

## The Physcome Project

At Moss 2003 it was generally agreed that the sequencing of the *Physcomitrella* genome would be of considerable benefit to evolutionary, population, physiological and developmental studies and should therefore be given a high priority. This moss has many useful experimental properties, is an excellent genetic model system because of its ability to undergo homologous recombination, and represents an important evolutionary contrast to the flowering plants. However, it was recognized that such a project would have to involve many labs in many countries.

A provisional outline strategy was put forward, but it was strongly felt that such a project should not be exclusive, and so contributions would be welcomed, both now in addressing the strategy, and in the future if the project gains momentum.

The strategy is as follows:

1. Immediately collect as many isolates of *Physcomitrella patens* from as many locations and as many environments as possible. A number of isolates have already been made, but many more are needed. Brent Mishler will engage the help of the wider community of bryologists and also assist in positive identification. He stresses that for each collection, a voucher specimen is needed. Brent will give instruction on what precisely is required and will curate the *Physcomitrella* herbarium. To proceed, axenic cultures will be needed. These can be obtained without difficulty from spores, by soaking intact capsules in a 1 in 5 dilution of domestic bleach (said to contain "less than 5% chlorine") for 2 minutes. If you do not wish to do this, send a culture with capsules to me (David Cove) - this should be in a rigid container, since I will want to obtain intact capsules from it, when it arrives here. We will need cultures originating from single spores. Since *Physcomitrella* is self-fertile, it is probable that most sporophytes will be the result of self fertilization and so contain genetically-uniform spores. I will undertake to keep fresh cultures of the various isolates.
2. The genome size of each collection needs to be determined. Ralph Reski is willing to do this, and it should be possible to assay any isolates collected this fall/autumn (for the Northern hemisphere) before the end of 2003. If any one else wants to help, let Ralph know.
3. Meanwhile, Ralph Quatrano will get estimates of the cost of sequencing the genome and the resources that are required. He and Brent (with help from others who wish to make an input) will draft a very short document which can be used as a basis for opening negotiations over funding with your own national or other funding sources (using the approach: "If the rest of the world is in on this, do you want us to be left out?").
4. Ideally we would next like, collections with the same genome size to be karyotyped. Here we need volunteers.

5. The molecular variability between strains next needs to be assessed.
6. Crosses between collections that are widely different, then need to be made. David Cove has volunteered to do this, and to cross new isolates to strains derived from the original Gransden wild-type. Again, any one else who wishes to carry out crosses is very welcome to participate.
7. Preliminary molecular analysis of progeny from wide crosses needs to be carried out next.
8. Sometime around now, we should be in a much better position to put forward a well structured proposal. How the work might be shared round needs further consideration. *Physcomitrella* certainly has enough chromosomes to allow the sequencing to be shared, but refining the molecular map, and mapping BACs to it are priorities too.

Great progress will only be made with adequate funding, but funding will only come with a well structured plan that is enthusiastically supported by as wide a community as possible. So start working on it. Feed back on the project plans is certainly welcome. You can do this via IBRIS, or if you would prefer, email me ([d.j.cove@leeds.ac.uk](mailto:d.j.cove@leeds.ac.uk)), telling me what you wish to share with everyone.

If you are willing to participate, let me know what you can do, and I will keep everyone up to date with progress. But remember, the first priority is to isolate new strains of *Physcomitrella*, something that many of you may be able to do straightaway, but if you are like me, you may need the help of a local expert.

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