Annual Conference 2022 of the European Partnership for Alternative Approaches to Animal Testing (EPAA)

"Accelerating the Transition to Animal-Free, Sustainable Innovation"

(Brussels, 15 November 2022)

Opening remarks

European Partnership for Alternative Approaches to Animal Testing (EPAA) Industry co-chair **Gavin Maxwell** welcomed participants, explaining that, as well as hearing about EPAA's progress over the last 12 months, the conference would include a broad discussion on the many current activities aimed at accelerating the transition to animal-free, sustainable innovation.

Conference moderator **Teri Schultz** walked through the day's agenda. She announced that with over 200 participants (100 in person and 125 online), both in the room and engaging virtually, was a record high attendance for the EPAA Annual Conference. She encouraged everyone to share what they heard during the day using the #EPAA3Rs social media hash tag.

Welcome Address

Chair of the European Parliament's Intergroup on the Welfare and Conservation of Animals, **Tilly Metz** MEP, opened the discussions. She pointed out that, despite many advances, the number of animals used in testing were still extremely high; more than 20 million in the EU each year. The transition to non-animal testing needed to be a greater political priority than now, and highlighted the September 2021 EP resolution calling on the European Commission to develop an action plan to 'accelerate the transition to innovation without the use of animals in research, regulatory testing and education'. The Parliament's position clearly recognised the need for a renewed and clear commitment to the ultimate phase out of the use of animals for scientific purposes and concrete steps on how to get there.

Metz suggested that the recent European Citizens Initiative, 'Save Cruelty Free Cosmetics' - which collected over 1.4m signatures - highlighted the strength of EU public opinion. However, she cautioned that too often, Member States and the Commission conveyed mixed messaging on alternative testing

methods, particularly around the efficacy of New Approach Methods (NAMs). She called for a more dynamic approach to increasing accessibility and use of innovative non-animal testing strategies, and praised the EPAA for its crucial role in coordinating a cross-sectoral and EU-wide approach. The EPAA was the key European platform for the 3Rs principle on the use of animals in scientific procedures where regulators, scientists, industry stakeholders and NGOs come together.

While still waiting for a concrete action plan in response to the EP resolution, she said she was particularly pleased to hear that the Commission was considering reinforcing the role of the EPAA as one of the measures to accelerate the transition to animal-free science. And, because she believes profoundly in dialogue and in learning and progressing through exchange, she said she was always delighted to see and hear of the activities of the EPAA and to cooperate whenever possible.

Keynote Speech: European Commission

Deputy Director-General DG RTD **Joanna Drake** told participants that the European Commission takes animal welfare extremely seriously and that sustainable innovation and the development of animal-free approaches are a high priority. The most visible proof of this is the substantial support it has received over the last two decades, with the Commission funding more than 230 projects for a total of €800m. Among these, she singled out the €60m Animal-free Safety assessment of chemicals (ASPIS) cluster and the €400m European Partnership for the Assessment of Risks from Chemicals (PARC) partnership.

In response to Tilly Metz, Drake said she was fully aware of the growing pressure to deliver more against the 3Rs principle. The Commission shortly intends to publish additional calls for proposals through Horizon Europe that will both address regulatory safety and efficacy assessment as well as biomedical sciences in general. Looking further ahead to the proposed REACH revision in 2023, there were discussions on introducing a package of NAM approaches, namely toxicokinetics, endocrine activity, bioaccumulation and acute toxicity in fish. In addition, Regulation (EC) No 440/2008, which lists the approved methods for testing chemicals under REACH, is also expected to be revised next year. Thanks to this revision, the legislative uptake of new methods is also expected to be much quicker in the future.

Drake also told the conference that both the Commission and the ECHA were committed to developing a roadmap towards the full replacement of animal testing, and is expected to outline the elements required to allow NAMs use for all industrial chemicals. The Commission hopes this will set an example for other policy areas that still rely on animal testing. Among a number of Commission initiatives she outlined was the launch last year of the ALURES Statistical EU database and the ALURES non-technical summary EU database. These were, she said, a quantum leap in the transparency and understanding. They will help target the development of alternative methodologies in those areas using the largest numbers of animals or whose activities result in the most severe suffering.

