食物安全焦點
Food Safety Focus

食物安全中心 Centre for Food Safety

食物環境衞生署 Food and Environmental Hygiene Department

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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,
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去年年底，食物安全中心(中心)發表報告，指本地人類戊型肝炎個案與豬肝中的戊型肝炎病毒有關，病毒可能經食物途徑傳播。近年，本港戊型肝炎個案有上升趨勢，二零一零年錄得117宗個案，為歷來最高的呈報數字。今期我們將會探討戊型肝炎病毒及食物中的相關風險。

戊型肝炎

戊型肝炎是由戊型肝炎病毒引起的肝臟發炎，症狀包括發燒、不適、食慾不振、噁心、腹痛、小便呈茶色和黃疸。患者一般會自行痊癒，症狀會於兩周內消退，但孕婦、慢性肝病患者和長者三類高危羣組可能會出現嚴重併發症。有報告指，孕婦和慢性肝病患者感染戊型肝炎的死亡率較高。年長者似乎較容易感染戊型肝炎。

戊型肝炎感染

戊型肝炎主要經糞-口途徑傳播，而受污染的水或食物過去曾導致較大規模的爆發。由於環境衞生欠佳，戊型肝炎常見於發展中國家。在發達國家個案較少，而以往的患者多數曾前往戊型肝炎流行地區。不過，近年發現與外遊無關的戊型肝炎感染個案在已發展國家有增多趨勢，一般懷疑與進食沒有徹底煮熟的食物有關，例如文獻記載可能會傳播戊型肝炎病毒的介貝類水產和豬內臟。

表面已熟的豬肝不代表內部已徹底煮熟
Outside surface done does not mean deeper portion is thoroughly cooked

戊型肝炎病毒經食物傳播的途徑

戊型肝炎病毒在世界各地的豬隻和日本、美國及荷蘭的豬肝商品中亦有發現。在本港，中心在二零零九年從屠房抽取樣本進行戊型肝炎病毒測試，結果發現佔內地輸港活豬總數約2%的燒種豬(約四月齡)中約有30%呈陽性反應，而佔內地輸港活豬總數約98%的肉豬(約六月齡)則全部沒有驗出戊型肝炎病毒。較重要的一點

At the end of last year, the Centre for Food Safety (CFS) reported the link between human hepatitis E cases and hepatitis E virus (HEV) in pig livers, possibly through foodborne transmission of HEV. In recent years, Hong Kong witnessed a rising trend of hepatitis E and in 2010 recorded 117 cases, the highest number of hepatitis E cases ever notified in a year. In this issue, we would talk about the virus and the risk in food.

Hepatitis E

Hepatitis E is the inflammation of liver caused by HEV. Symptoms include fever, malaise, anorexia, nausea, abdominal pain, dark urine and jaundice. The disease is generally self-limiting and resolves within two weeks; however, it can cause serious complications in some high risk populations, i.e. pregnant women, patients with pre-existing chronic liver disease, and elderly. The mortality rates for pregnant mothers and individuals with pre-existing chronic liver disease are reported to be high. Older people seem to be relatively more susceptible to hepatitis E.

Occurrence of Hepatitis E

HEV is primarily transmitted via the faecal-oral route, where contaminated water or food has been implicated in major outbreaks. Due to poor environmental sanitation, hepatitis E is common in developing countries. In most industrialised countries, the disease is rare and mostly occurs in travellers returning from endemic areas. However, there has been an increase in cases not related to travel in developed countries. It is not known whether these cases were caused by inadequately cooked food such as shellfish and pig offal which are documented possible food sources for HEV.

