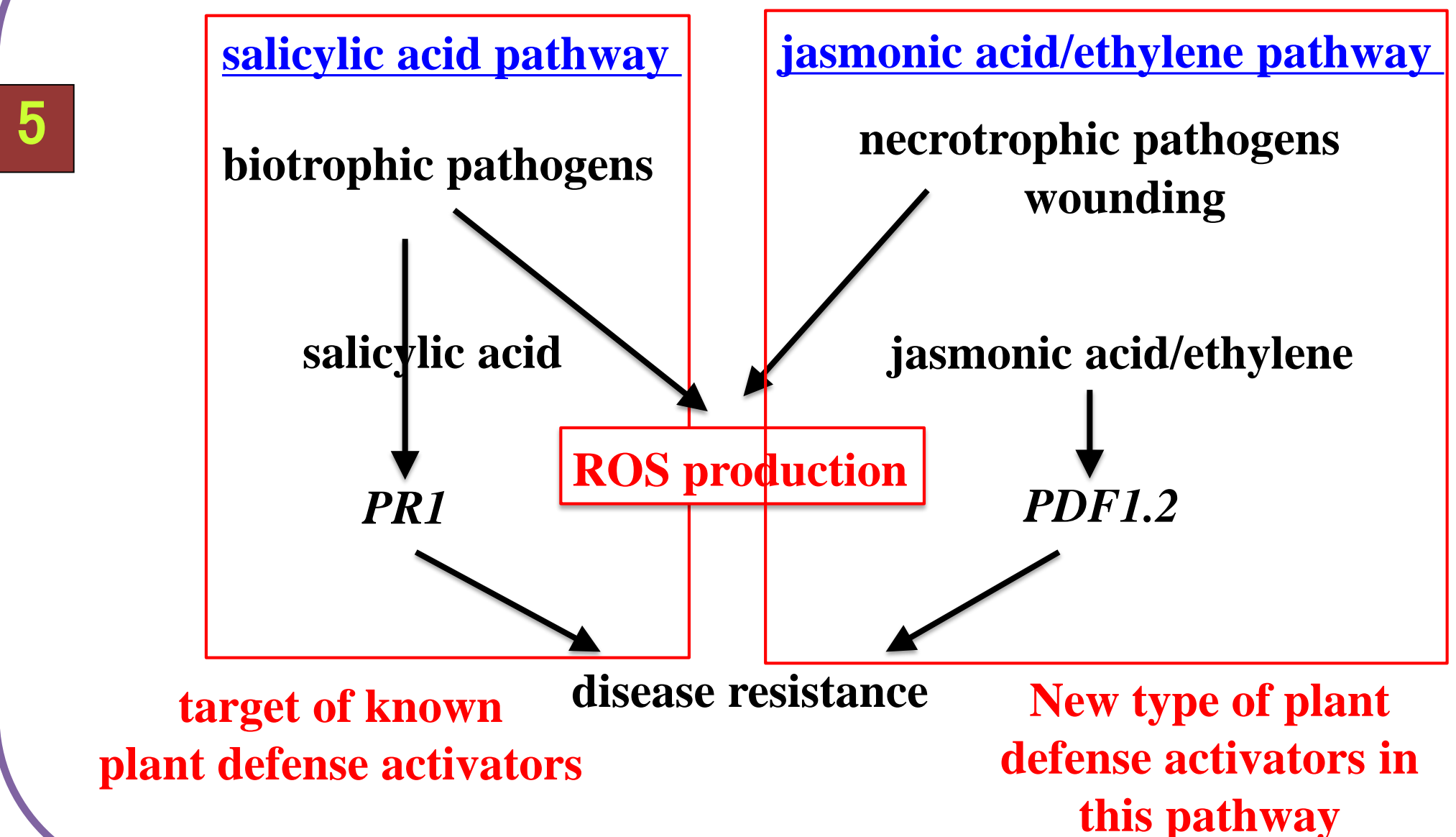
defense response in BY-2 cultured cells



Our system is suitable for high-throughput screening



New Plant Defense Activators in Jasmonic acid/ethylene Pathway



On going project

