食物安全焦點
Food Safety Focus

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Centre for Food Safety

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盧大威醫生報告

Reported by Dr. Dawin LO, Medical & Health Officer, Food Incidents Response & Management Unit, Centre for Food Safety

最近當局接報一宗雪卡毒素食物中毒個案，受影響的患者均曾進食珊瑚魚。雪卡毒素是本港其中一種常見引致食物中毒的神經毒素。本文將簡介本港的雪卡毒素食物中毒情況，並向市民和業界提供預防的方法。

雪卡毒素

雪卡毒素是一組耐熱的脂溶性化合物，由干比亞藻這種海洋浮游生物產生。食草魚類首先吃下依附在珊瑚礁上的有毒海洋浮游生物，然後體型較大的食肉魚類吃下這些含有毒素的魚類，毒素由此通過食物鏈在生物體內層層積聚，人類進食了含毒素的魚後，毒素便成了人類腹中之物。含雪卡毒素的魚，其內臟及生殖器的毒素含量較其他部位高50至100倍，但魚本身毫無徵狀，因此不能從外觀、味道、肉質和氣味來分辨一條魚是否有毒。雪卡毒素具有耐熱性，因此不能透過烹煮或加工過程消除。

進食含雪卡毒素的魚後，最快會在30分鐘後出現中毒的早期徵狀。患者會出現腸胃或神經系統不適。嘔吐、腹瀉、噁心及腹痛等腸胃不適一般只會持續數天，而唇部及四肢麻痺、皮膚發癢、冷熱感覺顛倒、疲倦、肌肉及關節疼痛等神經系統不適則會在後期出現，並維持較長時間。其他因素，例如以往曾中過雪卡毒、進食含毒素的魚時飲用了含酒精的飲料或食用了果仁及種籽製品，亦會令個別人士較易出現雪卡毒素食物中毒的徵狀。

本港情況

雪卡毒素是港人常見因進食魚類而中毒的神經毒素。由二零零零年至二零一三年六月十二日，食物安全中心共接獲衞生署轉介284宗雪卡毒素食物中毒個案(見圖)，共有867人受影響。

There has been a recent report of a ciguatoxin food poisoning (CFP) case which affected a number of people who had consumed coral reef fish. Ciguatoxins are one of the common forms of neurotoxins causing food poisoning in Hong Kong. This article describes the local situation of CFP and provides advice to the public and the trade on the prevention of CFP.

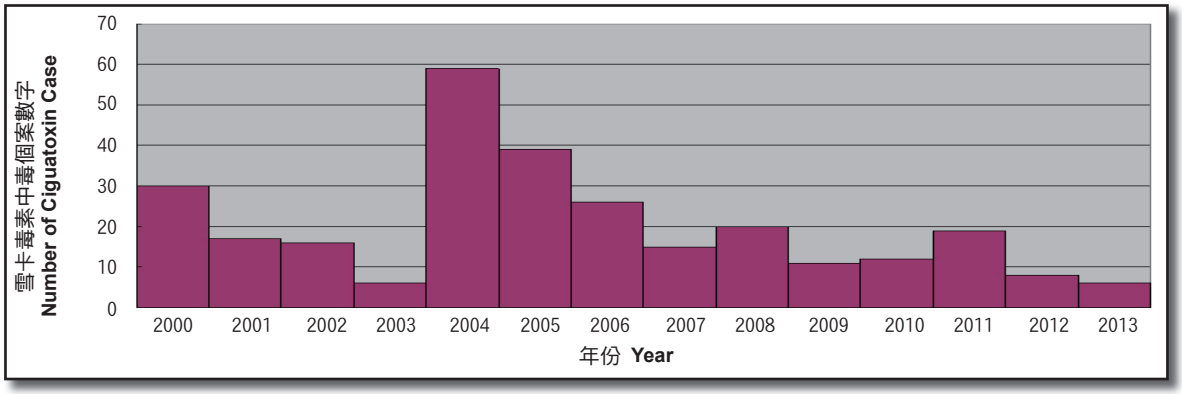
Ciguatoxins

Ciguatoxins are a group of heat-stable and fat-soluble compounds produced by the marine plankton *Gambierdiscus toxicus*. They bioaccumulate up the food chain, starting with herbivorous fish that graze on toxic marine planktons in the coral reef, then successively accumulate in the body of larger carnivorous fish and finally in humans. They are up to 50 to 100 times more concentrated in the viscera and gonads of the affected fish, while the fish has no symptom and also cannot be identified by its appearance, taste, texture or smell. The toxins are heat-stable and cannot be removed by cooking or processing.

