NEW FINDINGS OF DOCTORAL DISSERTATION

Name of Doctoral candidate: **Ly Hai Trieu**

Dissertation title: **Study on the hypoglycemic effect and mechanism of *Ensete glaucum* (Roxb.) Cheesman seeds in experimental models**

Speciality: **Pharmacology - Clinical pharmacy** Code of speciality: **972.02.05**

Name of academic advisors:

1. **Dr. Le Van Minh**
2. **Assoc. Prof. Dr. Nguyen Thi Thu Huong**

Name of academic institute: **National Institute of Medicinal Materials**

Summary of new findings of the dissertation:

In this dissertation, for the first time, the hypoglycemic effect and mechanism of ethanol extract of *Ensete glaucum* (Roxb.) Cheesman seeds were studied and proven, providing scientific evidence for the use of the extract in the treatment of diabetes.

1. Hypoglycemic effect and related effects of ethanol extract of *Ensete glaucum* (Roxb.) Cheesman seeds in the model of experimental hyperglycemia

The study demonstrated the hypoglycemic effect of the ethanol extract of *E. glaucum* seeds in STZ-induced hyperglycemic mouse model, oral glucose tolerance test on normal mice and STZ-induced hyperglycemic mice.

The study demonstrated the effect of ameliorating liver and kidney damage of ethanol extract of *E. glaucum* seeds in STZ-induced hyperglycemic mouse model via the mechanism of preventing cell membrane lipid peroxidation.

2. Mechanism of hypoglycemic effect of ethanol extract and some isolated compounds of *Ensete glaucum* (Roxb.) Cheesman seeds in experimental models

Determining the mechanisms of hypoglycemic effect of ethanol extract of *E. glaucum* seeds is the highlight of the dissertation. Mechanisms of action include (1) reducing/slowing glucose absorption through inhibiting α-amylase, α-glucosidase, and intestinal glucose absorption; (2) stimulating pancreatic β cells to secrete insulin; (3) protecting pancreatic β cells through the regulation mechanism of anti-oxidative stress,

anti-inflammation and anti-apoptosis (Figure 1); (4) increasing insulin sensitivity through the mechanism of hepatic AMPK activation and possibly PTP1B inhibition (Figure 2). These results provide meaningful scientific evidence for future clinical trial research on the hypoglycemic effect of ethanol extract of *E. glaucum* seeds.

