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MOLECULAR CHARACTERIZATION OF *TUBER MELANOSPORUM* RESPONSES TO LIGHT

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The first genomic sequence of a *Tuber* spp (*T. melanosporum*) has been published in 2010 (Martin et al, Nature 464,1033-1038). The presence among the annotated sequences of ORFs corresponding to known photoreceptors confirmed the presence of light induced phenomena previously observed only in a different Tuber specie (*T borchii*). In fact we already pubblished data on the existence of light dependent responses in this organism with an underground life cycle.

We identified in *T. melanosporum* different classes of light photoreceptors: as phototropins (WC-1WC-2), opsins, phytochome and velvet like transduction complex. The most conserved system is that of White collar proteins, but also the velvet complex appears conserved, while the retinal less opsine and the heavily rearranged phytochrome are more enigmatic. We have data from biochip that reveals that all the putative photoreceptors are expressed in tuber and in particular each of them is mainly expressed in a specialized structures of Tuber as fruitbody, mycelium or mycorrhiza.

Special attention we put on the characterization of the sensor domains.of the photoreceptors. In particular we would like to measure the minimal amount of photones necessary to activate an hypogeous sensor compared with the light required to activate a Neurospora LOV domain .

We constructed recombinant WC-1 molecules containing the original Neurospora LOV domain or the LOv domain from *T. melanosporum* or *borchii* and we used them for Neurospora transformation. We obtained new strains that have been characterized by Southern analysis and PCR. We are now characterizing the peculiar properties of Tuber LOV domain in responding to light activation: Kinetic of light dependent mRNA, time of photoreceptor recovery and others.