Initial symptoms of CFP can appear as short as 30 minutes after consumption of ciguateric fish. The symptoms can be gastrointestinal or neurological. Gastrointestinal symptoms like vomiting, diarrhoea, nausea and abdominal pain usually last only a few days. Neurological symptoms like tingling of lips, hands and feet, skin itching, change in temperature perception, fatigue, muscle and joint pain appear later and last for longer time. Sensitivity of an individual to CFP intoxication could be increased due to factors like previous CFP episode, consumption of alcoholic beverages, nuts and seed products.

Local Situation of CFP

CFP is the most common form of neurotoxin poisoning associated with the consumption of fish in Hong Kong. From 2000 to 12 June 2013, the Centre for Food Safety had received 284 referrals of CFP from the Department of Health (see Figure). A total of 867 persons were affected.



2000至2013年的雪卡毒素中毒個案數字（直至2013年6月12日）
Figure: Number of ciguatoxins cases from 2000 to 2013 (Up to 12 June 2013)

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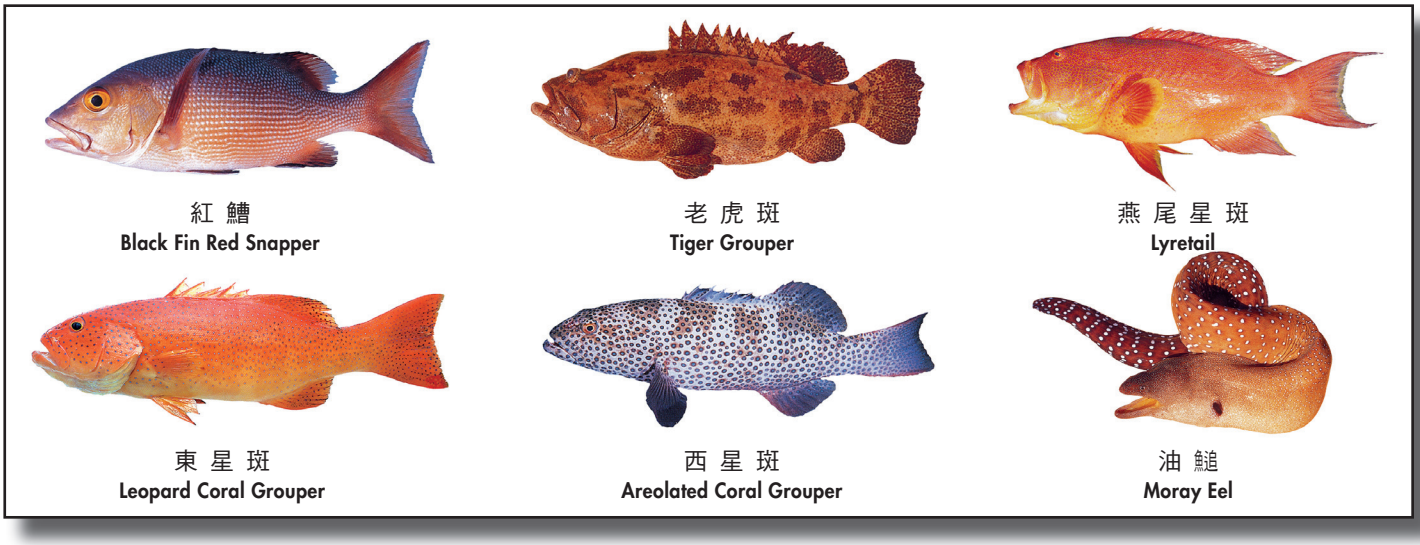
焦點個案 Incident in Focus

雪卡毒素食物中毒事件雖然一年四季都有發生，但觀察所得超過六成的個案是在三月至七月發生的，分析受影響人數亦得出同樣的結果。

引致雪卡毒素食物中毒的野生海魚種類繁多，其中紅鰽、老虎斑、燕尾星斑、東星斑、西星斑和油鯙是六種最常引致雪卡毒素食物中毒的魚類，佔雪卡毒素食物中毒個案總數五成以上。養魚一般餵飼顆粒魚糧或雜魚，不太可能含有毒素。

The reporting of CFP occurred year round. However, it was observed that over 60% of total cases were reported in March to July of the year. The number of persons affected also provided similar observation.