Foodborne Transmission of HEV

HEV has been found in pig populations across the world and in commercial pig livers in Japan, United States, and Netherlands. Locally, the CFS collected samples from slaughterhouse in 2009 and found that around 30% of roaster pigs (around 4 months old), but none of porker pigs (around 6 months old), which contribute to around 2% and 98% of total admission of live pigs from the Mainland respectively, were positive for HEV. More importantly, genetic homology, i.e. same gene partial sequences, was identified between some HEV isolates from pigs and current

焦點個案
Incident in Focus

是，從豬隻檢出的部分病毒分離株與現有及過去人類感染個案檢出的病毒分離株出現基因同源性，即比對基因部分序列相同；這表示部分戊型肝炎病毒分離株可能已在本港存在一段時間，而未徹底煮熟的豬肝可能是本港戊型肝炎個案的其中一個感染源。

由於從人類感染個案檢出的多株分離株與豬隻檢出的分離株不同，故可能仍有其他潛在感染源。雙殼介貝類水產以過濾海水的方法覓食，所以體內容易積聚受污染海水中的病毒，包括戊型肝炎病毒。雖然以往的本港研究沒有表明介貝類水產是戊型肝炎病毒的主要感染源，但介貝類水產一向是食源性病毒包括戊型肝炎病毒的潛在感染源。此外，亦有報告指戊型肝炎可經輸血傳播，豬農和獸醫亦可能因職業而接觸到戊型肝炎病毒。

預防之道

相對於細菌繁殖體，食源性病毒一般有較高的抗熱能力。此外，食源性病毒在不同食物基質中的存活時間各異，例如甲型肝炎病毒在雙殼介貝類水產中較在奶類中需要更嚴格的條件才達到相同的滅活效果。一般建議可確保食物安全的熱處理方法(即把食物烹煮至內部溫度達攝氏75度並維持30秒)在某些病毒與食物的組合情況下未必足夠，需有更嚴格的時間和溫度要求。

因為味道等感官原因，有些消費者較愛吃未徹底煮熟的豬肝。為預防戊型肝炎，食物處理人員及消費者應徹底煮熟食物，特別是火鍋和生滾粥。至於切片豬肝，應視乎厚度和分量以沸水烹煮或熱煎鍋／鑊炒最少3至5分鐘。由於雙殼介貝類水產需加熱到中心溫度達攝氏90度並維持90秒，因此應用沸水烹煮至外殼打開，然後再煮3至5分鐘。此外，食物處理人員和消費者亦應保持良好的個人及食物衞生習慣。如外出用膳，消費者可要求食肆必須徹底煮熟食物，高危羣組需特別留意這一點。

注意要點：

1. 戊型肝炎的患者一般會自行痊癒，但部分高危羣組可能會出現嚴重併發症。
2. 未徹底煮熟的豬肝可能是本港戊型肝炎個案的其中一個感染源。
3. 為預防戊型肝炎，必須徹底煮熟食物，特別是火鍋和生滾粥。

給消費者的建議

- 確保豬肝和雙殼介貝類水產徹底煮熟才進食。
- 在享用火鍋時，使用兩套用具，分開處理生和即食的食物，以免交叉污染。

給業界的建議

- 把生的肉類和內臟切成薄片，以加快受熱的速度，尤其是用於火鍋和生滾粥的肉類和內臟。
- 為享用火鍋的顧客提供兩套用具，分開處理生和即食的食物，以免交叉污染。

更多資料

- 中心擬備的“新鮮豬肝含戊型肝炎病毒的情況”風險評估研究

and past human cases. This suggests that some of the HEV isolates may have been present locally for a period of time and inadequately cooked pig livers could be one possible source for hepatitis E in Hong Kong.

Since many isolates from human cases were not matched with those from pigs, other possible sources may exist. Bivalve shellfish, which feeds by filtering out the seawater, tends to concentrate viruses, including HEV, present in the polluted water in the process. Although previous studies in Hong Kong did not show shellfish as a significant source for HEV, shellfish is a recognised potential source for foodborne viruses including HEV. In addition, there have been reports on transmission of hepatitis E by blood transfusion, and on the potential of occupational exposure to HEV in people like pig farmers and veterinarians.

