Metabolic engineering of *Taxus* plant cell cultures for increased production of the anti-cancer agent paclitaxel

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**Figure 1:** GUS expression in metabolically engineered *Taxus* cells in (a) callus and (b) suspension.

Paclitaxel (Taxol®, Bristol-Myers Squibb) is an anticancer agent used in the treatment of breast, lung and ovarian cancers, as well as the AIDS-related Karposi’s sarcoma. Currently, the drug is supplied primarily through plant cell culture; however, suspension cultures have relatively low product yields that are highly variable across cell lines and over time within a single cell line, leaving considerable room for process improvements. The Roberts’ lab is working to improve paclitaxel yields through metabolic engineering of *Taxus* suspension cultures. To help guide these studies, efforts are placed on identifying and isolating key genes involved in the regulation of paclitaxel biosynthesis, as well as applying genomic and metabolomic analyses to discover competing metabolic pathways that divert carbon flux away from paclitaxel. In collaboration with Joyce Van Eck at the Boyce Thompson Institute for Plant Research, a successful method for the stable transformation of *Taxus* suspension cultures has recently been established (Figure 1), opening the door for metabolic engineering studies and establishment of superior processes for paclitaxel supply.