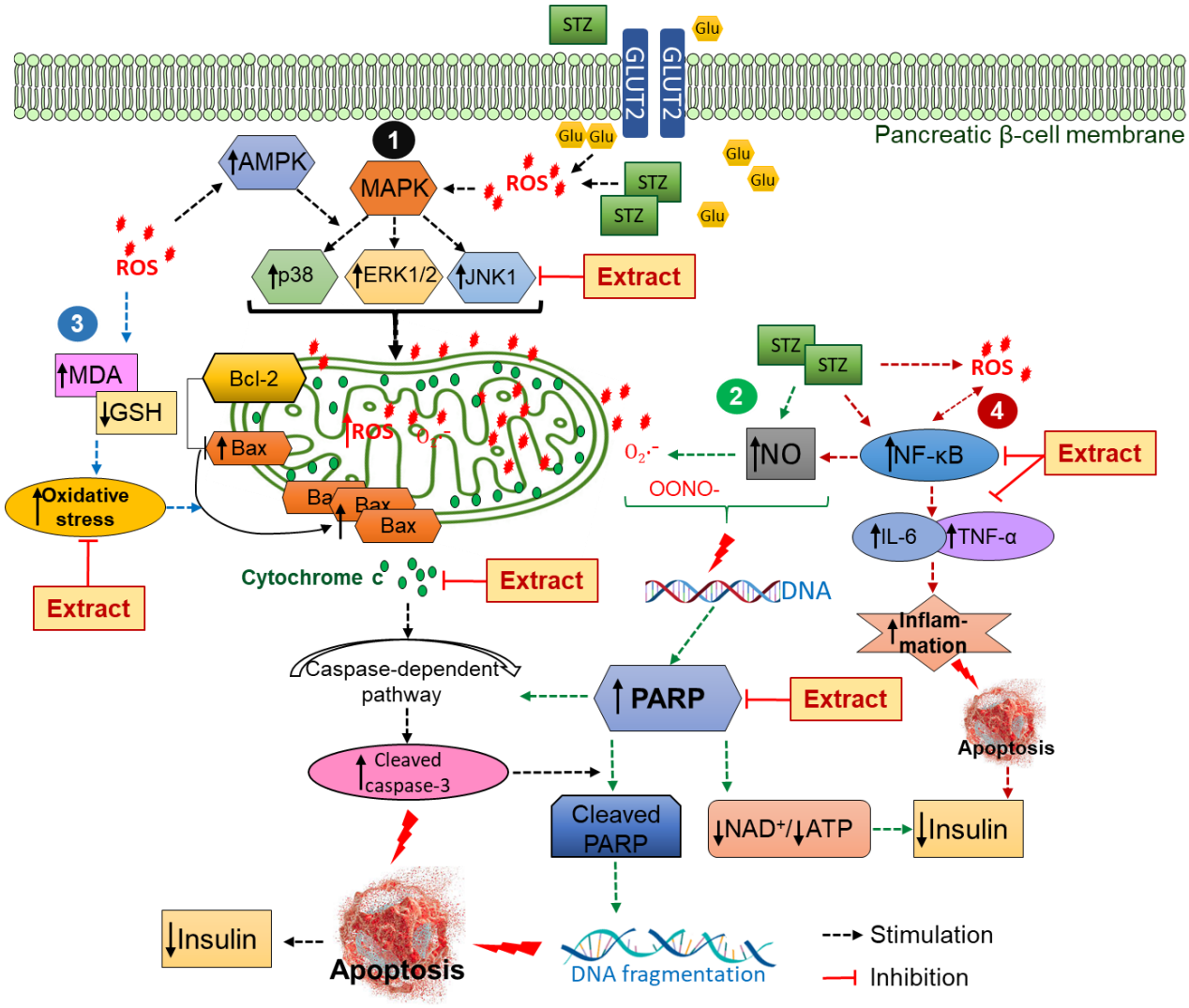
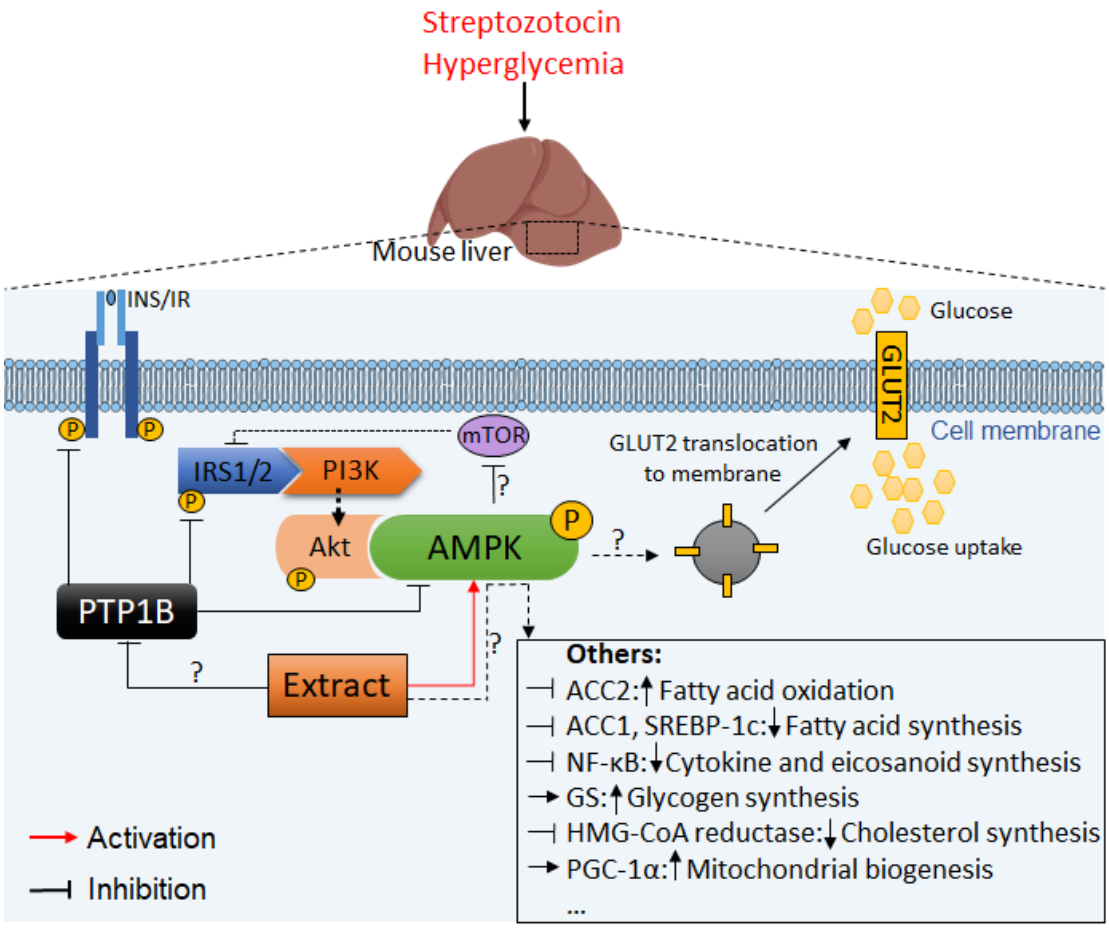