Prevention

Comparing to vegetative bacteria, foodborne viruses are generally more resistant to heat. In addition, persistence of the viruses may be different in different food substrates, e.g. hepatitis A virus in bivalve molluscs needs more stringent conditions than the virus in milk for the same level of inactivation. Heat treatment usually recommended (i.e. cooking to an internal temperature of 75°C for 30 seconds) to food safety may not be adequate for some virus-food combinations. More stringent time and temperature combinations are required.

For taste and other sensory reasons, inadequately cooked pig livers are preferred by some consumers. To prevent hepatitis E, food trade and consumers should cook food thoroughly, especially during hotpot or congee cooking. For sliced pig liver, depending on thickness and quantity, boil at 100°C or stir-fry in hot skillet/wok for at least three to five minutes. Heating to an internal temperature of 90°C for 90 seconds is required for cooking of molluscan shellfish; hence, boil at 100°C until their shells open; boil for additional three to five minutes afterwards. In addition, food trade and consumers are also advised to observe good personal and food hygiene practices. Consumers could ask for thoroughly cooked food when eating out, this is particularly important for high risk populations.

Key Points to Note:

1. Hepatitis E virus generally causes self-limiting disease, but can cause serious complications in some high risk populations.
2. Inadequately cooked pig livers could be one possible source for local hepatitis E.
3. Cook food thoroughly to prevent hepatitis E, especially during hotpot or congee cooking.

Advice to Consumers

- Make sure pig livers and molluscan shellfish are well cooked before consumption.
- Use separate utensils for handling raw food and ready-to-eat food to avoid cross contamination during hotpot.

Advice to the Trade

- Slice raw meat and offal into thin strips to allow thorough cooking, especially those for hotpot or congee cooking.
- Provide separate utensils for handling raw food and ready-to-eat food to avoid cross contamination during hotpot.

Further Information

- The CFS risk assessment study on Hepatitis E Virus in Fresh Pig Livers

食物安全平台
Food Safety Platform

納米技術與食物安全
Nanotechnology and Food Safety

食物安全中心
風險評估組
科學主任周淑敏女士報告

Reported by Ms. Shuk-man CHOW, Scientific Officer,
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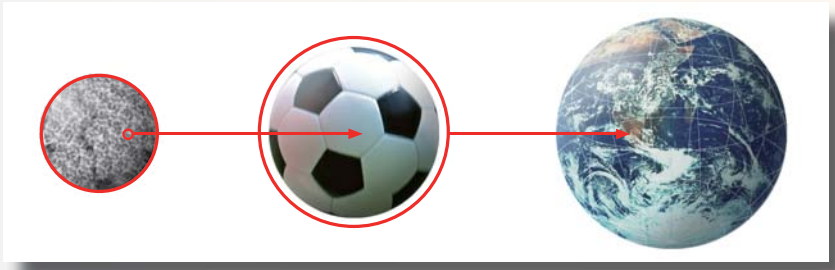
“納米技術”以往只見於科學小說，但現已成為我們生活的一部分，應用範圍廣泛，幾乎無孔不入，透明防曬霜、防水運動褲、防塗鴉塗料及具有抗菌功能的洗衣機只是目前納米技術應用的寥寥數例。本文將會探討納米技術在食物業的應用情況和潛在安全問題。

納米技術與納米粒子的特性

“納米”一詞源自希臘文，意指“侏儒”。納米粒子極細，普通顯微鏡難以看見。要知道納米尺寸到底有多細小，大家不妨想像一下，納米粒子相對於足球的比例，就好像足球相對於地球一樣(圖一)。如以數字來表達，“納米”指十億分之一(10^{-9})，因此，一納米等於十億分之一米。



圖一： 納米粒子與足球的比例大約相當於足球與地球的比例
Figure 1: The size of a nanoparticle in relation to that of a football is roughly equivalent to that of a football relative to the size of the Earth

