



Risks Associated with Eating Raw Fish and relevant Regulation in Hong Kong

Trade Consultation Forum

11 Oct 2018

Risk of Eating Raw Fish

- ▶ Intended for raw consumption : Inherent risk as there is no heat treatment
- ▶ Microbiological hazards
 - ▶ Bacteria
 - ▶ Parasites



Bacteria

- ▶ Two broad groups of bacteria may contaminate products at time of capture
 - ▶ (i) those that are normally or incidentally present in the aquatic environment, referred to as indigenous microflora

Examples: *Vibrio parahaemolyticus*, *Vibrio cholerae*, *Vibrio vulnificus*, and *Listeria monocytogenes*

- ▶ (ii) those introduced through environmental contamination by domestic and/or industrial wastes

Examples: *Salmonella* spp. and *E. coli*

Control of Pathogenic *Vibrio* species

- ▶ Guidelines on the Application of General Principles of Food Hygiene to the Control of Pathogenic *Vibrio* Species in Seafood (CAC/GL 73-2010)
- ▶ *V. parahaemolyticus*: estuarine and coastal environments in tropical to temperate zones
 - ▶ Amongst the top food poisoning agents in Hong Kong
- ▶ Control measures along the whole food chain, e.g. avoid contamination and minimise growth of *Vibrio* spp.

Parasites

- ▶ Food and Agriculture Organization of the United Nations: parasites are more likely to be present in wild caught aquatic animals and certain aquaculture fish if the fish is not fed exclusively on a diet free of parasites.
- ▶ Examples
 - ▶ Grass carp, big head carp: *Clonorchis sinensis* (Liver flukes)
 - ▶ Salmon, trout: *Dibothriocephalus latus* (previously known as *Diphyllobothrium latum*) (the fish or broad tapeworm)
 - ▶ Salmon, trout, herring, cod: *Anisakis simplex* (one of the roundworms)
- ▶ Parasitic risk can be controlled and reduced by aquaculture practice or freezing treatment.



Control at source

- The life cycles are quite different depending on the types of parasites
 - E.g.: the flukes need to go through some developmental stages in the snail before reaching the food vehicles that are consumed by humans
- Good parasite control programme, e.g. parasite-free fish feed and controlled aquaculture environments

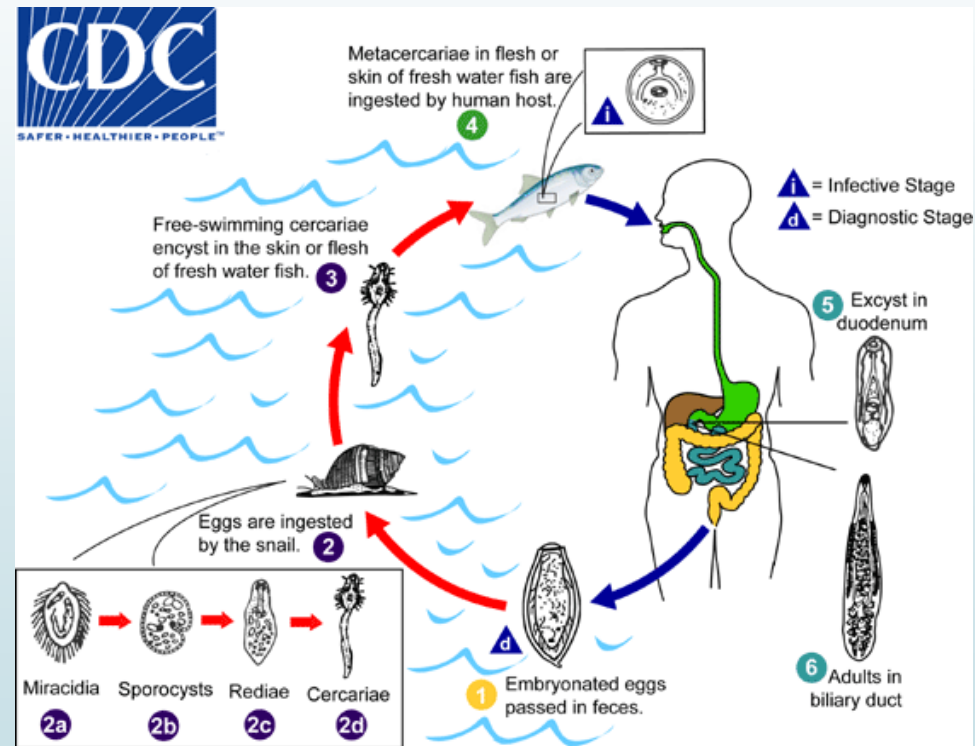


Image from US CDC: Clonorchiasis

<https://www.cdc.gov/dpdx/clonorchiasis/index.html>

Control measures applied at a later stage of the food chain

- ▶ Environment of wild fish cannot be controlled, measures have to be taken at a later stage
- ▶ Freezing treatment: Parasites commonly found in raw seafood for sushi and sashimi can generally be killed by freezing (-20°C for 24 hours) of the fish core.
 - ▶ Longer time or lower temperature is required for killing flukes
- ▶ Traditional marinating and cold smoking methods are not sufficient to kill fishery parasites!

