UK BioIndustry Association's response to the Convention on Biological Diversity Secretariat's consultation on digital sequence information on genetic resources pursuant to decision 14/20

June 2019

UK BioIndustry Association

1. About the BIA

The BIA is the trade association for innovative life sciences in the UK. Our goal is to secure the UK's position as a global hub and as the best location for innovative research and commercialisation, enabling our world-leading research base to deliver healthcare solutions that can truly make a difference to people's lives.

Our members include:

- Start-ups, biotechnology and innovative life science companies
- Pharmaceutical and technological companies
- Universities, research centres, tech transfer offices, incubators and accelerators
- A wide range of life science service providers: investors, lawyers, IP consultants, IR agencies

We promote an ecosystem that enables innovative life science companies to start and grow successfully and sustainably.

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2. Executive Summary

The BIA and its members do not believe digital sequence information ("**DSI**") should be included within the scope of the objectives of the Convention on Biological Diversity (the "**CBD**") and the objective of the Nagoya Protocol ("**NP**", as further defined below) on both legal and practical grounds.

The BIA and its members are concerned about the focus of this consultation given that compliance with the NP is still in its infancy. Indeed, addressing ongoing compliance and implementation challenges of the NP should be the main focus of the Parties to the NP and of the Secretariat to the CBD. The potential inclusion of DSI at this stage would complicate matters further, exacerbating the significant and complex issues and challenges.

Moreover, inclusion of DSI would do more harm than good by, amongst other things:

- presenting additional compliance challenges and problems which could seriously stifle innovation, particularly for SMEs; and
- resulting in unintended consequences on the country of origin of the underlying genetic resource ("**GR**").

As DSI is not a GR, any measures to include DSI within the scope of the objectives of the CBD and NP would require the NP to be formally amended.

Reaching a satisfactory definition for DSI would be very challenging. The BIA queries why significant resources are being incurred in determining the scope of the definition of DSI and the mechanism for access and benefit-sharing ("ABS") arrangements when DSI does not fall within the scope of the CBD or NP and consensus has not been reached as to its inclusion in principle.

Given that measures under the NP are meant to be "*appropriate, effective and proportionate*", careful consideration needs to be given as the due diligence challenges to the inclusion of DSI within the scope of the NP would be disproportionately burdensome.

3. Background

The Convention on Biological Diversity (the "**CBD**") entered into force on 29 December 1993 and has three main objectives:

1. The conservation of biological diversity;
2. The sustainable use of the components of biological diversity; and
3. The fair and equitable sharing of the benefits arising out of the utilization of genetic resources ("**GRs**") (including by appropriate access to GRs and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding).

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (the "**NP**") is a supplementary agreement to the CBD. It intends to provide a transparent legal framework for the effective implementation of the third objective of the CBD: the fair and equitable sharing of benefits arising out of the utilization of GRs. It was adopted at the tenth meeting of the Conference of the Parties, in Nagoya, Japan on 29 October 2010 and entered into force on 12 October 2014.

In the EU, the NP has been implemented under Regulation (EU) No 511/2014 of 16 April 2014 (the "**EU NP Regulation**") and accompanying Commission Implementing Regulation (EU) 2015/1866 of 13 October 2015.

In December 2016, the Conference of the Parties to the CBD adopted a decision to consider any potential implications of the use of digital sequence information ("**DSI**") on GRs on the three objectives of the CBD (decision XIII/16). The Conference of the Parties serving as the meeting of the Parties to the NP invited submissions to include information relevant to the NP (decision NP-2/14). The Secretariat to the CBD subsequently invited the submission of views and information through notification 2017-37. The BIA submitted a response to this consultation in September 2017[1] (the "**BIA 2017 Response**"), as did many other stakeholders[2]. Due to the interrelatedness between this response and the BIA 2017 Response, we have attached a copy of our previous response and recommend that both be read in tandem.

In November 2018, the Conference of the Parties to the CBD adopted decision 14/20 to establish a science and policy based process on DSI. On 5 February 2019, pursuant to decision 14/20 paragraph 9, the secretariat to the CBD in a notification invited parties to the CBD, other Governments, indigenous peoples and local communities, relevant organizations and stakeholders to submit views and information:

> (a) To clarify the concept, including relevant terminology and scope, of DSI on GRs and if and how domestic measures on access and benefit-sharing ("**ABS**") consider DSI on GRs;

[1] https://www.bioindustry.org/resource-listing/bia-response-dsi-regulation-in--nagoya.html
[2] https://www.cbd.int/abs/dsi-gr/ahteg.shtml

(b) On benefit-sharing arrangements from commercial and non-commercial use of DSI on GRs.

Pursuant to decision 14/20, paragraph 10, the secretariat to the CBD also invited parties to the CBD, other Governments and indigenous peoples and local communities to submit information on their capacity-building needs regarding the access, use, generation and analysis of DSI on GRs, in particular for the three objectives of the CBD.