While the Commission is recognised as a global leader in developing, validating and promoting use of alternative methodologies, there was still a lot of work to do to reach full replacement with alternative methods. It was why continuing dialogue between stakeholders within the EPAA's structured framework is so important. EPAA is well placed to continue its important role in advancing

alternatives; in particular the EPAA Mirror Group was praised for its worth as a consultation forum, combining extensive expertise to foster cross-sectoral dialogue.

Keynote Speech: Industry

Marco Mensink, Director General of CEFIC said that when he was invited to speak, he asked his colleagues why he should do it, as he wasn't an expert in eco-toxicology and knew little about non-animal testing. Their response was clear; because it's so important. When he asked 'why?' he was told it was because the chemicals industry is currently caught between meeting the demands of its customers and their end-user consumers - who clearly don't want animal testing - and the need to fulfil the regulatory demands for safe, tested chemicals. Mensink, who sits on the ECHA Management Board, said the EU agency was having the same issues in reconciling strict industry testing requirements while trying to reduce animal testing.

He stressed the importance of EPPA as a vehicle to bring regulators, industry stakeholders and NGOs together. The immediate strategy, he argued, should focus on driving the transition to animal-free testing up the political agenda and informing the next Commission's policy priorities. Referencing Joanna Drake's earlier comments on developing a roadmap, he said CEFIC is fully behind this and had been funding projects on alternative approaches through its Long-Range Research Initiative (LRI).

He called on the Commission to be as ambitious as Canada and the US - which are seeking to try to phase out animal testing by 2035 – and to ensure Europe takes the lead on the issue. Horizon Europe, he explained, doesn't end until 2027, meaning there are many more years to increase cooperation with DG RTD. EPAA has a key role to play, and there is now a rare opportunity - with industry, NGOs and policymakers aligned - to work together. His key message from the chemicals industry was that 'We're game, we're in and we'll push as much as we can'.

Session 1: State of the Partnership

2022 at a glance: EPAA Achievements and milestones

Industry co-chair **Gavin Maxwell** said 2022 has been a transformational year for EPAA, as it began implementing the vision outlined at last year's conference. He stressed that consensus building platforms such as EPAA were now needed more than ever and that it was well placed to bring partners and collaborators together. EPAA is a unique vehicle for the task and – as legislators look to implement the EU chemical and pharmaceutical strategies - could be hugely impactful if positioned correctly. EPAA's activities had also been ignited by the European Parliament's resolution, which had once again put the 'replacement' challenge firmly on the table. He said that there was an ongoing global paradigm shift on chemical regulatory testing, with the increasing use of NAMs reducing and/or replacing the need for animal testing. The increased use of NAM data exposure information will help deliver more meaningful human health and environmental protection goals, which in turn will strengthen confidence in chemical safety.

Presenting an overview of EPAA's accomplishments over the past year, he outlined several success stories from the EPAA project platform.

The results of the ***Clostridial Vaccines for Veterinary use*** project had been used to revise the European Pharmacopoeia, replacing *in vivo* with *in vitro* tests and changing the requirements to focus on residual

toxicity testing. Working with the EDQM, the EPAA has helped with ***the Harmonisation of 3Rs in Biologicals*** project supporting the strategy to delete the Rabbit Pyrogenicity test (RPT) from monographs and drafting new chapters for use of the Monocyte Activation Test for vaccines and broader pyrogenicity testing.

The ***Skin Sensitisation User Forum*** had seen Cosmetics Europe 'Use of NAMs for Skin Sensitisation Next Generation Risk Assessment (NGRA)' case studies submitted to the OECD Integrated Approaches for Test and Assessment project (IATA) for wider regulatory scrutiny. The ***PBK Modelling in Safety Assessments*** project had developed and published a platform workflow to derive a new pharmacokinetic model for a given chemical through evaluating its physico-chemical similarity. The ***NAMs in regulatory decisions for chemical safety*** project had looked at the feasibility of the ECETOC 'Framework for Chemical Safety Assessment, Incorporating NAMs within REACH'.

