Ben Shennan

Natural Products and the Future of Drug Discovery

Questions	Response from presenter
Do you think there's a way to decrease the amount of single use plastic waste in the lab or will it always be an issue?	This is definitely a big problem. We can always do more to try to "reduce". Ultimately the goal would be to use chemical research to discover the next generation of plastics that can be easily broken down or recycled.
I've recently been researching Venus flytrap secondary metabolites, and was wondering what you think about using carnivorous and parasitic plants/fungi secondary metabolites for natural products (considering their unique biological functions)? Are these functions relevant to the chemicals they produce and their uses?	Very interesting idea, I actually know very little about the chemistry of carnivorous plants. I'm sure that because of their unique biology they must have interesting chemicals contributing to this.
What are the chemicals in the chemicals page (slide 22, 23)?	The white solids will typically be intermediates on our synthetic route. Generally a white solid is a good indication of a pure compound. The coloured solutions will be the reaction mixtures containing transitions metals (e.g that green complex was a solution of CoBr2). Sometimes we're not sure of the exact identity of the species in our reaction mixtures.
Is biology required in secondary school in order to take this course?	Biology is not required for either undergraduate chemistry at Oxford or the DPhil programme I enrolled in. On the DPhil programme, we had a quick course in biology teaching us all of the relevant topics.
If certain natural products become endangered does this mean we can create the natural products to stop them becoming endangered?	In theory, we could use natural-product inspired treatments to save organisms at threat from extinction if that threat was a disease. Unfortunately, most organisms at risk of extinction are at risk due to human factors.
How do you know whether a molecule is useful to us?	Molecules can be investigated in biological assays. These are tests where we investigate whether the pure compound has any effect on known disease-causing cells. For example, does it kill cancer cells or does it bind to a protein that causes a disease?

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Why is it that enantioselective synthesis is used instead of creating a racemic mixture and separating it out (I've read that this is difficult but possible using enzymes)?	Great question! Racemic synthesis and separation is still used for a lot of synthesis but it necessarily means that you waste half of your material. If you "carry" both enantiomers through many steps of chemical synthesis you are wasting half of all of your chemicals and solvents because you have to throw away the undesired enantiomer. Also the separation of the two enantiomers can be very expensive... but so can enantioselective synthesis. So in reality we need both and it depends on the exact problem.