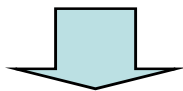


Bio-accumulation or bio-concentration of radionuclides through food chain

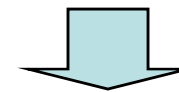
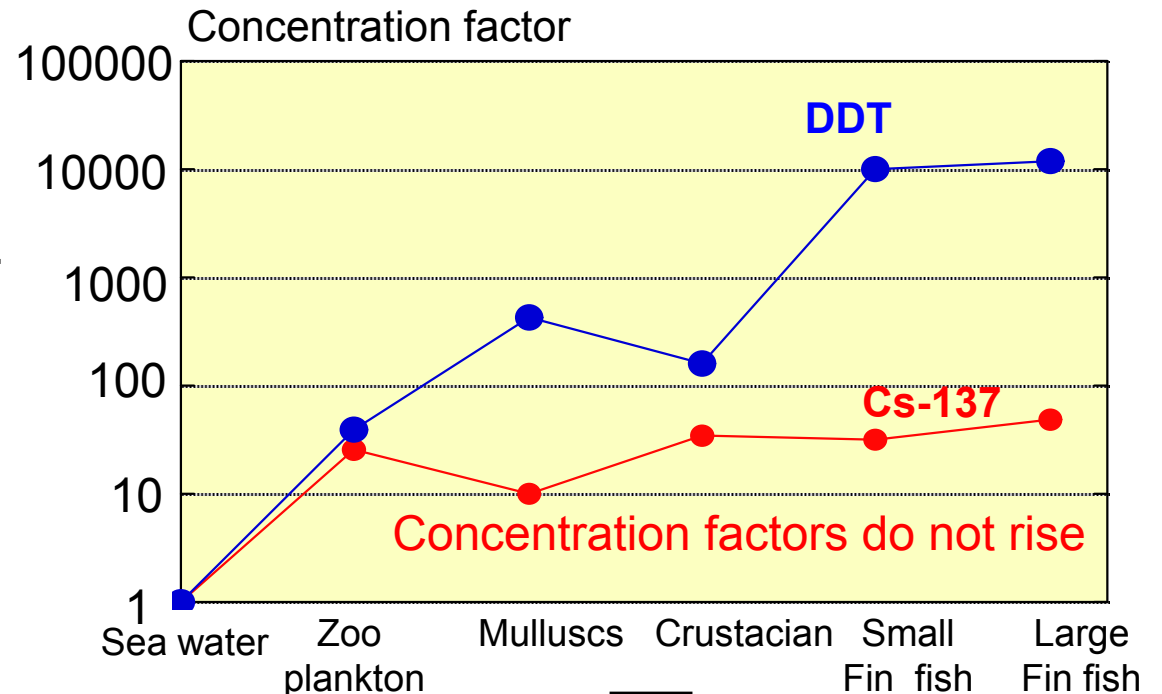
$$\text{Concentration factor} = \frac{\text{Concentration in fish body}}{\text{Concentration in sea water}}$$

Materials	Concentration Factor of marine fish
Cs	5 ~ 100
I	10
U	10
Pt	3.5
Hg	360 ~ 600
DDT	12000
PCB	1200 ~ 1000000



▪ Very low Concentration Factors

Reference:
 Fujio Kasamatsu
 bio-concentration Edit. N. Yamagata,
 Radioisotopes 48, 1999.



▪ Bio-accumulation or bio-concentration of radionuclides through food chain is not increasing.



Why are not accumulated ?