Figure 1. Proposed mechanism for the protective effect of pancreatic β cells caused by STZ and/or hyperglycemia of ethanol extract of *E. glaucum* seeds



Hình 2. Proposed mechanism involves an increased insulin-sensitizing effect of ethanol extract of *E. glaucum* eeds

This study identified afzelechin (flavan-3-ol) and coniferaldehyde (phenolic aldehyde) as potential isolated compounds contributing to the hypoglycemic effect of ethanol extract of *E. glaucum* seeds with proven mechanisms including (1) reducing/slowing glucose absorption through inhibiting *α*-glucosidase; (2) stimulating pancreatic β cells to secrete insulin by a mechanism predicted to be binds and closes the ATP-sensitive potassium channel (K_{ATP}) (Figure 3); (3) protecting pancreatic β cells against STZ toxicity; (4) increasing insulin sensitivity possibly by inhibiting PTP1B. The results of the study are the basis for further studies on the hypoglycemic effect of afzelechin and coniferaldehyde.

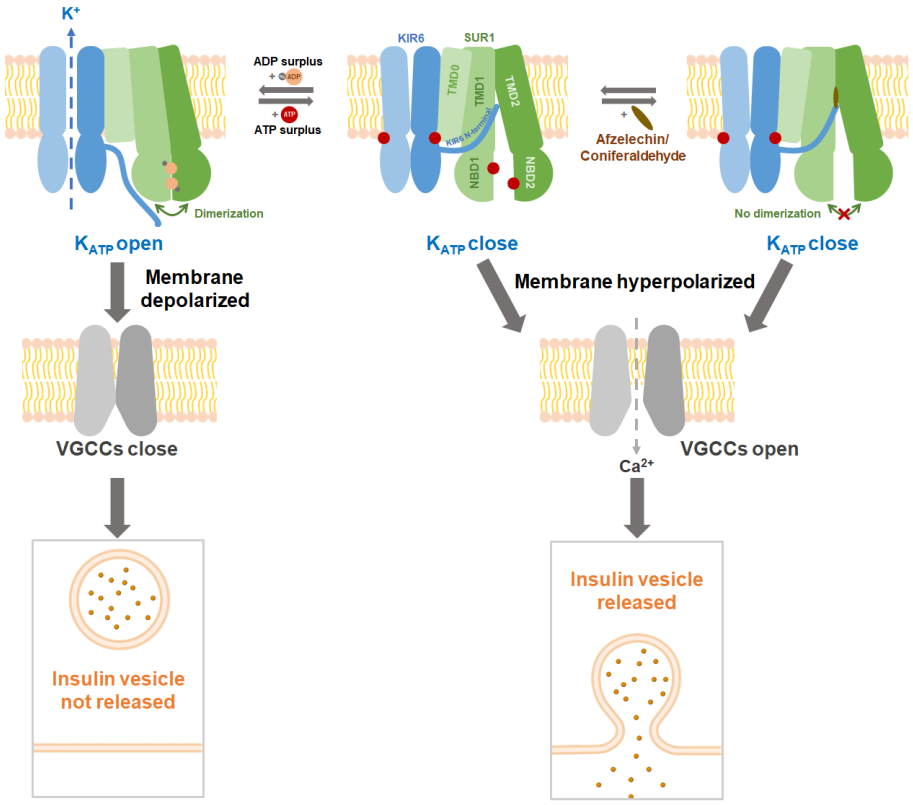


Figure 3. Illustration of the insulin-releasing mechanism of afzelechin and coniferaldehyde through inhibition of K_{ATP} channels

Ho Chi Minh City, 19 August 2024

Academic advisors **Doctoral Candidate**

Dr. Le Van Minh **Assoc. Prof. Nguyen Thi Thu Huong** **Ly Hai Trieu**