Local Requirements (I)

- ▶ Public Health and Municipal Services Ordinance Cap 132
 - ▶ All food intended for human consumption for sale in Hong Kong, whether imported or locally produced, must be fit for human consumption.
- ▶ According to the Food Business Regulation (Cap 132X) schedule 1, “Chinese dishes – Yu Sang” has been prohibited for sale in Hong Kong.

Local Requirements (II)

- Obtain relevant licence/permit from FEHD for manufacturing and/or sale of sushi and sashimi.



- Obtain fishery products from reliable sources with **health certificates issued by relevant authority** of the exporting countries.

IV. Sanitary Attestation / Declaración Sanitaria

The undersigned official inspector hereby certifies that the fishery or aquaculture products described in point I are fit for human consumption and;

El inspector oficial abajo firmante, certifica que los productos de la pesca y/o acuicultura identificados en el punto I son aptos para consumo humano y;

1. The establishment described in point II is approved by SERNAPESCA, and is under official control.
El establecimiento mencionado en el punto II, está aprobado por SERNAPESCA y se encuentra bajo el control oficial.
2. The products fulfil organoleptic, parasitological, chemical and microbiological requirements established by:
Los productos cumplen satisfactoriamente los estándares organolépticos, parasitológicos, químicos y microbiológicos establecidos por:
 - 2.1 The National Fisheries and Aquaculture Service of Chile, SERNAPESCA or,
El Servicio Nacional de Pesca y Acuicultura de Chile, SERNAPESCA o,
 - 2.2 Provisions of agreements between the National Fisheries Service and the Competent Authority of the country of destination.
Los acuerdos adquiridos entre Sernapesca y la Autoridad Competente del país destino.
3. The fishery or aquaculture products do not come from toxic species, and in case of marine biotoxins susceptible species, these products fulfil international requirements recommended by Codex Alimentarius.
Los productos de la pesca o acuicultura no provienen de especies tóxicas y en el caso de especies susceptibles a biotoxinas marinas, los requerimientos de certificación se basan en estándares internacionales recomendados por el Codex Alimentarius.

V. Remarks ⁽²⁾ / Observaciones ⁽²⁾.

The aquatic products have been handled, prepared or processed, identified, stored and transported under a competent sanitary programme consistently implemented and in accordance with the requirements laid down in Codex Code of Practice for Fish and Fishery Products.

Rainbow Trout

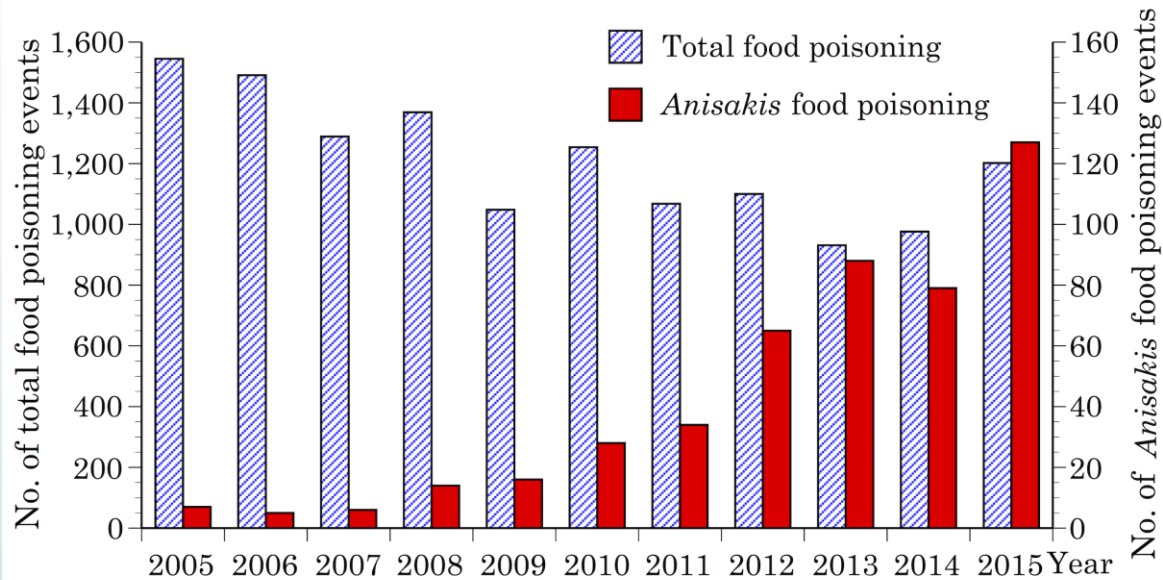
- Rainbow trout generally refers to the fish with scientific name *Oncorhynchus mykiss*. Similar to other raw fish intended for raw consumption, there is inherent risk.
 - Parasitic risk can be controlled and reduced by aquaculture practice or freezing treatment.
- Avoid raw or undercooked fish, especially high risk populations!