Iodine and Cesium

• Iodinesolid/gaseous (sublimation nucleotide)

I-131 (Half life time: 8.04 days)

• Cs.....solid , behaves like potassium :

does not accumulate to specific organs

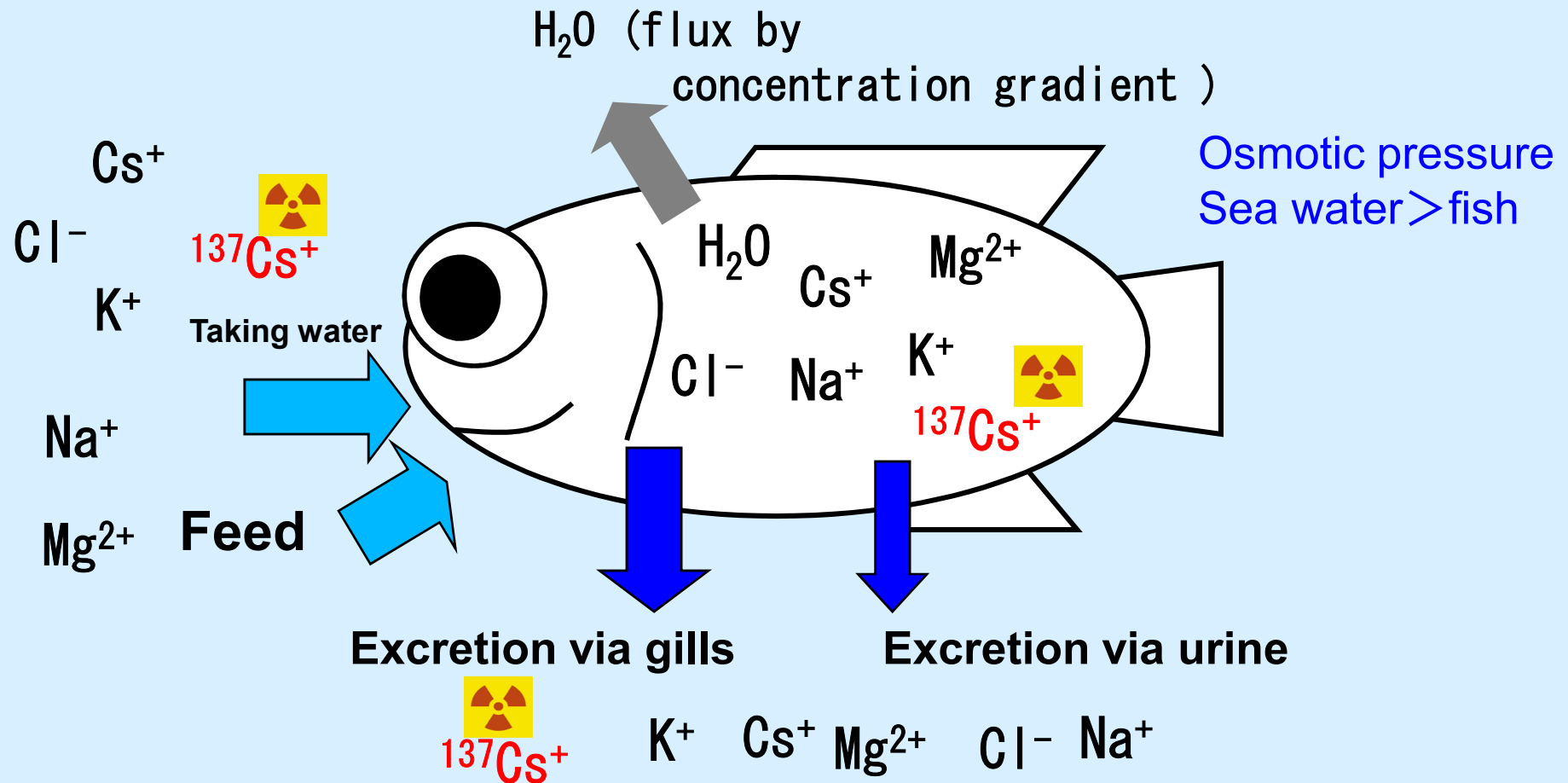
Cs-137 (Half life time :30.1years),

Cs-134 (Half life time: 2.07years)

Periodic table

	1A	2A	3A	4A	5A	6A	7A	8	1B	2B	3B	4B	5B	6B	7B	0		
1	H															He		
2	Li	Be									B	C	N	O	F	Ne		
3	Na	Mg									Al	Si	P	S	Cl	Ar		
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
6	Cs	Ba	*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
7	Fr	Ra	**															
*	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu			2
**	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr			