Different kinds of coral reef fish caught in the wild were known to be associated with CFP. Black fin red snapper, Tiger grouper, Lyretail, Leopard coral grouper, Areolated coral grouper and Moray eel were the top six common types of fish linked to CFP, accounting for over 50% of CFP cases. Farmed fish which was usually fed by formulated pellet or trash fish was not likely the source of toxins.



2000年至2013年6月12日涉及雪卡毒素食物中毒的魚類
Fish commonly involved in CFP from 2000 to 12 June 2013.

雪卡毒素通過食物鏈層層積聚，魚的體積愈大，所含的毒素愈高。涉及雪卡毒素中毒的魚體重通常為兩公斤（三斤）以上，但偶爾也有低於這個重量的魚引致中毒的個案。當局在追溯食物來源時發現，最常受雪卡毒素影響的捕魚區有南沙羣島、南太平洋及海南島。

Ciguatoxins bioaccumulate up the food chain, the larger the fish the higher the concentration of ciguatoxins. The fish involved in CFP is usually greater than 2 kg (3 catties) but occasionally fish less than this weight had also been reported. Source tracing revealed that the most frequently at-risk contaminated fishing grounds are the Nansha Island, South Pacific and Hainan Island.

注意要點：

- 雪卡毒素是本港其中一種常見因進食珊瑚魚而引致食物中毒的神經毒素。
- 含雪卡毒素的魚不能從外觀、味道、肉質和氣味來分辨。
- 珊瑚魚的體積愈大愈有可能含雪卡毒素，且毒素含量愈高。

Key Points to Note:

- CFP is the most common form of neurotoxin poisoning associated with the consumption of coral reef fish in Hong Kong.
- Fish containing ciguatoxins cannot be identified by its appearance, taste, texture or smell.
- The larger the coral reef fish, the more likely ciguatoxins may be present and at higher concentration.

給市民的建議

1. 減少進食珊瑚魚的次數和每次吃的分量。
2. 珊瑚魚的頭、內臟、皮和卵通常毒素含量較高，應避免進食。
3. 進食珊瑚魚時，應避免喝酒和吃花生或豆類食物。
4. 曾有過雪卡毒素中毒的人士應避免進食珊瑚魚。
5. 如出現雪卡毒素食物中毒病徵，應立即求醫。

給業界的建議

1. 避免從已知有含雪卡毒素魚類的水域採購魚類。
2. 嚴格遵守《食物安全條例》有關備存紀錄的規定。

Advice to the Public

1. Consume less coral reef fishes in terms of frequency and the amount consumed in each meal.
2. Avoid eating the head, viscera, skin, and roe of coral reef fish which usually have higher concentration of toxins.
3. When eating coral reef fish, alcohol, peanuts or beans should be avoided.
4. Persons who have previous CFP episode should refrain from eating coral reef fish.
5. Seek medical treatment immediately when symptoms of CFP appear.

Advice to the Trade

1. Avoid sourcing fishes from areas known to be at risk of ciguatoxins.
2. Adhere strictly to the Food Safety Ordinance in record keeping.

食物安全平台
Food Safety Platform

基因改造動物是四不像怪物嗎？
Are Genetically Modified Animals Chimera?