EPAA had also promoted 3Rs methods through eight publications, seven oral presentations and 11 poster presentations during international scientific conferences. In addition, via EPAA's consensus building philosophy, some of the key highlights had been its dialogues at various events, including the EPAA Partners Forum on 'Exposure Considerations for Human Safety Assessment', the Helsinki Chemical Forum and a European Parliament debate - hosted by MEP Tilly Metz - on accelerating the transition to animal-free, sustainable innovation.

Looking ahead, the EPAA had set itself an ambitious agenda which, with its partners, aims to support the development of the EU roadmap focusing on and replacing the use of animals for regulatory testing of chemicals. It will also seek, through the ***NAMs in regulatory decisions for chemical safet***y project, to Identify priority research challenges. He added that EPAA will also organise, with EDQM, a workshop on 'The Future of Pyrogenicity Testing : Phasing out of the Rabbits Pyrogens Test'.

He thanked partners and colleagues for their tireless work over the year. He stressed that - with its ambitious agenda - EPAA's determination is only increasing.

Mirror Group Perspective

Vera Rogiers, a member of the EPAA Mirror Group and co-Chair of the European Commission's Scientific Committee on Consumer Safety (SCCS), thanked the EPAA for the opportunity to propose ideas and discussion points over the year. She also praised the EPAA for giving the Mirror Group the space to become a strong discussion partner.

She began her overview by reminding attendees that EU Cosmetics legislation is the only one in the world that must use non-animal testing methodology. She said that because of the rigorous exposure-driven risk assessment procedure involved, which relies on demonstrating the safety of all ingredients, Europe had the safest cosmetics in the world.

However, she warned that the methodology was under threat and outlined several challenges. The first challenge is to provide safe cosmetic ingredients. Testing and marketing bans for animal tested cosmetic ingredients had been in place for over a decade and that those ingredients were currently the only ones relying on animal-free methodology in a regulatory toxicology context. That methodology has the backing of MEPs, affords the same degree of protection for all cosmetic ingredients and provides highly transparent risk assessment, in line with the principles of the SCCS Notes of Guidance (NOG).

The second challenge was the Green Deal strategy. Here, chemicals use the 'One Substance, One Hazard Assessment'. This, she argued, was a hazard strategy, applicable for industrial chemicals, but not for cosmetic ingredients, where safety is obtained by risk assessment. As EU consumer product legislation is specific to product types, i.e. the 3Rs are applied for industrial chemicals but only replacement by NAMs for cosmetic ingredients, she suggested that 'One Substance, One Hazard Assessment' approach could deliver a 'sustainable' option across legislative frameworks.

Challenge three was the ongoing revision of the Classification, Labelling and Packaging (CLP) regulation and endocrine disrupting activity (EDA), specifically the issue of exemptions for 'Essentiality'. She argued that a scientific approach through risk assessment was necessary, rather than a blanket ban. The question, 'Are cosmetics and their ingredients essential?' she felt would receive several different answers. Therefore, it shouldn't be about essentiality but rather about safety and the safety of ingredients.

Challenge four covered the introduction of a Mixture Assessment Factor (MAF) which she argued could be very valuable, particularly on the safety of unknown mixtures. But she said MAF was not suitable for Cosmetics as their compositions are known and their ingredients are already safe.

Challenge five revolved around relocating the SCCS. There were currently three proposals; remaining independent under DG SANTE, independent under ECHA, or incorporation into the Risk Assessment Committee of ECHA. Remaining under DG SANTE was the preferred option, but accepted this was not possible. Independence under ECHA was the second-best option, allowing sharing of NAMs expertise and allowing SCCS to remain independent. Incorporation into RAC was the worst-case scenario and would see it lose not only its independence and credibility but also its hard-fought-for animal-free position. It would see a push to hazard-only assessment and a loss of SCCS and its Notes of Guidance status.

