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Poster Abstract – C.26

CRY-DASH GENE IS UNDER THE CONTROL OF THE CIRCADIAN CLOCK MACHINERY IN TOMATO

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The ability of plants to respond to light is achieved through a number of photoreceptor families, which include red and far-red light sensing phytochromes (PHY) and blue-light specific phototropins and cryptochromes (CRY).

Cryptochromes are flavoproteins that share structural similarity to DNA photolyases but lack photolyase activity. Although originally identified in *Arabidopsis*, the cryptochromes have now been found in bacteria, plants and animals. Most cryptochrome proteins, with the exception of CRY-DASH (or CRY3), are composed of two domains, an amino-terminal photolyase-related (PHR) region and a carboxy-terminal domain of varying size.

In *Arabidopsis*, three cryptochrome genes (*CRY1*, *CRY2* and *CRY-DASH*) have been described so far. Plant cryptochromes play an important role in several blue light-regulated developmental processes such as de-etiolation, flowering and flavonoid biosynthesis. CRY1 and CRY2 are intimately connected with the circadian clock machinery: *CRY1* and *CRY2* transcript levels are regulated by the clock and the encoded proteins seem to be involved in the input to the clock.

In tomato (*Solanum lycopersicum*), three cryptochrome genes have been discovered and analysed in detail so far: two *CRY1*-like (*CRY1a* and *CRY1b*) and one *CRY2* genes. The use of transgenic and mutant lines have shed light on the role of tomato cryptochromes in seedling photomorphogenesis, flavonoid and carotenoid accumulation, adult development, fruit pigmentation and flowering.

We report the characterization of an *ORF* of tomato which shares high similarity with *Arabidopsis CRY-DASH*. The tomato *CRY-DASH* mRNA is expressed in both seeds and adult organs and cycles in a light-dependent way during the day, with a peak of expression at dusk. Its transcription pattern is altered in a *cry1a* mutant and in a transgenic *CRY2* overexpressor (*CRY2-OX*). In plants transferred for 24 hours of continuous light, the *CRY-DASH* transcript still maintains its cycling rhythm, suggesting that it is controlled by the circadian clock machinery.