



Next-Generation Cry1Ab Proteins

Insect resistance to Cry proteins is growing – and conventional strategies are falling behind. But what if you could screen thousands of Cry1Ab variants in a single round, directly against resistant insect cell lines? Let's future-proof your next-generation insecticidal proteins with acib's next-generation screening platform.

BACKGROUND

Cry1Ab has long been a cornerstone in bioinsecticide formulations, but growing resistance – particularly due to mutations in ABCC2/ABCC3 transporters – is threatening its effectiveness. Traditional strategies to identify improved Cry proteins rely heavily on time-consuming, labor-intensive bioassays using live insects, which are costly, ethically complex, and often too slow to keep pace with evolving resistance.

acib proposes a smarter way forward: A next-generation screening platform, combining a Rosetta-based protein design tool with a fast, high-throughput expression & screening system that encompasses yeast-based secretory expression of Cry1Ab variants with direct cytotoxicity assays on insect cell lines. This platform will accelerate the discovery of superior Cry1Ab variants and will enable rapid validation against real resistance targets.

TECHNOLOGY

acib's system is based on integrating yeast-based protein secretory expression and insect cell assays into a rapid and scalable high-throughput pipeline:

- **Generation** and transformation of Cry1Ab variant libraries in the industrial yeast *Pichia pastoris* aka *Komagataella phaffii*
- **Expression** of up to 10,000 clones per round; supernatant used directly (no purification) i.e. easy and fast
- **Activation** of Cry proteins (solution or immobilized)
- **Cytotoxicity screening** on relevant insect cell lines
- **Time-to-result:** approx. 6 weeks per screening cycle (10,000 variants)

Once implemented, the platform enables rapid identification of resistance-breaking Cry1Ab variants, with direct applicability in commercial biocontrol solutions.

OFFER

acib offers industrial partners a co-development of this engineering and screening platform to:

- Rapidly generate and evaluate custom Cry1Ab variants
- Benchmark activity against resistant insect cell models
- Identify top-performing leads for commercialization

All project IP can be fully transferred and used commercially by the financing company partner.

EXPERTS

Prof. Dr. Harald Pichler

DEVELOPMENT STATUS:

Status of the project proposal – Technology Readiness Level 2 (technology concept formulated)

KEYWORDS

- Cry1Ab
- Insecticidal proteins
- Resistance management
- High-throughput screening
- Cosmetic ingredients
- Protein engineering
- ABCC2/3
- Sf9 cell-based assay
- Biocontrol

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