Freedom to Cooperate: Transbacter as a Biological Open Source (BiOS) tool for gene transfer

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With four billion people living on less than four dollars a day, using science as a basis for problem solving in agriculture should not be an option solely for the rich, but an imperative for all. The rhetoric in modern biotechnology is remote from this reality.

Virtually all enabling technologies used by public sector plant biologists are encumbered by broad patent rights owned within the private sector. Tens of thousands of genes – much of the genome of many plants - are similarly patented, or subject to pending patent claims. Most patent rights are held by a few multinational corporations, or their affiliates, even though many derived from discoveries, technologies and inventions by public agencies that then sold or exclusively licensed the rights. But delivery of research work product – other than as intellectual curiosities - requires securing sufficient rights through the complex web of intellectual property to achieve a path to market. And only those who can assemble such capability can use the science in commercial applications, including applications for public good.

Scientists and policy-makers in government, academic and non-profit sectors are largely unaware of the wholesale co-opting of public science that this entails.

If public good and neglected priorities are to be addressed, all innovators must be able to navigate these pathways. To do so requires new tools for patent system transparency, mapping patent rights, bypassing unjust restrictions, creating and sharing better and cheaper technologies and assembling the necessary 'freedom to co-operate'. The BiOS Initiative – Biological Open Source – is a concerted effort to provide these tools.

We are developing new 'open source' enabling technologies as examples of a dynamic and useable 'protected commons' – a shared resource. TransBacter™ was invented as an alternative to the thoroughly patent-constrained *Agrobacterium* technology used in virtually all academic laboratories. We have identified the components of the *Agrobacterium vir* regulon sufficient to enable diverse bacteria – including benign symbionts – to transfer genes to plants without infringing on others' patent rights. This technology has been refined so that the capability is now conferred on *Sinorhizobium* and other bacteria by a single broad host range vector of about 40kb, including the transferred DNA. These new vectors and the GUSPlus reporter system are available under a BiOS shrink-wrap agreement and can be used with full commercial rights at no cost. They will be distributed at the meeting.