食物安全中心
風險評估組
科學主任莊梓傑博士報告

Reported by Dr. Ken CHONG, Scientific Officer,
Risk Assessment Section,
Centre for Food Safety

基因改造動物在一些人的心目中，可能如某些電影或電玩遊戲所描述的，是生化危機或四不像怪物。也有人把基因改造動物與複製動物混為一談。事實上，基因改造動物和基因改造植物一樣，都是透過改造基因而令生物獲得理想的特徵。這次我們會闡釋動物複製與基因改造的區別，以及基因改造動物作為食物用途的可能性。

複製與基因改造

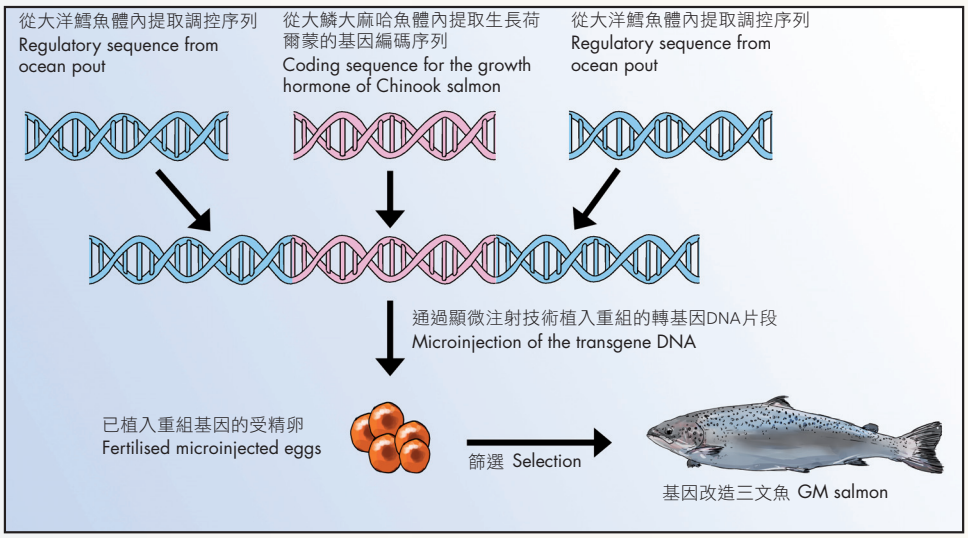
基因改造動物與複製動物是兩碼事。可能因為兩者都是生物科技的產物，以致有人誤把二者混為一談。複製不涉及改變脫氧核糖核酸(DNA)，而基因改造卻牽涉改變、植入或移除DNA。目前尚未有基因改造動物獲准作食物用途，但複製動物下一代的肉或奶可能已經上市。美國食物及藥物管理局曾評估複製動物的食物安全風險，結論是複製牛、豬和山羊的肉和奶，以及複製動物的後代的肉和奶與傳統食物一樣安全。

基因改造動物

複製動物的最主要原因是保留動物的某些優良特性，而基因改造的目的則是引入一些理想的新特徵，並傳給下一代。至於擬作食物用途的基因改造動物，改造其基因的目的是提高動物的整體表現，從而帶來農業和／或經濟上的好處。

和基因改造植物一樣，開發基因改造動物的其中一個主要目標是提高產量。最廣為人知的例子是基因改造三文魚，研發人員在大西洋三文魚的體內加入了大鱗大麻哈魚(Chinook salmon)生長荷爾蒙的基因，令基因改造三文魚的生長速度較正常養殖的大西洋三文魚快。

除了植入生長荷爾蒙外，亦可在被改造的動物體內植入抗菌蛋白或酵素，以減少受感染的情況。此外，基因改造技術亦可用於幫助動物吸收營養。研發人員在豬體內植入幫助分解磷分子的酵素的基因，令豬能從飼料吸收更多的磷，這樣既減少了飼料中的磷添加物，又減少了豬糞便中的含磷量。



從其他魚類提取的DNA片段經重組後被植入大西洋三文魚的受精卵內。
DNA fragments from other fish species are recombined and injected into the fertilised eggs of Atlantic salmon.

對吸引消費者方面，改造動物基因的好處是可以按消費者的需要來改造食物的成分，例如透過改造乳牛的基因，使其奶液的乳糖量減少，變得適合有乳糖不耐症的人士飲用。

批准基因改造三文魚作食物用途

基因改造三文魚很可能成為第一種可供食用的基因改造動物，其他基因改造動物會否順勢被陸續端上餐桌仍屬未知之數。美國食物及藥物管理局的評估結論是，基因改造三文魚與普通大西洋三文魚在食物安全方面無異。但何時獲准上市則仍

Genetically modified (GM) animals may perhaps be imagined as biohazard organisms or chimera, as portrayed in some films or TV games. Some people may also wrongly regard GM animals as cloned animals. In fact, GM animals, similar to GM plants, are organisms with their genes modified for desirable characteristics. In this issue, we will talk about the differences between animal cloning and genetic modification, and the potential of GM animals for food use.

