

第7回 細胞生物学セミナー

The Palytoxin Mystery

- On the hunt for the producer of the strongest non-peptide poison -

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Palytoxins are a class of extremely poisonous marine biotoxins. The first isolation of a palytoxin compound from a marine invertebrate of the genus *Palythoa* was reported more than 40 years ago. These animals grow as colonies of polyps with a simple body plan and harbour a variety of microorganisms. However, the organism actually producing the toxin has not been identified yet. Current literature discusses various possibilities with some authors favoring the hypothesis of bacteria being the producers, but there is also evidence that dinoflagellates are the source. To find the palytoxin producer, we have been using two different approaches: culture-independent ecological genomics and culture-dependent transcriptomics. The first project is based on the metagenomic analysis of environmental samples. It started with the preliminary observation that the toxicity levels of palythoa colonies in Ishigaki Island, Okinawa, varied considerably between different locations. We sampled palythoa colonies at various sites of Kabira Bay (Ishigaki Island) in order to (1) investigate the community structure of both prokaryotic and eukaryotic microorganisms associated to the animal, (2) measure toxicity levels by mass spectrometry and (3) find correlations between the chemical and metagenomic data. The second project studies a dinoflagellate culture that produces ovatoxins, which also belong to the palytoxin compound class. This culture offers the opportunity to investigate the transcription activities associated with toxin production and thus identify genes involved in the biosynthesis. I will try to demonstrate the usefulness of an ecological genomics approach for analysing toxin distribution patterns in nature. Furthermore, I will be summarizing the insights we have gained so far and discussing how much progress we have made on the hunt for the palytoxin producer.

(要約) パリトキシンはイソギンチャク類に由来する海産毒素であり、渦鞭毛藻や細菌などのイソギンチャクに寄生する微生物がパリトキシンを合成していると考えられているが、その詳細は不明である。パリトキシンを産生する種を同定するために、(1)石垣島川平湾で採取したイワスナギンチャクを用いたメタゲノミクスおよびLC-MS解析、(2)培養した渦鞭毛藻類のトランスクリプトーム解析を行い、パリトキシン生合成に関連する遺伝子群の同定を試みた。

*セミナーは英語で行われますが、質疑応答は日本語可です。

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