

國立中山大學 107 學年度碩士暨碩士專班招生考試試題

科目名稱：科學英文【海資系碩士班乙組】

題號：452006

※本科目依簡章規定「不可以」使用計算機(問答申論題)

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Reading Comprehension 閱讀能力測驗

Plastics are a contaminant of emerging concern accumulating in marine ecosystems. Plastics tend to break down into small particles, called microplastics, which also enter the marine environment directly as fragments from a variety of sources, including cosmetics, clothing, and industrial processes. Given their ubiquitous nature and small dimensions, the ingestion and impact of microplastics on marine life are a cause for concern, notably for filter feeders. Oysters were exposed to polystyrene microparticles, which were shown to interfere with energy uptake and allocation, reproduction, and offspring performance. A drop in energy allocation played a major role in this reproductive impairment. This study provides ground-breaking data on microplastic impacts in an invertebrate model, helping to predict ecological impact in marine ecosystems.

(引自 Sussarellu et al. 2016 PNAS)

簡答題 (30%，每題六分。請中文回答)

1. Based on the above article, please list three marine organisms that likely ingest more microplastics.
2. Please explain the major reason for the reducing profit of reproduction in oysters.

Dopamine is produced by *Ulvaria obscura*, a bloom-forming green alga that occurs from the mid intertidal to the shallow subtidal zones of North Pacific and North Atlantic shores. Its concentrations in the alga are approximately 0.5–1% of the alga's fresh mass. When experimentally desiccated and rehydrated at ecologically realistic densities, *Ulvaria* releases dopamine, resulting in seawater dopamine concentrations that can exceed 500 μM . Thus, dopamine could be responsible for previous reports of bioactivity by *Ulvaria exudates*. We tested this hypothesis by measuring the effects of dopamine in seawater on co-occurring macroalgae and crab larvae and juveniles. We ran assays that examined the effects of a range of dopamine concentrations on the growth of the green alga *Ulva lactuca*, on the germination of zygotes of the brown alga *Fucus distichus*, and on the survival, time to metamorphosis and time to first molt of crab (*Metacarcinus magister* and *Cancer oregonensis*) larvae and juveniles. Dopamine began to inhibit *Fucus* germination at concentrations above 5 μM , *Ulva* growth at concentrations above 50 μM , and the survival of *Metacarcinus* zoeae at concentrations above 168 μM . It did not affect the survival of *Cancer* megalopae or juveniles or the time to metamorphosis of megalopae. It had no effect on the time to first molt of *Cancer* juveniles, except at the highest concentration tested (738 μM), where it delayed molting by an average of a day and a half. These toxic effects could have been due to the dopamine or to its oxidation products. We concluded that the large-scale release of dopamine by *U. obscura* following stressful environmental conditions could significantly affect co-occurring species in intertidal pools as well as intertidal and shallow subtidal marine communities where the alga can form large blooms.

(引自 Van Alstyne et al. 2014 Phycologia)

3. What is the hypothesis of this study?
4. What are the toxic effects of *Ulvaria obscura*?
5. What is the stressful environmental factor for *Ulvaria obscura* considered in this article?

For each of the following articles, please (1) translate into Chinese 英翻中, and (2) write ONE summary sentence.

A.
“Human activities impact nearly all parts of the ocean. Lost and discarded nets continue to lethally snare fish, seabirds, and marine mammals as they drift. Ships spill oil and garbage and transport critters to alien habitats unprepared for their arrival. Mangrove forests are cleared for homes and industry. More than

背面有題

試題隨卷繳回

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half of the U.S. population lives in coastal areas, spilling garbage and sewage into the ocean. Fertilizer runoff from farms turns vast swaths of the ocean into dead zones, including a New Jersey-size area in the Gulf of Mexico. The greenhouse gas carbon dioxide is turning ocean waters acidic, and an influx of freshwater from melting glaciers threatens to alter the weather-driving currents.” (25%)

[Quoted from: National Geography]

B.

“The World Conservation Union is now warning the world of a "global extinction crisis," claiming nearly 40 percent of all of Earth's species are now at the highest risk of extinction. More than one third of all fish are threatened; as are just under a third of all reptiles and amphibians and 20 percent of all mammals.” (20%)

[Quoted from: Rachel Oliver, CNN]

Please translate the following paragraph into English 中翻英.

C. 海洋占地球表面面積71%，包含多樣的生態系統，為植物和動物提供了生活環境，且是人類食物的一個主要來源，對維繫地球上的生命，提供了不可缺少的生存條件。託四面環海之便，台灣其實擁有利用海水資源的優勢。然而，近幾十年來，由於在陸地上的活動，海洋環境的健康和生產能力都面臨重大威脅。值得注意的是，海洋中的絕大部分污染物，大都來自陸地活動，這些污染物對人體健康和海洋生物資源都帶來極大威脅。臺灣為四面環海的島國，幾乎每個縣都有接觸到海洋，居民的生活與海洋息息相關；因此，海洋資源的遭受破壞及威脅，都將直接或間接地對臺灣帶來衝擊。而海洋資源的保護工作是極為複雜的問題，必須採取及結合各類性質不同的措施，以求海洋能夠永續發展，資源不虞匱乏。(25%)

[摘錄自楊荏婷國政研究報告網站]