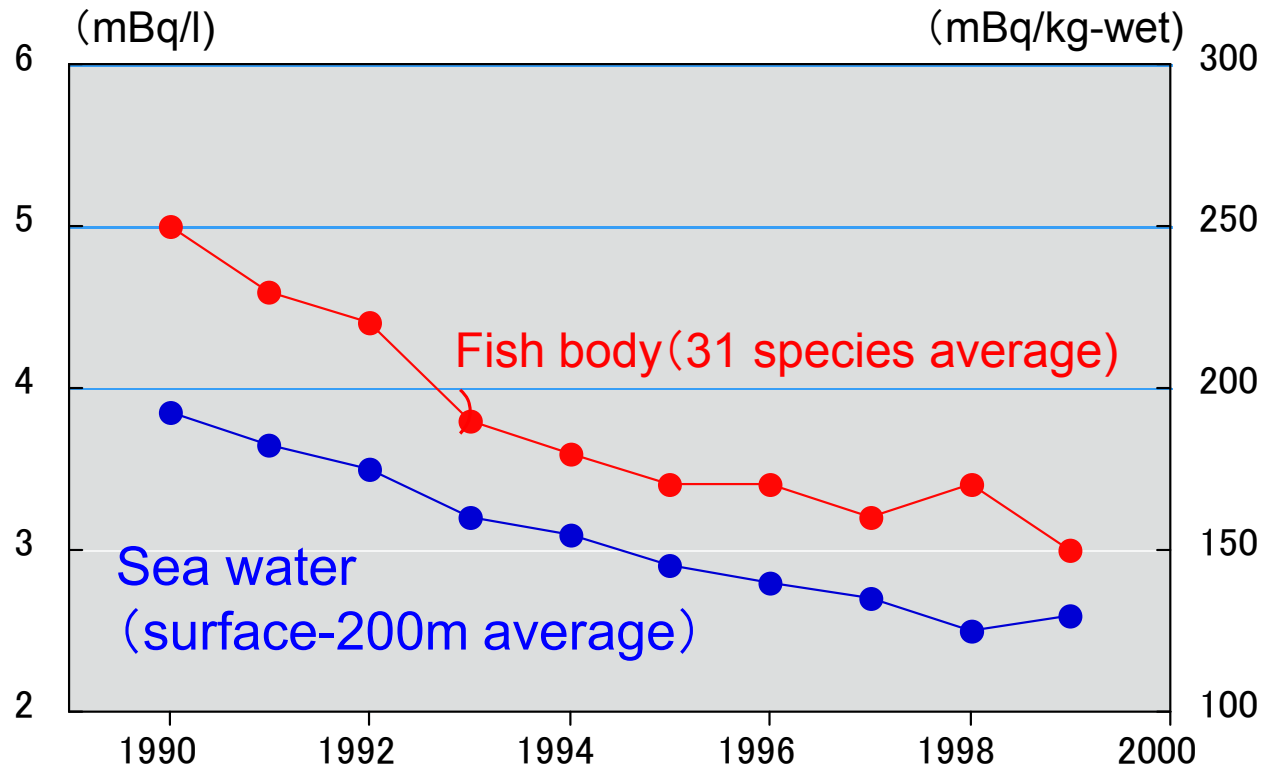
The flow of salts in marine fish body



- Radionucleotides excrete, not accumulate.
- The concentration in fish is depend on the concentration of environmental water .