From an EPAA Mirror Group perspective, she asked why NAMs were not standard practice for chemicals within REACH. She argued that as, both validated NAMs and scientifically valid NAMs are effectively used by SCCS to deliver safe cosmetics, the key question for the Mirror Group is why do NAMs, for which we have validated OECD guidelines, not have priority within the REACH chemicals legislation?

Her take-home message was that modernising of the regulatory toxicology of chemicals is urgently needed and should be delivered without loss of human safety and through animal-free NAMs. If NAMs were good enough for cosmetics, she felt they should be good enough for pesticides or chemicals. If your alternative methods are good, believe in them and use them.

PARC Perspective

Pascal Sanders from the French Agency for Food, Environmental and Occupational Health & Safety (ANSES) presented an overview of the European Partnership for Assessment of Risks from Chemicals (PARC). As coordinator of this €400m PPP, he explained that its key objective of developing the EU's research and innovation capacity for chemical risk assessment was closely intertwined with its vision of establishing a 'Science to Policy' dialogue and interface, and an excellence hub.

The ubiquity of chemicals production meant it was important to think holistically and with a OneHealth approach to the long-term vision of EU policies such as the Chemical Strategy for Sustainability.

Establishing a hub of excellence through PARC would, he argued, help pave the way to a New Generation Risk Assessment (NGRA) approach without animal testing.

PARC aims to overcome barriers to the use of NAMs by providing test guidelines and biological or toxicological proof of their safety to human health and the environment. In addition, the suitability of any testing models developed will be considered for uptake into the regulatory system.

Sanders said he expected strong collaboration with EPAA throughout PARC's seven-year duration through formal discussions, the exchange of case studies and knowledge sharing, to ensure they could work together to identify gaps and needs. If Europe wanted to fully apply NAMs in future, it needed to strengthen the capacity of stakeholders to deliver. It was therefore crucial to work together to bridge gaps.

Animal-Free Innovation: drivers and vision

Bob van de Water, Project Coordinator of the Horizon 2020-funded Research & Innovation project, RISK-HUNT3R, gave an overview of the achievements and importance of the EU-TOXRISK programme in the move away from animal-based toxicological testing. The achievements included developing over 150 different novel test methods, guidance on method description and the application of NAM-assisted read-across (RAx).

He outlined the achievements of RISK-HUNT3R in developing, validating and implementing alternative test methods for NAMs under the NGRA strategy. RISK-HUNT3R was one of three projects within the €60m ASPIS research cluster.

He stressed the need for EPAA and PARC to 'join forces' to collaborate on tackling the 'dilemma' of facilitating the 'validation' of new test methods. In addition, there was a clear requirement to enhance the commercial availability of new test methods and an urgent need to break stakeholder barriers to the uptake and application of NAMs.

Andrew Worth, Senior Scientific Officer, at the Joint Research Centre, European Commission, presented some thoughts on what a future chemicals regulatory system could look like. He explained that while the ideas he was presenting had been developed in collaboration with his JRC colleague Elisabet Berggren, his presentation did not necessarily represent a Commission position.

He outlined some of the issues being encountered in the process of introducing NAMs into REACH, including the perception that NAMs are not sufficiently validated or standardised to be used for regulatory purposes and the belief that they are 'less safe', which in turn leads to a view that NAMs will end up triggering animal testing rather than reducing or replacing animal use.

He also highlighted the issue of NAMs for systemic toxicity, stressing the need to develop integrated approaches based on a combination of NAMs, rather than 1-to-1 replacement. Additionally, he highlighted the 'square peg in a round hole' problem of standalone NAMs not being considered to be sufficient on their own for classification and labelling. This he explained was because classification criteria are written largely in terms relating to animal testing rather than NAMs.

While it would be premature to say what any future system would look like, one thing was clear: Any future chemicals regulatory system must provide an equivalent level of protection to what we have today. That would entail taking the same risk management decisions, but on a different basis.