由於納米粒子尺寸微小，故在顏色、傳導性、可溶性及化學活性等化學物理特性上與尺寸較大的相同物質極為不同。

納米技術在食物業的應用

相對於其他行業，食物業應用納米技術只屬於起步階段。納米技術現時在食物業主要用於製造食物接觸材料，例如在塑膠容器加入納米銀粒子，以抑制微生物生長和延長食物保質期。此外，還有直接應用於食物配料及食物添加劑的納米囊化技術，例如用來掩蓋魚油的不良氣味和味道。納米技術亦可用來製造納米結構食物，例如雪糕，為消費者提供味道、口感和濃度較佳的選擇。

以納米技術衍生的食物及食物接觸材料的安全性

雖然大部分應用於食物和飲品的納米科技目前仍處於研發階段，但食物含有納米粒子並非新鮮事物。不少我們日常食用的食物配料，成分包括蛋白質、碳水化合物及脂肪，這些物質大小不一，由較大的生物聚合物至納米尺寸不等。事實上，納米粒子天然存在於食物之中，我們一直從飲食中攝入這些極微細的粒子。

由於納米技術在食物業中迅速發展，多個國家和國際食物安全當局近年評估這項技術的潛在食物安全問題。現時並無有力證據證明納米技術衍生的食物或食物接觸材料較傳統對應食物或材料安全或危險。因此，對於納米食物及加入納米材料的食物接觸材料的安全性，不能一概而論。直至目前為止，沒有事例證明人體食入納米材料有損健康。

Once only existed in the science fiction, “nanotechnology” has become a part of our life. Nanotechnology is being applied in almost every field imaginable. Transparent sunscreens, water repellent pants, anti-graffiti paints, and antimicrobial washing machines are just a few examples of current nanotechnology applications. In this article, we are going to discuss how nanotechnology is being used in the food industry and its potential safety implications.

Nanotechnology and Properties of Nanoparticles

“Nano” comes from the Greek word meaning “dwarf”. Nano-sized particles are so tiny that they are well below what can be seen with a typical microscope. To get an impression on the size of a nanoparticle, one can imagine the size of a nanoparticle compared to a football is like the size of a football compared to the Earth (Figure 1). When quantifiable, “nano” refers to one-billionth (10^{-9}), therefore, one nanometre is equal to one billionth of a metre.

As a result of the small sizes, the chemical and physical properties of nanoparticles can vary considerably from those of larger particles of the same substance. These differences include colour, conductivity, solubility and chemical reactivity.

Application of Nanotechnology in the Food Sector

Compared to the use in other industrial sectors, the application of nanotechnology in the realm of food is just in the infancy. Nanotechnology is now mainly used for the production of food contact materials in the food industry. For example, nano-silver particles are embedded into plastic containers to inhibit microbial growth and extend the shelf-life of food. Beside the use in food contact materials, nanoparticles can be added directly into food to encapsulate food ingredients and additives, for example to mask the unpleasant tastes and flavours of fish oils. The food itself (e.g. ice cream) may also be made into nano-structure to provide a better texture, taste and consistency.

Safety of Food and Food Contact Materials Derived from Nanotechnology

Whilst most nanotechnology applications for food and beverages are currently at research and development stage, the presence of nanoparticles in food is not a new phenomenon. Many of the commonly consumed food ingredients are comprised of proteins, carbohydrates and fats with sizes extending from large biopolymers down to nanoscale. Nano-sized particles, in fact, are naturally present in our food and we have always been exposed to these very fine particles in the diet.

In view of the rapid development of nanotechnology in the food sector, a number of national and international food safety authorities have recently reviewed the potential food safety implications of the technology. At present, there is no tenable evidence that food or food contact materials derived from nanotechnology are any safer or more dangerous than their conventional counterparts. No general conclusion can be made on the safety of nanofood and food contact materials incorporated with nanomaterials. Up till now, there is no evidence of instances where ingested nanomaterials have harmed human health.

