

Driving Sustainability in Drug Discovery: A Community Approach

The pharma and biotech industry is growing. While this brings the promise of new therapeutics for currently untreatable diseases, the increasing environmental impact of the industry cannot be ignored. As a significant contributor to the global climate change crisis, biotech and pharma must also be part of the solution, if the net zero by 2050 Paris Agreement is to be realised. But sustainability can only be achieved if the drug discovery community works together.

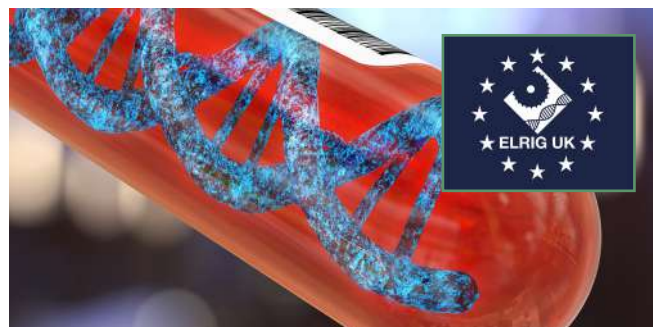
To support the sustainability efforts of the industry, ELRIG, Europe’s largest community of life science professionals, launched a new event, Sustainability Practices in Drug Discovery Research in April 2023 at St Hilda’s College, Oxford. At this forum, ELRIG brought together leaders who are driving sustainable practices in biotech and pharma with colleagues from across the industry to share ideas and learning. From the problematic accumulation of plastic waste to the vast volumes of water used, all aspects of sustainability were discussed. By coming together, and learning from each other, the pharma and biotech industry can unlock the sustainability opportunity, and benefit the wider, global community.

Ahead of the event, we spoke to three leading organisations as they explore why improving sustainability in drug discovery is critical to the health of the planet, the core areas they see as being important, and what the future of sustainable practices looks like. Each interviewee brings a unique perspective to the challenges that need to be overcome and demonstrate how a multi-angled approach to sustainability is required.

In this article, we hear directly from James Connelly, CEO, My Green Lab, a non-profit formed to unify scientists, vendors, designers and energy providers in a mission to build a global culture of sustainability in science. Joining James is Annie Lu, Co-Founder and CEO of H20k Innovations, an IoT-enabled analytics platform that provides data driven optimisation of industrial liquid systems for pharmaceutical development and manufacturing. And Carey Ann Comeau, Senior Director of Wet Lab Operations, Greentown Labs, a climatetch incubator that provides community, resources and laboratory space for startups and unites them with corporates, investors, politicians and many others to shape a sustainable future.

Why is Driving Sustainability in the Drug Discovery Industry So Important?

The total carbon impact of the pharma and biotech industry is significant. My Green Lab was one of the first organisations to quantify this, and we found that public companies in the biotech and pharma industry produce nearly 230 million metric tonnes



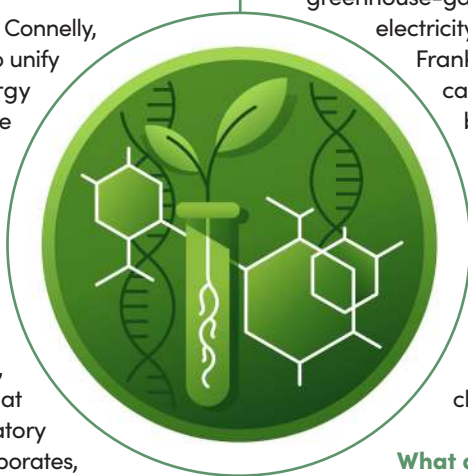
of carbon equivalent annually, which is equivalent to 578 natural gas power plants. When you realise that biotech and pharma produce more carbon emissions than forestry and paper, it really puts the scale of the challenge into perspective. And the industry is growing, so, if we’re going to solve the global climate change crisis, this is one of the industries we need to address. Ultimately, we have to be part of the solution.

The impact of pharma and biotech on planet health can’t really be argued. Data shows the industry is a significant contributor of carbon and waste and uses incredible amounts of energy and water. To me, sustainability in drug discovery in its purest form is the intersection between both environmental and social governance. By protecting the environment, we’re helping to protect public health. For this to become a reality, we need to think about sustainability right across the entire drug life cycle; from early discovery, to manufacture and getting it to the end user. CC: There are sustainable actions you can take no matter what industry you work in, no matter what kind of life you live. Often, when assessing areas to improve, we think about the largest greenhouse-gas-emitting sectors including transportation, electricity, manufacturing, buildings and agriculture.

Frankly, drug discovery can fit into any of these categories. For example, new facilities can be built more sustainably, the transportation methods used to ship therapies can be greener, let alone improvements that can be made to reduce the waste caused by consumables. I was at the bench for over 11 years, I know how much I threw out, and I’m only one person. To me, it’s clear that driving sustainability in drug discovery can have a significant and positive impact on tackling climate change.

What are the Core Areas to Improving Sustainability in Drug Discovery, and How Can they Make a Difference?

