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Difference of proteomics vernalization-induced in bolting and flowering transitions of *Beta vulgaris*

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ACCEPTED MANUSCRIPT

1	Difference of proteomics vernalization-induced in bolting and flowering
2	transitions of Beta vulgaris
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5	China.
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7	ABSTRACT. Sugar beet (Beta vulgaris) is a biennial crop that accounts for 30% sugar production of
8	the world. Vernalization is an essential factor for sugar beet reproductative growth under long days.
9	Although genes association with bolting and flowering were well explored, the difference of
10	proteomics in the two growth stages were still poorly understood. To address the molecular mechanism
11	at the level of proteins, an isobaric tags for relative and absolute quantification (iTRAQ)-based
12	quantitative proteomics approach was employed to the three different growth stages (germination,
13	bolting, flowering) of vernalized samples and the corresponding stage germination (17W weeks), 19W
14	and 20W of nonvernalized samples. A total of 1110 peptides, 842 unique peptides and 570 proteins
15	were identified. Most of them were assigned to phenylpropanoid biosynthesis, hormone metabolism
16	and protein processing pathway. IAA and Gibberellins (GA3) promoted growth and development in a
17	threshold manner at growth stage germination after vernalization. A novel discovery was that IAA
18	biosynthetic pathway of sugar beet was the Trp-dependent. In addition, two predominant pathways of
19	protein processing association with vernalization were also identified in sugar beet at growth stage
20	flowering. This study provided an in-depth understanding of the molecular mechanism of vernalization
21	at the level of proteomics.
22	Keywords: vernalization, nonvernalization, proteomics, iTRAQ, sugar beet
23	1. Introduction
24	Developmental transition from vegetative to reproductive growth of plant species were induced by
25	environmental signals such as vernalization and photoperiods. Flowering plant Arabidopsis thaliana
26	perceived vernalization stimuli to initiate flowering transition, which process had been extensively

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