Summary

- ▶ There is inherent microbiological risk (bacteria & parasites) of eating raw fish and cooking the food thoroughly is the effective means to address the risk.
- ▶ Source of bacteria: indigenous microflora & environmental contamination
 - ▶ Control measures: avoid contamination and minimise growth along the food chain
- ▶ Parasitic risk can be controlled and reduced by aquaculture practice or freezing treatment.

Lower risk to eat raw fish overseas ?

Figure. Reported number of total food poisoning events and *Anisakis* food poisoning events



(Statistics of Food Poisoning in Japan, Ministry of Health, Labour and Welfare)

IASR
Infectious Agents Surveillance Report

Foodborne helminthiases in Japan
(IASR Vol. 38 p69-70: April, 2017)

URL: <https://www.niid.go.jp/niid/en/iasr-vol33-e/865-iasr/7225-446te.html>

15

THANK YOU

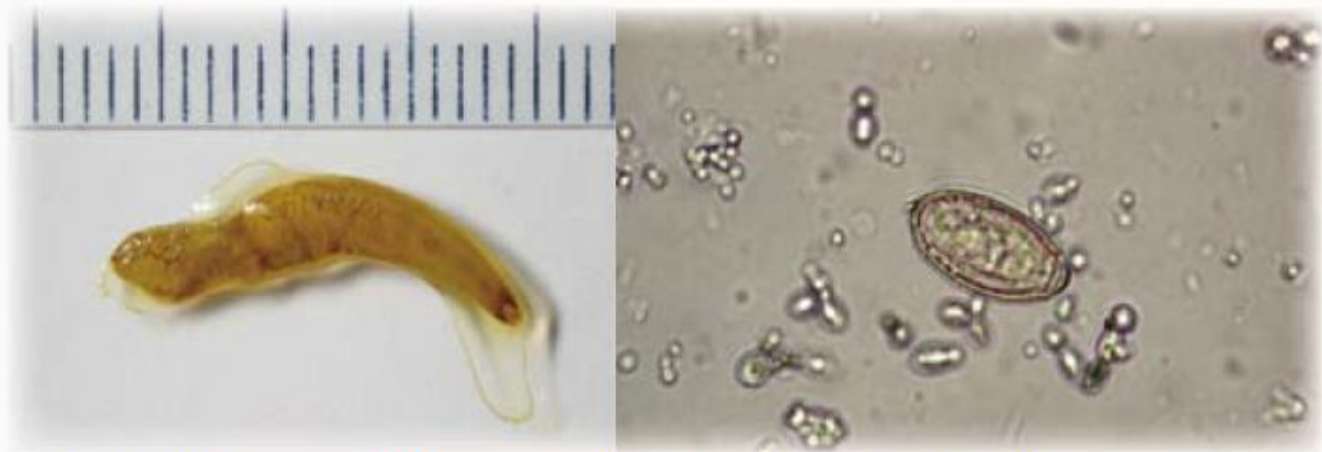


食物環境衛生署
Food and Environmental
Hygiene Department



食物安全中心
Centre for Food Safety

Grass carp, big head carp *Clonorchis sinensis* (Liver flukes)



中華肝吸蟲:(左)成蟲及(右)蟲卵(照片來源:香港大學微生物學系黃世賢醫生)

Clonorchis sinensis: (left) adult and (right) egg (Photo: Dr. Samson S.Y. Wong, Department of Microbiology, University of Hong Kong)

Salmon, trout: *Dibothriocephalus latus* (previously known as *Diphyllobothrium latum*) (the fish or broad tapeworm)



Wood print depicting a man passing a strobila of a broad tapeworm. The caption (not shown) said, “**The man ate masu salmon. After a time, a strange object emerged from the anus and was pulled out: it turned out to be 2–3 m long.**”

From Shinsen Yamaino Soushi, by Daizenosuke Koan (1850). Courtesy of the Tohoku University Medical Library.



Figure A: Section of an adult *D. latus* containing many proglottids. The scolex was not present in this specimen. Image courtesy of the Florida State Public Health Laboratory.

Image from US CDC, available from [URL:https://www.cdc.gov/dpdx/diphyllobothriasis/index.html](https://www.cdc.gov/dpdx/diphyllobothriasis/index.html)

Arizono, Naoki et al. “Diphyllobothriasis Associated with Eating Raw Pacific Salmon.” *Emerging Infectious Diseases* 15.6 (2009): 866–870. PMC. Web. 8 Oct. 2018.

Salmon, trout, herring, cod *Anisakis simplex* (roundworm)



Figure 5.10 *Anisakis simplex* (left) and *Pseudoterranova dicipiens* (right) both in cod (photos courtesy of Dr. Stig Møllergaard).

FAO FISHERIES TECHNICAL PAPER 444
Assessment and Management of Seafood Safety and Quality
<http://www.fao.org/docrep/006/y4743e/y4743e0c.htm>