Cloning vs Genetic Modification

GM animals are different from cloned animals. Some people may confuse these two types of animals as both of them are developed from biotechnology. Cloning does not involve any change in the DNA, while genetic modification may involve alteration, insertion, or deletion of DNA. While there is currently no GM animals that have been approved for food use yet, meat or milk from the offspring of cloned animals may have already been available in the market. Risk assessment conducted by the US Food and Drug Administration (FDA) on the food safety of cloned animals concluded that meat and milk from cow, pig and goat clones, and the offspring of any animal clones are as safe as conventional food.

GM Animals

The main purpose of cloning is to preserve some good qualities, whilst genetic modification aims at introducing desirable characteristics that can be passed to offspring. With regard to GM animals potentially for food use, the animals are modified to enhance the overall performance which in turn will deliver in agronomic and/or economic benefits.

Similar to GM plants, increase in productivity is one of the main targets of GM animal production. The most well-known example is GM salmon, featuring Atlantic salmon engineered to contain the growth hormone gene from the Chinook salmon. As such, the GM salmon can grow faster than conventionally farmed Atlantic salmon.

Apart from introducing growth hormone, antimicrobial proteins or enzymes can be incorporated in a modified animal to decrease its susceptibility to infections. Genetic modification can also help improve animal nutrition. Gene encoding enzyme for the digestion of phosphorus compound has been introduced into pigs to make better use of phosphorus in pigs' feed. This can reduce the use of phosphate supplements and also the amount of phosphorus in pig manure.

As for the benefits that entice consumers, the content of the food derived from animals can be modified to meet consumers' needs. For example, cows can be modified to produce milk with lowered lactose content that is suitable for individuals with lactose intolerance.

Approval of GM Salmon for Food Use

GM salmon could be the first GM animal approved for food use but it is uncertain whether this would pave the path for other GM animals in the pipeline. The US FDA concluded that food derived from the GM salmon has been assessed as safe as food from conventional Atlantic salmon. Yet, there is currently no information when the GM salmon will be approved for marketing. Some environmentalists or consumers

未有定案。有環保人士和消費者反對基因改造三文魚上市，部份原因是憂慮基因改造三文魚對環境生態的影響。他們擔心基因改造三文魚一旦意外從養殖基地釋放，隔離措施無法防止這些基因改造三文魚在大自然中存活。這些基因改造三文魚的生長優勢會威脅到野生三文魚的生存，而其攜帶經改造的基因亦會轉移到野生的近親。然而，美國食物及藥物管理局發表的初步環境評估報告顯示，只要遵守特定的培育和養殖條件，基因改造三文魚對美國的生態環境沒有顯著影響。

除了備受爭議的基因改造三文魚外，還有些基因改造食物事故引起了公眾關注，例如讓兒童食用基因改造大米的試驗、老鼠被餵飼基因改造粟米後長出巨瘤等。我們將在下期談論這些問題。

oppose the marketing of GM salmon partly due to the concerns regarding the potential environmental impact. They have concern that the GM salmon may be accidentally released from the culture facilities and confinement measures are not sufficient to prevent the survival of the fish in the environment. The growth advantage of the GM salmon may endanger the survival of wild salmon and the modified genes may even be passed to close relatives in the wild. However, the preliminary finding of a draft environmental assessment issued by the US FDA is that the GM salmon would not have a significant impact on the US environment, under the specific conditions for production and grow-out of the GM salmon.

Besides the controversial GM salmon, some GM food incidents, such as research trial on feeding children with GM rice and study showing mice developed giant tumors after being fed with GM corn, have also raised public concern. We will talk about these in the next issue.