4. Incorporation of DSI within the scope of the CBD and Nagoya Protocol

Whilst the BIA and its members support the three objectives of the CBD and the objective of the NP, we do not believe DSI should be included within the scope of the objectives of the CBD and the objective of the NP on both legal and practical grounds. Indeed, when our members were consulted in 2017 on how they might be impacted by the proposed incorporation of DSI into the NP **all responding members strongly disagreed with the proposed incorporation of DSI into the NP**.

4.1. Compliance with the NP is still in its infancy

On 24 January 2019, the European Commission published the first report on the implementation of the EU NP Regulation. The report is mainly based on information from national reports submitted by all 28 EU Member States. It includes the following conclusions as to the status of play and the identified challenges:

- The implementation of the EU NP Regulation is still in its early days with many Member States starting relatively late to set up necessary institutional and administrative frameworks, and with implementation and enforcement being slow and uneven amongst Member States;
- Lack or limited human and financial resources devoted to the implementation of the EU NP Regulation is often reported as a major obstacle;
- Lack of specialized personnel and qualified experts is also identified as a problem;
- Concerns have been raised by Member States as to the significant administrative burden and costs of implementing the EU NP Regulation;
- Delays in designating Competent Authorities has slowed down the implementation of other provisions of the EU NP Regulation;
- A low level of interest, among Member States, in becoming a registered collection in the EU register of collections;
- A low level of awareness among Member States institutions and administrations, as well as by stakeholders about the obligations stemming from the NP and EU NP Regulation; and
- Interpretation challenges with requests for further guidance to clarify some of the terms and more real examples on implementation to clarify the issues.

According to the UK report on the implementation of the EU NP Regulation prepared by the Department for the Environment, Food and Rural Affairs ("**DEFRA**"), as at 31 August 2017, no due diligence declarations had been received based on Articles 7(1) or 7(2) of the EU NP Regulation. The lack of such declarations is reported to be due to the low level of awareness among stakeholders and, in many cases, GRs being accessed before 12 October 2014 (when the EU NP Regulation came into force) still being used in R&D. DEFRA had yet to conduct checks on users at the time the report was published with the first check stated in the report to be planned in October 2017.

Given that compliance with and implementation of the NP is still in its infancy with numerous challenges still needing to be addressed, the BIA and its members are concerned about the focus of this consultation. Indeed, the BIA and its members consider that addressing ongoing compliance and implementation challenges of the NP as it currently stands should be the main focus of the Parties to the NP and of the Secretariat to the CBD. The potential inclusion of DSI at this stage would complicate matters further, exacerbating the significant, complex issues and challenges that have already been identified.

Further, as we stated in the BIA 2017 Response, "*any decision to amend the scope of the NP must be based on clear evidence that the ABS objective is not working, the current ABS system is failing and that the incorporation of DSI would help achieve the ABS objective and remedy the identified failing in the ABS system. We are not aware of such evidence.*

If there are shortcomings with the ABS system, it is largely due to the lack of provider country laws which facilitate access and thus generate benefits. Once addressed, and comprehensive legal frameworks of national ABS laws are put in place, concerns about the lack of benefit sharing related to genetic resources access and use should disappear."

4.2. Inclusion of DSI within the NP would do more harm than good

The BIA and its members believe that the inclusion of DSI would do more harm than good by presenting additional compliance challenges and problems which could seriously stifle innovation. The BIA already has evidence from its members that the NP is having a negative impact on R&D. Due to uncertainties as to the exact nature and scope of the obligations to be fulfilled, many stakeholders are putting measures in place to navigate the NP in such a way as to mitigate against any disruption to innovation as further evidenced below:

AstraZeneca

In a presentation made by AstraZeneca on 22 February 2018 at the BIA Committee Summit, it described its approach to proactively engaging with compliance under the NP by, amongst other things:

- Establishing a Nagoya Governance Team
- Defining the Company's public policy position
- Modifying its Bioethics Policy
- Developing a Global Standard defining individual responsibilities
- Developing a Nagoya Sourcing e-tool to determine if GRs are in or out of scope of the NP
- Creating 3-minute training videos that provide an overview of the NP and the Company's responsibilities

AstraZeneca has the resources to implement sophisticated measures in order to comply with the NP but not all biotech companies are as well resourced.

Prokarium

Prokarium is developing a technology platform based on engineered bacteria to prevent infectious diseases and treat solid tumours. It ensures compliance with the NP by selecting microorganisms from a non-NP country. As a result, the regulation is having unintended consequences of reducing ABS with signatory source countries due to difficulties associated with compliance; inclusion of DSI will only exacerbate this.

We also refer to the BIA 2017 Response which considered the following three key points in some detail and which exemplified some of the negative consequences of incorporating DSI into the NP for our members:

1. The incorporation of DSI into the NP will lead to further legal uncertainty and compliance difficulties for SMEs;
2. DSI regulation in the NP will hinder SMEs' R&D; and
3. The incorporation of DSI into the NP poses serious public health concerns.

Moreover, the inclusion of DSI into the NP could have unintended consequences on the country of origin of the underlying genetic resource. Open access to and use of DSI is widely accepted to be a fundamental driver of scientific research and innovation. Limiting or hindering access to DSI by requiring ABS agreements to be entered into before being entitled to access the information would in all likelihood have a negative impact on the conservation and sustainable use of components of biological diversity (two objectives of the CBD). This is because such DSI would be less likely to be accessed and used for research and development. This would undermine the potential to conserve and sustainably use the underlying genetic resources which would, in turn, negatively impact the country in which such genetic resource is found.

