

## The genome of sesame sheds new lights on oil biosynthesis

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Researchers from Oil Crops Research Institute of the Chinese Academy of Agricultural Sciences, BGI, University of Copenhagen and other institutes have successfully cracked the genome of high oil content crop sesame, providing new lights on the important stages of seed development and oil accumulation, and potential key genes for sesamin production. The joint efforts made sesame become the second Lamiales to be sequenced along with the former published minute genome of *Utricularia gibba*. The latest study was published online in *Genome Biology*.

Sesame, *Sesamum indicum* L., is considered as the queen of oilseeds for its high <u>oil content</u> and quality. It is grown widely in tropical and subtropical areas as an important source of oil and protein. Compared to other eatable oil crops such as soybean, rapeseed, peanut and olive, sesame has innate superiority for its high oil content (~55% of dry seed), and thus is an attractive model for studying lipid biosynthesis. However, currently only limited genomic data of sesame is available.

In this study, researchers presented a high-quality draft genome of the sesame genotype 'Zhongzhi No. 13', an elite cultivar in China been planted over the past ten years. After data process, the assembled sesame genome size is about 337 Mb, with a total of 27,148 genes. The result highlighted the absence of the Toll/interleukin-1 receptor domain in resistance genes, and suggested that this may be a new paradigm in elucidating the interaction of resistance genes along with diseases.



To explore the molecular mechanism of <u>lipid biosynthesis</u>, researchers conducted comparative genomic and transcriptomic analyses and found an expansion on type 1 lipid transfer genes by tandem duplication, a contraction on lipid degradation genes, and the differential expression of essential genes in the triacylglycerol biosynthesis pathway, particularly in the early stage of <u>seed development</u>. Researchers further resequenced 29 sesame accessions from 12 countries to investigate the genetic diversity of lipid-related genes.

Sesamin is an oil-soluble furofuran lignan typically present in sesame seed. Numerous studies on rats and mice have suggested various health benefits of sesamin. This compound is known to promote normalize blood pressure, lower cholesterol, protect the liver, and contribute to weight loss. Sesamin biosynthesis involves two key genes encoding dirigent protein (DIR) and piperitol/sesamin synthase (PSS), respectively. In this study, researchers found that DIR homologues were present in sesame and tomato, but the PSSs are only detected in sesame, indicating the genetic foundation for the sesame-specific product.

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Provided by BGI Shenzhen

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