食物事故點滴
Food Incident Highlight

奶製品總含菌量超標

食物安全中心(中心)上月透過恆常食物監察計劃，發現一批經巴士德消毒的澳洲奶製品的總含菌量超出法定標準，隨即向市民及業界發出食物警報，並向進口商發出警告信，暫停有關產品的進口。涉事的進口商已主動回收受影響的產品。另一方面，中心亦已知會澳洲當局有關事件以作出跟進。如有需要，中心會採取進一步行動。

根據《奶業規例》，經巴士德消毒進行熱處理後的奶類，每毫升不得含有多於三萬個細菌。當總含菌量超出此法定標準，雖然並不表示飲用後定必會引致食物中毒，但卻顯示產品的衞生情況欠理想。中心呼籲消費者應停止飲用受影響的產品，業界須確保所出售的食物符合法例要求。

Milk Product with Total Bacterial Count Exceeding Limit

Last month, the Centre for Food Safety (CFS) issued alerts to the public and the trade on a batch of Australian pasteurised milk product which was found to have a total bacterial count exceeding the legal limit under the regular Food Surveillance Programme. The CFS issued a warning letter to the importer and suspended importation of the product concerned. The importer has initiated a recall of the milk product. The Australian authorities were also informed by the CFS about the incident for their follow up action. The CFS will take further actions deemed necessary.

According to the Milk Regulation, milk after heat-treatment by means of pasteurisation should not contain more than 30,000 bacteria per millilitre. When the total bacterial count exceeds this legal limit, it indicates unsatisfactory hygienic conditions though it does not mean it would lead to food poisoning. The CFS advises consumers not to drink the affected product. The trade should ensure that all food for sale comply with the legal requirements.

受影響產品 — 寶萊脫脂牛奶
The affected product – Pura Slim Milk

皮蛋中的重金屬

傳媒上月報道，內地有不法商人為縮短醃製期，以工業用硫酸銅醃製皮蛋(又名松花蛋)。由於工業用硫酸銅可能含有重金屬污染物，事件引起公眾關注。

銅是身體必需的微量營養素。硫酸銅在內地是准許使用的食品加工助劑，可用於代替氧化鉛醃製皮蛋，以減少皮蛋中的鉛含量。長期攝入過量鉛會令腎臟和中央神經系統受損。

本港所有從內地進口的禽蛋(包括皮蛋)均須來自註冊的養殖場和加工廠，並須附有衞生證書。食物安全中心最近有關皮蛋中重金屬(包括鉛)含量的測試結果全部合格。食物生產商應只採用獲准在食物中使用的食物添加劑。市民購買食物時應光顧可靠的店鋪。

Heavy Metals in Lime-preserved Eggs

Last month, the media reported that industrial copper sulphate, which might contain heavy metals as contaminants, was being used as an additive to speed up production of lime-preserved eggs (also known as "thousand-year eggs") in Mainland China. The incident has raised public concerns.

Copper is an essential micronutrient. In the Mainland, copper sulphate is a permitted processing aid that can be used to substitute lead oxide in the production of lime-preserved eggs in order to reduce the level of lead present in the final products. Excessive chronic exposure to lead can cause damages to kidneys and the central nervous system.

In Hong Kong, all poultry eggs, including lime-preserved eggs, imported from the Mainland must be sourced from registered farms and processing plants, and accompanied with health certificates. Results of recent surveillance conducted by the Centre for Food Safety on heavy metals, including lead, in lime-preserved eggs were all satisfactory. Food manufacturers should only use those food additives that are approved for use in food. Members of the public are reminded to obtain food from reliable sources.

風險傳達工作一覽
Summary of Risk Communication Work

風險傳達工作一覽（二零一三年六月） Summary of Risk Communication Work (June 2013)	數目 Number
事故/食物安全個案 Incidents / Food Safety Cases	82
公眾查詢 Public Enquiries	110
業界查詢 Trade Enquiries	163
食物投訴 Food Complaints	428
給業界的快速警報 Rapid Alerts to Trade	30
給消費者的食物警報 Food Alerts to Consumers	1
教育研討會/演講/講座/輔導 Educational Seminars / Lectures / Talks / Counselling	66
上載到食物安全中心網頁的新訊息 New Messages Put on the CFS Website	59