規管納米食物

雖然美國、加拿大、歐盟、澳洲、新西蘭及中國內地等主要國家及地區目前仍無規管納米食物的特定法例，但規管其他食物的健康及安全規例一般亦適用於納米食物。世界衞生組織表示，使用納米材料於食物之前必須對其潛在的健康和環境風險加以評估。《公眾衞生及市政條例》(第132章)訂明，所有擬在本港出售的食物必須適宜供人食用。這項原則同樣適用於以納米技術衍生的食物。食物業如提供這些食物，有責任確保食物中人工納米材料的安全性。雖然消費者很可能會因納米技術而受惠，但現時仍有待新的數據和測量方法，確保能準確評估以納米技術製造的產品的安全性。

如欲了解更多有關食物業應用納米技術的安全問題，請參閱食物安全中心的《納米技術與食物安全》文獻研究。

Regulation of Nanofood

While some major countries and regions including the United States, Canada, the European Union, Australia, New Zealand and Mainland China have not yet formulated any specific legislation on the regulation of nanofood, in general it is subject to the same public health and food safety regulations that apply to other food types. According to the World Health Organization, the potential health and environmental risks of nanoscale materials need to be assessed before they are introduced into food. It is stipulated in the Public Health and Municipal Services Ordinance (Cap. 132) that all food intended for sale in Hong Kong shall be fit for human consumption. This principle also applies to nanotechnology-derived food products and the food trade have the responsibility to ensure the safety of engineered nanomaterials in their food products if they are to supply such products. While consumers are likely to benefit from the technology, new data and measurement approaches are needed to ensure safety of products using nanotechnology can be properly assessed.

For more information on safety issues surrounding the application of nanotechnology in the food industry, readers may refer to CFS's literature review on "Nanotechnology and Food Safety".

食物事故點滴
Food Incident Highlight

德國二噁英污染事件

本年一月五日，食物安全中心(中心)就德國部分飼料受二噁英污染的報告立即聯絡德國及歐盟有關當局。得悉受影響的農場及加工廠已被勒令停止出口食品。根據德國有關當局驗出的二噁英含量，即使在一段較短時間內食用受影響的食品亦不會即時對健康構成影響，市民無須擔心。

為審慎起見，中心扣起有關德國食品作檢查和化驗，至今已對16個樣本進行化驗，包括雞蛋、家禽製品、豬肉及豬肉腸，結果全部合格。中心會繼續與有關當局保持聯絡，並密切留意事態發展。

二噁英是一組持久性環境污染物，經食物鏈自然積聚在動物體內，特別是脂肪中。如欲減少從食物中攝入二噁英，消費者應保持均衡飲食，並減少攝入脂肪，例如除去肉類的脂肪和採用烤、焗等烹調方法。

Dioxins Contamination Incident in Germany

On 5 January 2011, the Centre for Food Safety (CFS) immediately contacted the German and European authorities following reports that some German farms might have been contaminated with dioxins. The CFS learned that food exports from the affected farms and processing plants had been suspended. Based on the levels of dioxins detected by the German authorities, it is reassuring that even if the affected products are consumed over a relatively short period of time it does not have any immediate health concern.

As a precautionary measure, the CFS held the concerned food products from Germany for examination and testing. So far, results of 16 samples including eggs, poultry products, pork and pork sausages have been satisfactory. The CFS will continue to liaise with the relevant authorities and monitor the situation closely.

Dioxins are a group of persistent environmental pollutants which can naturally accumulate in animals particularly in fat via the food chain. Consumers may reduce dietary intake of dioxins by maintaining a balanced diet and reducing fat intake by trimming fat from meat and using cooking methods such as broiling and baking.

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

風險傳達工作一覽（二零一零年十二月） Summary of Risk Communication Work (December 2010)	數目 Number
事故/食物安全個案 Incidents / Food Safety Cases	77
公眾查詢 Public Enquiries	106
業界查詢 Trade Enquiries	333
食物投訴 Food Complaints	242
給業界的快速警報 Rapid Alerts to Trade	43
給消費者的食物警報 Food Alerts to Consumers	0
教育研討會/演講/講座/輔導 Educational Seminars / Lectures / Talks / Counselling	51
上載到食物安全中心網頁的新訊息 New Messages Put on the CFS Website	26