In other words, we should exploit the vast amount of existing data currently held and already used to classify and label hazardous chemicals, including chemicals of high concern, to calibrate a future system so that it gives equivalent protection (the same risk management consequences). The new system could exist in parallel with the current system, and when there was sufficient confidence in it, it would become the default mechanism for processing and regulating chemicals.

Summing up, he said that what was being proposed was a 'Less is More' approach: a simpler system using a limited number of NAMs to construct a large number of testing strategies. Additionally, the NAMs for classification and labelling should be limited in number, and be highly standardised, providing regulatory certainty for stakeholders and a higher overall level of protection.

Looking at the risk assessment process, he suggested there could be more flexibility in the system, allowing industry to innovate and develop their own bespoke solutions and providing multiple pathways to acceptance and useof NAMs. For this, guidance would need to be developed.

Carl Westmoreland, director of science and technology at Unilever's Safety and Environmental Assurance Centre (SEAC) used his speaking time to provide a personal perspective on the issue of making safety decisions with NAMs.

As a toxicologist, a safety scientist, he stressed that his job was both to directly protect people and ensure that everyone involved, consumers, workers, regulators and manufacturers has trust in safety decisions. However, those decisions, which for so long arrived at through animal testing - the traditional cornerstone of toxicology - are now being challenged as outdated as new non-animal, human biology-based tools become available.

This has raised a number of questions around the efficacy of mammalian laboratory toxicity tests in predicting what might happen in humans, galvanising toxicologists in this area to consider how NAMs can be brought into the same safety decision-making framework. He argued that while there's a wealth of information on non-animal approaches, he felt there was a considerable lack of experience in using them to make decisions. This was partly due to the fact that NAMs are not designed to predict what might happen in animal tests, they are designed to evaluate human safety, but in a different way.

Attempting to recreate animal studies with non-animal approaches was he felt, a retrograde step, particularly when there was an increasing body of evidence showing that bioactivity exposure ratios (BER) can actually protect people. However, there was still a significant amount of work to do on establishing frameworks for confidence in NAMs. In terms of building capability and capacity, he said it was important to continue sharing and publishing what works and what doesn't work through the use of NAMs in safety decision making.

Referring back to **Vera Rogiers'** presentation covering the changes that have happened in the cosmetics regulations and the notes of guidance available in that space that are helping to embracing NAMs, he said he was hopeful that the same will happen within the chemical space.

Helena Hogberg from the United States Department of Health and Human Services National Toxicology Program's Inter-agency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) said she was particularly pleased that the protection of human health had been central to the day's presentations.

She explained that she had received feedback during a recent environmental justice stakeholder workshop that raised concerns over the transition to non-animal testing, citing a lack of trust in NAMs to protect human health. She said it was important to remember that protecting people was the central goal, which she believed could be done with NAMs.

She explained that she was representing NICEATM whose main role was to support ICCVAM, the Interagency Coordinating Committee for the Validation of Alternative Methods. ICCVAM consists of 17 regulatory and research agencies all working together to establish guidelines, recommendations and regulations promoting the regulatory acceptance of toxicological tests that protect human and animal health and the environment.

She welcomed the proposed Commission- ECHA roadmap on replacing animal testing under the EU's Chemicals legislation, explaining that the establishment in 2018 of a similar roadmap by ICCVAM had helped accelerate the use and acceptance of NAMs. Key to developing confidence in the adoptions process was early communication between NAM developers, end users and regulators.

She explained that when you know what application a NAM is supposed to cover, it's much better if you're talking with the regulatory bodies from the beginning to avoid problems. She said a fit-for-purpose performance based evaluation was necessary, as validation depended on both purpose and context of use. Communication, she reiterated was key: not only between developers and end users but - with many NAMs already ready for use – also globally.

