

Marine Genetic Resources

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Introduction

The marine environment is vast and covers approximately 70% of the Earth's surface, with 95% of the total ocean volume considered areas beyond national jurisdiction (ABNJ).^(a) Environments in ABNJ, largely comprised of deep ocean, remain poorly known, with up to 90% of species still undescribed.^(b) However, with rapid progress being made in technological fields of marine exploration and laboratory testing, there is potential for discovery of new and possibly valuable genetic resources with applications in a number of market sectors.^(c) As such, developing our collective understanding of these genetic resources plays an important role in advancing scientific research and supporting the conservation and sustainable use of global biodiversity.

What are Marine Genetic Resources (MGR)?

No internationally agreed or legal definition for MGR yet exists. However, a definition can be inferred by considering the terms 'genetic resource' as defined in the 1992 Convention on Biological Diversity.^(d) A genetic resource is any material of plant, animal, microbial or other origin which contains functional units of heredity and is of actual or potential value. MGR, therefore, could be considered as the marine equivalent of these definitions.

Access and Benefit Sharing (ABS) and ABNJ

Genetic resource obtained from terrestrial areas and / or coastal waters within national jurisdiction (see light blue areas in Figure 1) may fall within the scope of ABS provisions under the Nagoya Protocol.^(e) However, genetic resources also exist in ocean ABNJ, i.e. in the water column beyond the exclusive economic zone / beyond 200 nautical miles from state coasts and on the seabed which lies beyond the limits of the continental shelf (see dark blue areas in Figure 1).

MGR of ABNJ fall outside the scope of ABS regulations under the Nagoya Protocol. As such, there is currently no international legal framework governing how benefits associated with MGR in ABNJ should be shared.

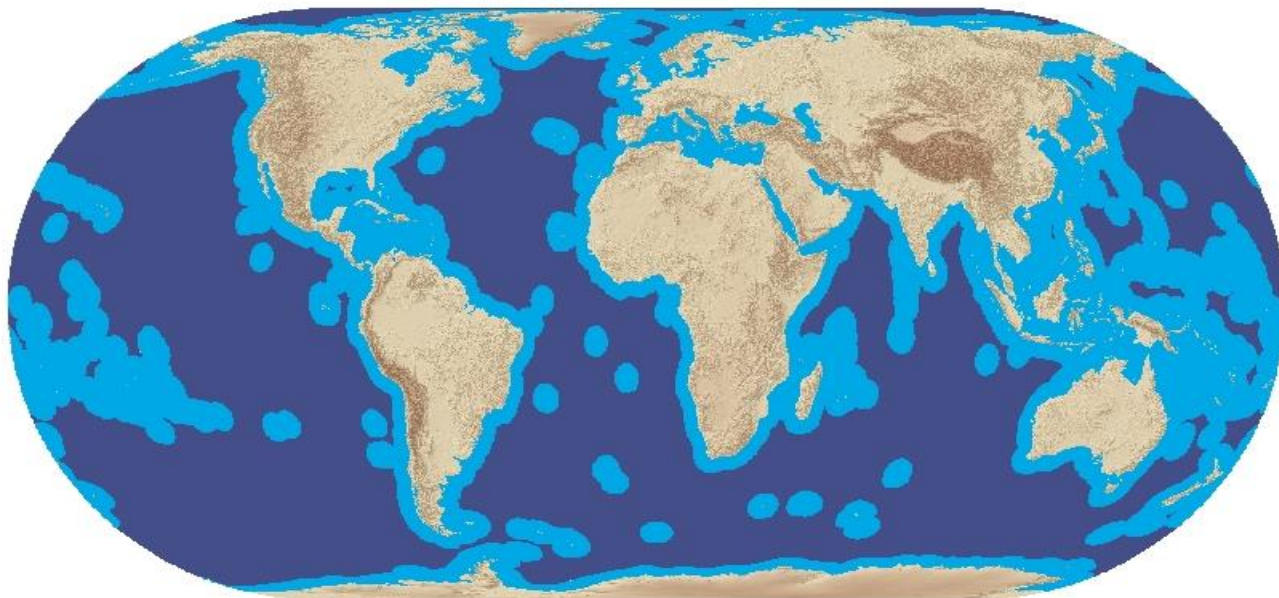


Figure 1. World map to indicate ocean areas within national jurisdiction (light blue areas) and international ABNJ (dark blue areas).

Source: National Geographic

<http://theterramarproject.org>

Note

- <https://www.nature.com/articles/nchembio841>
- <https://bg.copernicus.org/articles/7/2851/2010/>
- <https://www.cambridge.org/core/journals/journal-of-the-marine-biological-association-of-the-united-kingdom/article/marine-biodiscovery-pipeline-and-ocean-medicines-of-tomorrow/1A12205C9881F2711D272E49A81E8208>
- <https://www.cbd.int/doc/legal/cbd-en.pdf>
- <https://assets.kpmg/content/dam/kpmg/uk/pdf/2022/11/life-science.pdf>

Potential Benefits Associated with MGR

MGR represent a source of materials with as-yet largely unknown and untapped potential. To date, only a handful of pharmaceutical products derived from marine bioactive compounds have been marketed (none from ABNJ) – see Table 1. As such, there are opportunities for discovery of new MGR as part of academic research, with potential for application in market sectors ranging from the pharmaceutical industry to cosmetics, agriculture, nutraceuticals and energy, as well as application in environmental conservation efforts.^(c) The degree to which this potential is realized will depend largely on the manner in which discovery is guided and benefits are shared.

