

# FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

**Project Title:** New strategy for producing "high biomass plants" by increasing gibberellin content or sensitivity

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## 1. Background of research

Gibberellin (GA) is a phytohormone that is necessary for plant elongation. In the 20<sup>th</sup> century, breeding of crops was aimed at lowering plant height by reducing GA content or GA sensitivity of the plants. In rice, application of high amount of fertilizer allowed yield increases and the reduction in height enabled the plants to support the high yielding panicles. This strategy doubled rice grain yield and paved the way to the so-called "Green Revolution". However, recent global issues are also concerned in using crops as sustainable biomass energy, and thus not only high grain yield but also high biomass producing plants are desired. A novel breeding strategy that will give both high yielding and high biomass producing plants is now required.

## 2. Research objectives

Our objective is to create "high biomass producing rice" with high stature and strong lodging resistance. This could be achieved by increasing the GA content or GA sensitivity of the plant and by introducing genes that function to strengthen the rice culm. Results of such research in rice will be applied to other plants.

## 3. Research characteristics (incl. originality and creativity)

Conventional breeding to increase grain yield was achieved by reducing GA content or GA sensitivity. Our current research attempts to create "high biomass producing rice" using a completely opposite breeding approach, and that is by increasing GA content or GA sensitivity.

## 4. Anticipated effects and future applications of research

Rice with increased biomass can be used for biofuel production. Our breeding strategy can be applied to leverage similar research on other plants such as *Miscanthus* or switchgrass, which are considered potential "biomass crops". Therefore, our results could contribute in promoting the "Green innovation".

## Background of research 1

We identified GA signal components and their structures (Fig. 1,2).

Fig. 1 Gibberellin (GA) signaling

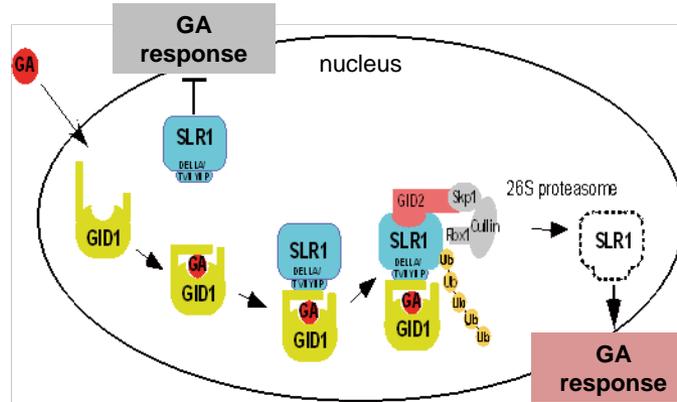
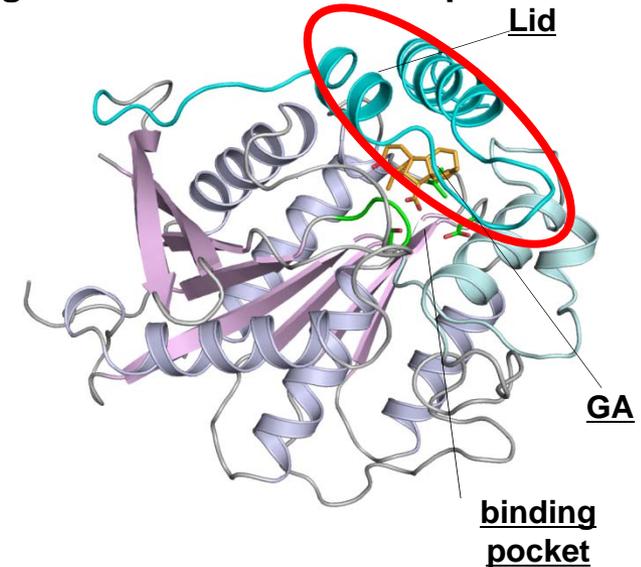


Fig. 2 Structure of GA receptor



## Background of research 2

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Using our knowledge of gibberellin

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