Emily McIvor, European Coalition to End Animal Experiments (ECEAE) reminded participants of last year's EPAA conference where she had delivered the Mirror Group presentation. From an animal protection perspective, 2021's developments around the EU chemical strategy had, she said, looked VERY bleak.

She said that proposals for increasing animal test requirements under REACH, ECHA animal data requirements for cosmetics ingredients undermining the EU cosmetics ban, and anxiety that REACH last-resort requirements weren't being fully implemented, had all added to concerns about a perceived lack of attention paid to animal protection.

There was also growing disquiet that two of the major achievements that had been made by animal protection organisations over the years – that animals can only be used in research when there is a convincing scientific justification, and the ban on cosmetics animal testing, including the testing of ingredients used in cosmetics - were potentially being undermined through implementation of the chemical strategy as it was then being envisaged.

However, opening her presentation with the heading, 'What a difference a year makes', she said that in response to a lot of activity from animal protection stakeholders, it had been interesting to see that proposals coming from the Commission had she believed, been strongly influenced by the JRC and she welcomed **Andrew Worth's** earlier presentation. The long term aim of eventual complete replacement of use of animals in chemicals testing was, she said, a turning point because although the

chemical strategy still included plans to increase animal testing, it also acknowledged this longer term aim.

Among a number of positive acts over the year she singled out the Commission's response to the EP resolution, the launch of PARC, the European Citizens' Initiative and the clarification, at the 4th Annual Forum on Endocrine disruption, of the validation process described/scientific need for robust new approaches. She also welcomed the ECHA Management Board's recent consideration of a paper that included a statement that, 'the promotion of alternatives to animal testing is among the aims of REACH and therefore part of ECHA's mandate'.

Regarding the response to the Parliament's resolution she hailed the potential opportunity for EPAA to take a key role in any high-level multidisciplinary task force on drawing up an EU-wide action plan. In closing, she said it had been a most incredible year for animal protection with the science accelerating, collaboration building, and that momentum on the full replacement of animal testing was becoming unstoppable.

Sonja Beken, chair of the European Medicines Agency's 3Rs Working Party (3RsWP) began by analysing the drivers of animal-free innovation from a regulatory perspective.

She explained that regulatory requirements for the testing of human and veterinary medicinal products were a main driver of animal experimentation in Europe. For human medicinal products, most of the animals are used for quality control, batch safety and potency testing, closely followed, by toxicity and other safety testing.

The 3Rs requirements enshrined in the 2010 directive on the protection of animals used for scientific purposes was another key driver, as was the European Parliament's plans and actions to accelerate the transition to innovation without the use of animals. What was clear from the Commission's answer to the EP resolution, she suggested, was the emphasis on the 3Rs in medicines R&D and the role of the EMA in their implementation.

Another important driver is drug attrition, with a large proportion of drugs that fail either clinical development or when brought to the market. She said that EMA, since 2011 with the creation of its 3Rs working group, had worked on developing guidelines delineating the criteria for regulatory acceptance of novel approaches and that the agency had recently drafted a regulatory science strategy up to 2025, which included 3Rs as a core recommendation both for the regulatory science strategy for human medicines as well as for veterinary medicines.

She said that EMA had recently set up a new joint 3Rs Working Party (3RsWP) to monitor and supervise the numerous 3Rs activities required to achieve the regulatory science strategy. The 3RsWP's short term strategic goals focus on following-up and identifying actions related to alternatives to the use of non-human primates, with the aim of driving innovation and the push towards alternative strategies.

The long-term strategic goals of 3RsWP include adopting a critical role in the field of 3Rs through collaboration between all stakeholders and international partners, moving non-clinical assessment from discovery toxicology towards regulatory use and the acceptance of NAMs, and ensuring the follow-up of the 3Rs in batch release testing. Additionally, the review and update of EMA guidelines on implementing best practice around 3Rs is also a strategic long-term aim, as are follow-up actions on the EP resolution.