Table 1. Examples of marketed pharmaceutical drugs derived from marine bioactive compounds extracted from marine organisms. ^{(f)(g)(h)}

Marine organism/species	Bioactive compound	Application/indication	Commercial name
Sponge/ <i>Tethya crypta</i>	Cytarabine	Treatment of leukaemia	Cytosar-U®
Sponge/ <i>Tethya crypta</i>	Cytarabine liposomal	Treatment of lymphomatous meningitis	Depocyt®
Sponge/ <i>Tethya crypta</i>	Vidarabine	Antiviral	Vira-A®
Snail/ <i>Conus magus</i>	Ziconotide	Antiviral	Prialt®
Sea squirt/ <i>Ecteinascidia turbinata</i>	Trabectedin	Antitumoral	Yondelis®
Sponge/ <i>Halichondria okadae</i>	Eribulin mesylate	Antitumoral	Halaven®

United Nations Biodiversity Beyond National Jurisdiction Negotiations

In 2018, the UN initiated formal negotiations for a new international legally binding instrument under the auspices of the UN Convention on the Law of the Sea for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ).⁽ⁱ⁾ Negotiations address a ‘package’ of four elements plus cross-cutting issues (see Figure 2):

1. MGR, including questions on the sharing of benefits;
2. Measures such as area-based management tools, including marine protected areas;
3. Environmental impact assessments, and;
4. Capacity-building and the transfer of marine technology

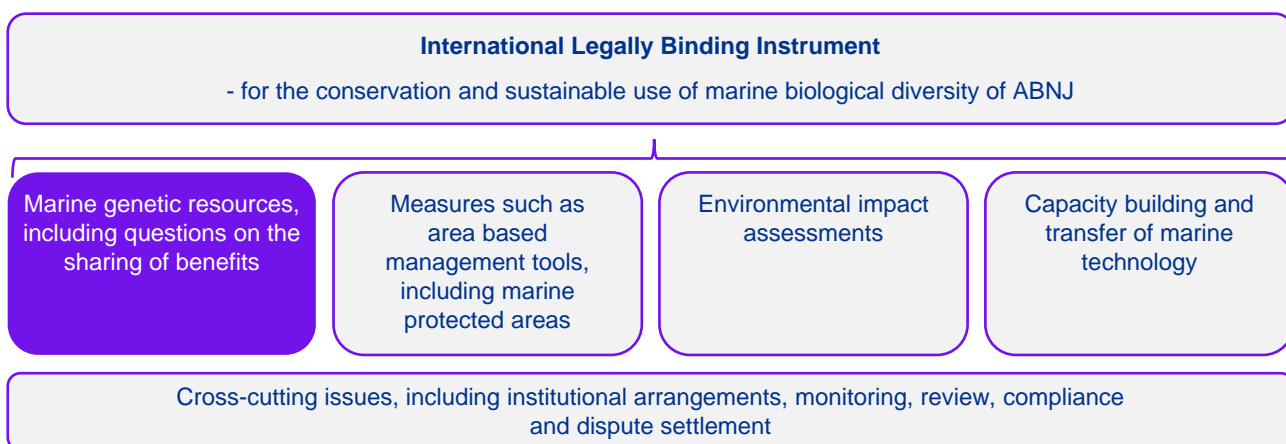


Figure 2. Overview of elements considered as part of the UN BBNJ negotiations.

Note

- f. <https://academic.oup.com/femsle/article/365/21/fny239/5106815?login=false>
- g. <https://link.springer.com/article/10.1007/s12094-007-0138-9>
- h. http://www.dhmjournal.com/images/Journals/39/DHM_Vol39_No4.pdf#page=30
- i. <https://www.un.org/bbnj/>



Potential Future Implications

The MGR element of the BBNJ negotiations, including benefit sharing considerations, has proven to be the most contentious aspect of treaty negotiations, with few detailed solutions proposed to date.^{(j)(k)} However, it is recognized that in order for the new agreement to be fair and effective, it is vital that all States and stakeholders are able to participate in the long-term sustainable use, management and protection of the marine environment in ABNJ. This includes participation in the utilization of MGR as well as the sharing of associated benefits.

The first session of the BBNJ Intergovernmental Conference (IGC) convened in September 2018. There have been five IGCs to date, with a sixth (and potentially final) session anticipated to take place in early 2023. Once the international BBNJ instrument is agreed, States may then take steps to implement provisions at the national level.

How We Can Help

The KPMG Life Science Regulatory Solutions team has expertise in the field of MGR and ABS, and can provide advice in terms of understanding potential policy implications associated with ongoing BBNJ negotiations, as well as future implementation and compliance with relevant treaty provisions. In addition, the team offer strategic regulatory advice to life science organisations throughout key product development stages, from early phase planning to launch and compliance for approved products across critical markets internationally.



Note

j. https://brill.com/view/journals/estu/33/1/article-p3_3.xml

k. <https://www.sciencedirect.com/science/article/pii/S0308597X19308218>

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