I think sustainability can be improved in so many ways, and the difference they make will vary for each organisation. In fact, I’d encourage any organisation starting their own sustainability journey to recognise and embrace the freedom you have – choose where you start. It has to make business sense too, so it could be that you focus on reducing your water usage first, and then explore how you can best implement green chemistry



principles second. For other companies, they might best be served by assessing their cold storage capabilities to see if they can save energy. There really is no one size fits all solution.

There are a few core areas that jump out: consumables usage, the use of toxic chemicals, energy and water. Biopharma in particular is a very heavy user of water, and you see this in R&D labs in particular. And it's not just the use of water and resulting wastewater. The treatment of wastewater itself uses a lot of energy and chemicals. Yet, without access to real-time data that shows how water is used, you're essentially operating part-blind and can't begin to identify ways you can reduce your water usage. With this in mind, I think enabling the collection of real-time data to measure and assess all aspects of waste production is crucial, which is what we focus on at H2Ok Innovations.

There's another aspect that I also want to highlight, and that's staff turnover. We see high staff turnover in many industries, including pharma and biotech. The challenge here is that knowledge gets lost. This can negatively affect sustainability, as if researchers who are experts in sustainable practices leave, their replacements may come in and start using less optimal ways of working, which can result in organisations taking a step backward on their journey to greater sustainability.

The importance of green chemistry shouldn't be underestimated. If, at the outset, researchers can incorporate green chemistry principles to minimise the use of toxic chemicals and select more energy-efficient routes of synthesis, the benefits of doing so will be scaled drastically downstream when it comes to production and manufacturing. Having said that, sustainability does go beyond green chemistry. Even simple things like closing fume hoods or changing the set points of freezers can significantly reduce energy consumption. When it comes down to it, a single person can make a big difference.

What is your Organisation Doing to Aid Sustainability Efforts and What Do You See as Being Important to the Future?

H₂Ok Innovations is a flexible, AI-powered operating system for any facility that uses water and other mediums of liquid on scale. The suite is modular, so the entire platform can be configured to meet the individual needs of each organisation. By using optical sensing and machine learning, we can measure various parameters to elucidate insights into industrial liquid and liquid-adjacent systems like never before. But why are we so passionate about this? In short, by analysing data and making recommendations, we actually cut the water usage of one of our customers by 10%. Now, imagine if we could help every organisation do that. Not only does it result in cost savings for them, but the environmental impact is also huge. To date, we've seen a lot of great work when it comes to identifying and setting goals that, when met, will help achieve sustainability in drug discovery. But now, we need to see organisations and individuals take steps to actually meet those goals. To do so, we need to think creatively and tap into non-traditional partners. Ultimately, what got us here today, might not get us to where we need to be tomorrow, so we need to continue to evolve our thinking and approaches.

We engage with researchers, organisations, and laboratory suppliers to unify and lead the whole life science community, including drug discovery, to a greener, more sustainable future. Dedicated to building a global culture of sustainability in science, we work with partners and supporters from small laboratories,



through to some of the scientific community's largest corporations and institutions. The My Green Lab Certification programme provides scientists and the teams that support labs with actionable ways to make meaningful change. Labs that acquire the My Green Lab certificate often save money and preserve resources.

But we quickly realised that labs adopting change is only part of the puzzle. That's why we introduced ACT certification for suppliers. This makes it easier for labs and procurement to choose more sustainable consumables, equipment, and chemicals. It's this joined up thinking and combined efforts that we see as being critical to achieving sustainability in drug discovery and helping meet the UN's net zero target.

At Greentown Labs, our members, partners and staff are united to solve the climate crisis through entrepreneurship and collaboration. To support our members, we provide thriving environments with access to the wet and dry lab space they need to develop prototypes and optimise their products, but that's not all. By fostering innovation from various industries in one space, our members have a unique opportunity to learn from each other and make connections that could help them get their business to the next level. And establishing these relationships is something we passionately help with. We know who would benefit from collaborating across startups, investors and corporate companies, and frequently make those initial introductions happen.

Going forward, we really do believe that it will take a village to drive sustainability and combat climate change. By taking steps to reduce emissions and be less wasteful, the planet benefits, and organisations can save money – so why wouldn't you join the sustainability movement?!

What Are You Waiting For?

It's globally acknowledged that real changes have to be made now to prevent global warming from going above 1.5 °C. As a large waste contributor and energy user, the pharma and biotech industry has to be part of the solution. To be successful, the whole community must come together to enact change and share learnings, which can then be transferred to other industries.

ELRIG

At ELRIG, we bring together all aspects of the drug discovery community, from large pharma to small biotechs, investors and academics. Our mission is to provide an open communication forum within which members can learn through sharing information and experiences, and network with other members. We run a series of open-access, free-of-charge conferences, webinars, and networking events to equip life scientists with knowledge of cutting-edge research areas with the potential to revolutionize drug discovery. Our flagship event, Drug Discovery, returns to Liverpool in October 2023.

Web: www.elrig.org