Among the tactical goals planned for the working party are a reflection paper to define regulatory acceptance criteria for organ-on-chip technologies, the development of training sessions on 3Rs methods and best practices, and annual multi-stakeholder brainstorming sessions on emerging 3Rs. She stressed that operationally the 3RsWP will need to cooperate with and provide support to the scientific Advice Procedure and qualification Advice/Opinion as well as assisting the Innovation Task Force (ITF) on the regulatory acceptance of NAMs.

Her take-home home message was that EMA and the regulatory network in Europe was open for discussions on use of NAMs.

Sirpa Pietikäinen MEP, and honorary president of the European Parliament's Intergroup on the Welfare and Conservation of Animals, opened by thanking EPAA for the great work it had achieved since its inception. She said the inaccuracy of animal tests had been an astonishing revelation to her, while she had been positively surprised by the speed of NAMs development over the years.

Pietikäinen and her EP colleagues were, she said, disappointed with the direction of the REACH revision and its new interpretations, arguing that doubling or tripling the number of animal tests for chemicals that have already been tested didn't make any sense and should be urgently phased out. She also called for more resources to be focussed on accelerating the transition to animal free testing and innovation and questioned why the NAMs validation process was so slow.

She also asked what could be done to speed up validation internationally, proposing that perhaps an International Convention could help step up NAM validation and acceptance. An international approach, particularly around chemicals would, she argued, be good for European consumers and would help deliver a level playing field for European industry.

EPAA 3Rs Science Prize Ceremony

Following a short discussion on some of the challenges of making animal-free sustainable innovation a reality, **Gavin Maxwell** then announced the winner of the EPAA 3Rs Science Prize for 2022. The award, worth €10,000, is presented every other year to a European-based scientist working in the field of alternative regulatory testing methods, who the selection panel believe has delivered an outstanding contribution to the use of the 3Rs.The jury, made up of EPAA members and representatives from the Mirror Group, selected the work of Senior scientist at Dutch mechanistic toxicity testing company Toxys, **Amer Jamalpoor**.

Accepting the prize Jamalpoor said he had dedicated his scientific career to replacing animal testing and that winning the award was an honour. He thanked the EPAA evaluation committee and his Toxys colleagues for making the research possible.

He presented his winning case study entitled 'ReproTracker: Human Stem Cell-Based Biomarker Assay for Screening of Developmental Toxicity'. The objective had been to produce an animal-free platform for developmental toxicity testing. This was achieved by developing a human stem cell-based test system combining functional/morphological profiling and expression of selected biomarker genes.

The resulting *in vitro* assay was sensitive enough to predict whether a compound would have an adverse effect on early embryonic development. Application-wise, ReproTracker could be used as part

of an early drug development phase, an alternative for animal-free teratogenicity testing of chemicals, or as a tool to extrapolate animal-derived results to humans.

Closing remarks

EPAA European Commission Co-chair **Giacomo Mattinò** provided the conference's concluding remarks. He stressed that from the Commission's perspective, the day's theme of accelerating the transition to animal-free, sustainable innovation, was particularly relevant, as the EU executive was conscious of the current momentum around progressing the development of adequate alternatives to animal testing.

Equally important was the issue of compatibility around the roll-out of NAMs with the overall and complex regulatory objectives in current, or proposed, EU legislation. He said he was particularly interested in understanding different stakeholders' expectations and added that the EU's ambition to be a global frontrunner in eliminating animal-testing had been reflected publicly and politically, through the success of the citizens' initiative and the EP's resolution.

He praised the unique set up of the EPAA partnership for its instrumental role in optimising collaboration between regulators, industry and NGOs, and for ensuring that its activities were prioritised according to the 3R principles. And he was equally pleased to witness the close involvement and cooperation from his colleagues in the relevant Commission services as, he said, they will be instrumental in assessing the effects of non-animal testing on the regulatory environment.

He closed by thanking the organisers and moderator for all their efforts and singled out EPAA Industry co-chair **Gavin Maxwell** and the Commission Conference service team for making the day possible. Finally, he thanked the participants, saying that their commitment and hard work was making a world with alternatives to animal testing possible.