

SPOTLIGHT ON ...

The Manchester Fly Facility: supporting and promoting *Drosophila* as a modern research and teaching tool



Since the discovery of the *white* mutation in 1910, work with the fruit fly *Drosophila* has laid important foundations for modern biology and helped advance scientific understanding in many areas of biology, stretching from the mechanisms of differential gene expression to research into sleep, learning and neurodegeneration. Work in *Drosophila* and other genetic invertebrate model organisms provides powerful means to pioneer research into fundamental principles of biology and their genetic and cellular mechanisms in health and disease. The gained understanding can then direct the design of subsequent experiments in mammals. This strategy is fast, cost-effective and the track record of success is impressive and suitable for most aspects of fundamental biology shared between fly and man (of which there are many!). There is no doubt that flies will remain an important pillar of scientific discovery for the foreseeable future. For example, modern "omics" approaches and human genetics are producing increasing numbers of disease-relevant genes and processes which are crying out for mechanistic analysis, and there is a growing need to explore the void between detailed molecular mechanisms on the one extreme and the flood of global data derived from "omics" approaches on the other. These tasks can be addressed in *Drosophila*, capitalising on its uniquely detailed, conceptually mature and readily accessible body of knowledge, as well as its constantly evolving arsenal of genetic tools, resources and experimental strategies.

The Manchester Fly Facility was established in September 2009 through funding from both the UoM and the Wellcome Trust to support *Drosophila* research. The role of the Facility is not only to help those already working with flies. It also invites those who are non-drosophilists to learn about or test the fly's potential for addressing their research questions. For this, the Facility is now in excellent shape in that we have established efficient and resourceful training programs that will help you understand the essentials of fly research in the shortest time. Furthermore, we support you with any equipment and materials needed, help you order mutant or transgenic stocks, provide you with space and expertise to host your flies, and assist you with any technical and scientific *Drosophila*-specific aspects. Notably, members of the Manchester fly community work on a wide range of topics and provide a fantastic grouping to collaborate with or discuss fly-based strategies for your research topic. If you are interested, further information can be found on the Manchester Fly Facility [web page](#).



Besides its growing potential in research, *Drosophila* also has a lot to offer with respect to teaching and education. Being within a research and teaching institution, the Fly Facility is also contributing in this area. For example, we developed new teaching strategies for second year undergraduate practical courses of Genetics, responding to the radical changes which modern "omic" technologies have brought to this field. Thus, classical genetics is no longer required for the study of heredity but still routinely applied for functional analyses in model organisms, and its teaching should consequently focus on those active uses (Redfield, 2012, PLoS Biol 10, e1001356ff.). We meet this demand by

teaching students *Drosophila* mating scheme design with the same training resources that are actively used at the Fly Facility. This training conveys the essentials of classical genetics concisely and in a relevant context, and it leaves substantial time on courses for other topics. To assess the outcome of this complex learning process even on large University courses, we have developed a new fully automated hybrid assessment which combines advantages of conventional paper with standard electronic examination methods to assess the complex skills fairly and reliably (evaluated by M. Fostier and S. Clarke from the FLS teaching and IT teams). Importantly, our strategies can easily be applied to other genetic model organisms from yeast to mouse, and the assessment strategy might even be useful for other disciplines which require complex problem solving, such as mathematics, chemistry, physics or informatics.

Also at school level we have taken initiative and develop *Drosophila* as a modern teaching tool to convey a variety of curriculum-relevant biology topics and their conceptual backgrounds. Traditionally, teachers use flies as lively substitutes of peas to teach Mendelian rules of inheritance. However, there is hardly any animal in which fundamental biology is conceptually better understood than in *Drosophila*, and it gives access to many excellent experiments which are informative, cheap and entertaining. This makes *Drosophila* ideal to teach and enthuse pupils about a wide range of biology topics. We already do this with great success on extracurricular school days, have started to spread the idea at STEM teacher conferences, and will soon place PhD students at schools to develop teaching resources which teachers will find attractive. We hope that this will not only help teachers during their biology lessons, but also help to raise the general acceptance and awareness that *Drosophila* is an important pillar in the process of scientific discovery, whilst also contributing to the University's wider participation scheme.

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