(Ref: Fundamental physiology of fish
 Edit. K. Aida)

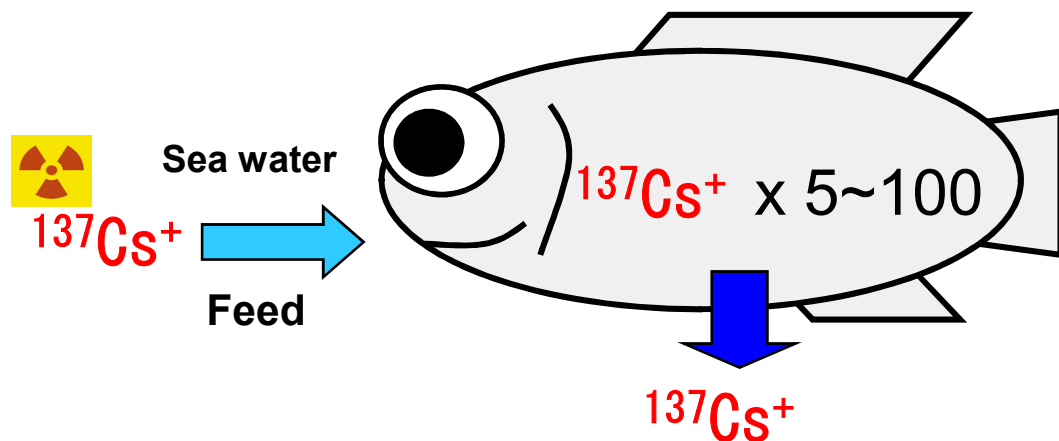
Comparison of Cs-137 concentration between sea water and fish body



Cs-137 concentration annual changes in Japan coast

- Fish body concentration depends on sea water concentration

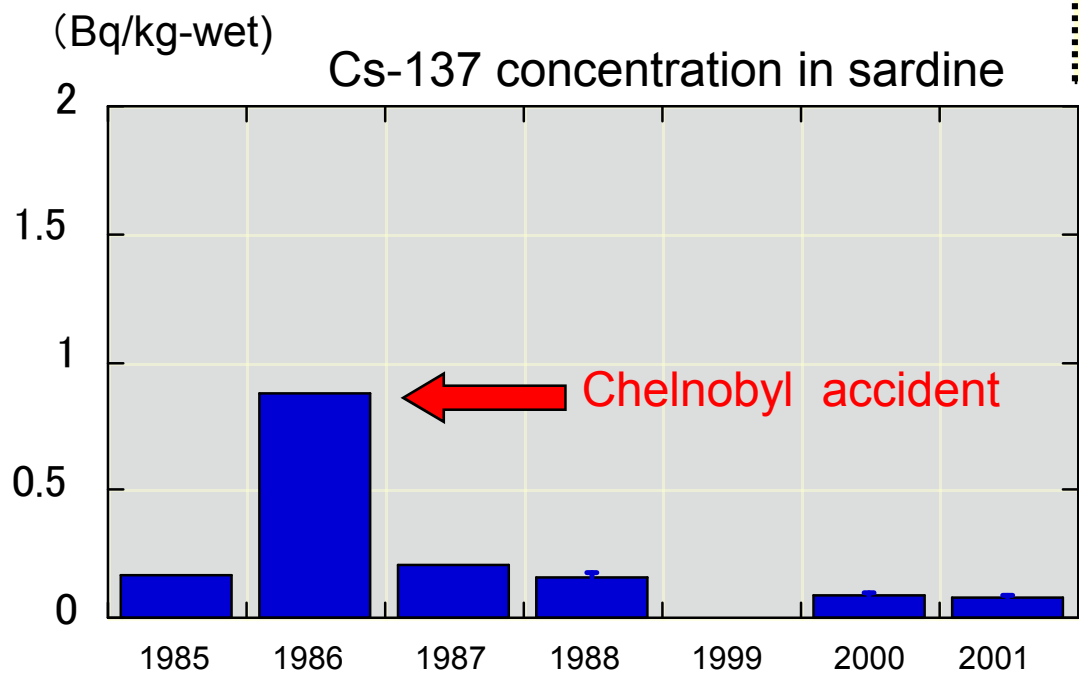
Excretion of radio nucleotides



Biological half time of
Cs-137 = **50 days**

↓

The half of Cs-137 is excrete
in 50days. (Laboratory work
result)



• In natural condition
Cs-137 excretes
quickly.

Ref:
K. Yoshida , JCAC 34, 1999.
F. Kasamatsu, Radioisotopes 48,
1999.