In the next section we set out some additional points particularly pertinent to the current consultation and re-state previous points which we consider important to raise in the context of this consultation.

5. DSI is not a genetic resource

The current consultation appears to be based on the erroneous assumption that DSI falls within the scope of the CBD and the NP.

According to the CBD, GRs means "genetic material of actual or potential value" and genetic material means "any material of plant, animal, microbial or other origin containing functional units of heredity". DSI cannot be genetic material as it is merely a representation of the sequence of a biological molecule (e.g. DNA). Since it is not a physical material (whether plant, animal, microbial or other form that contains functional units of heredity), it cannot be a GR as such.

The NP incorporates the CBD definition for GRs and genetic material and also defines a derivative as "a naturally occurring biochemical compound resulting from the genetic expression or metabolism of biological or genetic resources, even if it does not contain functional units of heredity". DSI is information and, as such, cannot be said to be "naturally occurring" or a "biochemical compound" let alone that it (the information) can result from the "genetic expression or metabolism of biological or genetic resources".

Consequently, DSI cannot be legitimately brought within the scope of the CBD and the NP without first amending the CBD and/or the NP itself. Any such amendment would require agreement by consensus from the parties to the CBD and the NP or, as a last resort, be adopted by a two-thirds majority vote of the parties to the instrument in question.

6. What is DSI?

Asking stakeholders to define DSI for the purposes of ABS arrangements requires stakeholders to consider issues in the wrong order. If information (which is what DSI is) cannot fall within the scope of the CBD or NP because it is not a genetic material, GR or derivative and consensus has not been reached with parties to the CBD and the NP as to its inclusion in principle, the BIA queries why significant resources are being incurred in determining the scope of the definition of DSI and the mechanism for ABS arrangements. This is

not least because the implementation of the NP as it currently stands it still in its infancy (see section 4.1 above).

Moreover, attempting to define DSI is not straightforward and raises more questions than answers. Indeed, the term "digital sequence information" is broad in scope and does not encompass a single type of data:

- If you limit DSI to DNA, it would not include RNA genomes (such as a retrovirus). Should DSI be limited to genomic DNA or RNA sequences?
- Should it be limited to native DNA (i.e. the form found in nature) or should it include only the coding regions?
- What about regulatory DNA that does not code for proteins but has other effects (e.g. processing genes)?
- DSI is often edited, codon-optimised or compiled from alignments of other sequences. What happens when you modify DNA sequences *in silico* or create a compilation of synthetic DNA from different sources to develop novel molecules and functions – would they still fall within the scope of the definition for DSI?
- If an 'NP sequence' forms part of an alignment, is the resulting consensus sequence subject to the obligations under the NP?
- As DNA/RNA sequencing technology is not 100% error-free and there is a high degree of natural variation in genetic sequences within populations, what level of alignment would be required to invoke obligations under NP?
- What if only a partial sequence is known?
- What about information relating to the secondary or tertiary structure of DNA?
- What about any annotations to DSI?

7. Measures on access and benefit sharing for DSI

Given that DSI does not fall within the scope of the CBD or the NP, in the UK there are no measures and arrangements on ABS for DSI on GRs whether commercial or non-commercial.

8. Due diligence challenges

As we reported in the BIA 2017 Response, DSI has been generated, stored and used for several decades in vast and increasing quantities. As at 2015 it was estimated that "*publicly available databanks now contain quadrillions (>10^{15}) of nucleotides of DNA sequence data, soon to be quintillions (>10^{18} bases). These have been collected from over 300,000 different species of organisms*"[3].

The GenBank sequence database is one of many such DNA sequence databanks. It is an open access, annotated collection of all publicly available nucleotide sequences and their protein translations which is produced and maintained by the US National Center for Biotechnology Information as part of the International Nucleotide Sequence Database Collaboration. From 1982 to the present, the number of bases in GenBank has doubled approximately every 18 months[4]. As at April 2019, the number of base pairs recorded on GenBank were 321,680,566,570.

[3] Pevsner, J. (2015). *Bioinformatics and functional genomics.* Chichester, West Sussex: Wiley Blackwell.
[4] https://www.ncbi.nlm.nih.gov/genbank/statistics/

The country of origin of DSI is not always recorded and traceability of sequences would be a key challenge if DSI were to be included within the scope of the NP. Natural variation and mutations that occur over time also clouds traceability. Moreover, as an organism can often exist in multiple countries, questions arise as to which country should derive benefit from the DSI of that organism (especially if the original country of origin for that particular sequence information is unknown).

This, together with the sheer size of data being generated and stored, would create additional due diligence challenges and would be disproportionately burdensome should DSI eventually fall within the scope of the NP. Given that measures under the NP are meant to be "*appropriate, effective and proportionate*" careful consideration needs to be given to the basis for the justification of extending the scope of the NP beyond GRs and into DSI.