



Increased health risks of swimming and bathing in natural waters ?

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Quality of water – emerging and new emerging pathogens?



Excretion and bacterial contamination

	feces (g per day)	<i>E. coli</i>	<i>Enterococci</i>
cattle	29500		
humans	150	13×10^6	3×10^6
waterfowls	336	33×10^6	54×10^6

Canadian geese:

- Clostridium
- Salmonella
- *E. coli*
- Virus
- Cryptosporidium

Uptake of water:

Swimmer: 50 -100 ml

Non-swimmer: 30 ml

Water associated pathogenic agents

Norovirus

Clinical symptoms

- Sudden onset of severe vomiting and diarrhea
- Stomach pain and cramps
- Watery and loose diarrhea

infection

Highly contagious and commonly spread through food and water

duration

- Begin after 12 to 48 h after exposure
- Last to three days

shedding

can last weeks to months

Water associated pathological agents

Pathogenic *E. coli*: EPEC, ETEC, EIEC, Ecaag, UPEC, EHEC

Enterohaemorrhagic *E. coli*

Toxin

Shiga toxin 1/2

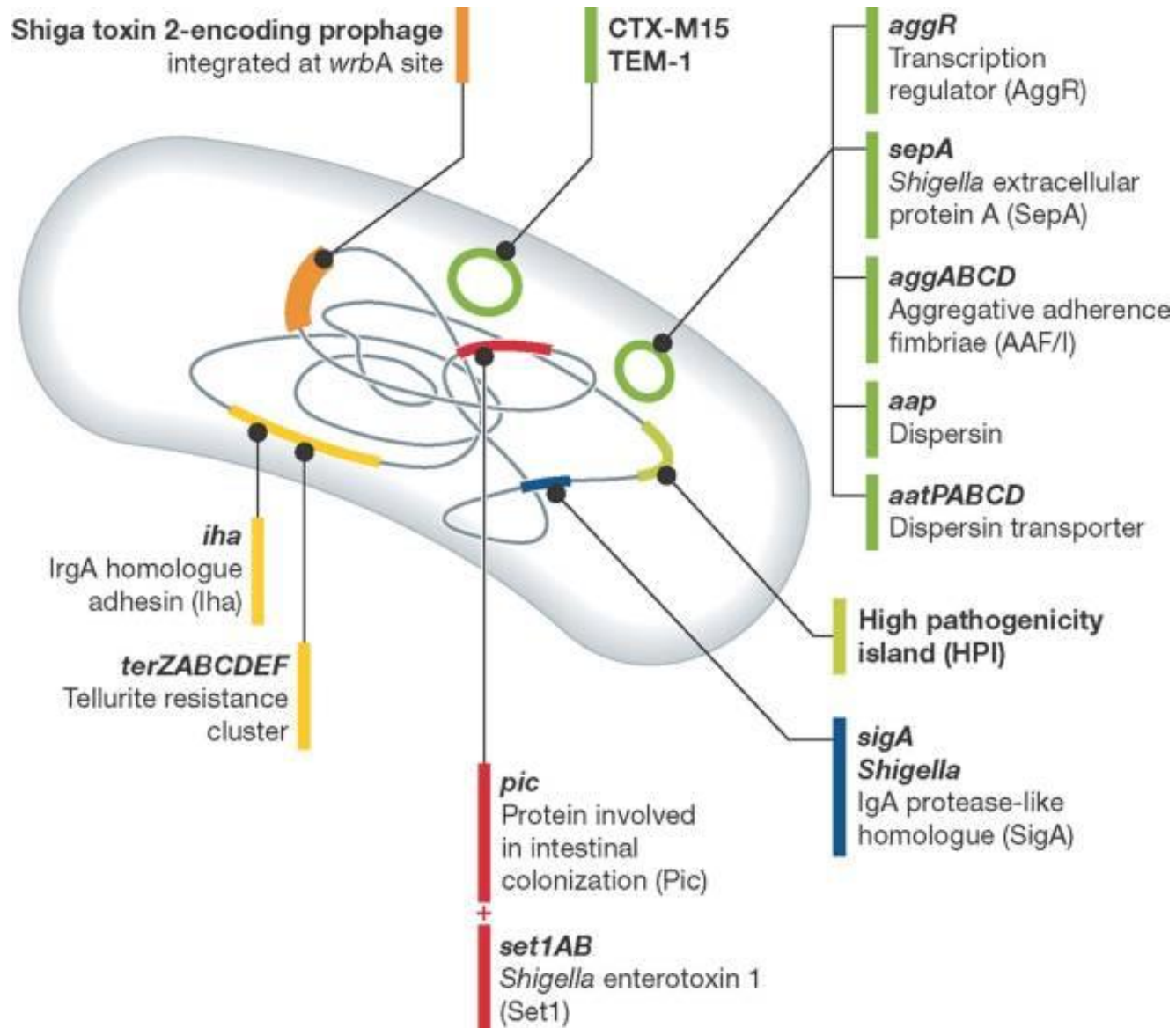
Clinical symptoms

- **Uncomplicated diarrhoea**
- **Severe haemorrhagic colitis**
- **Hemolytic uremic syndrome**

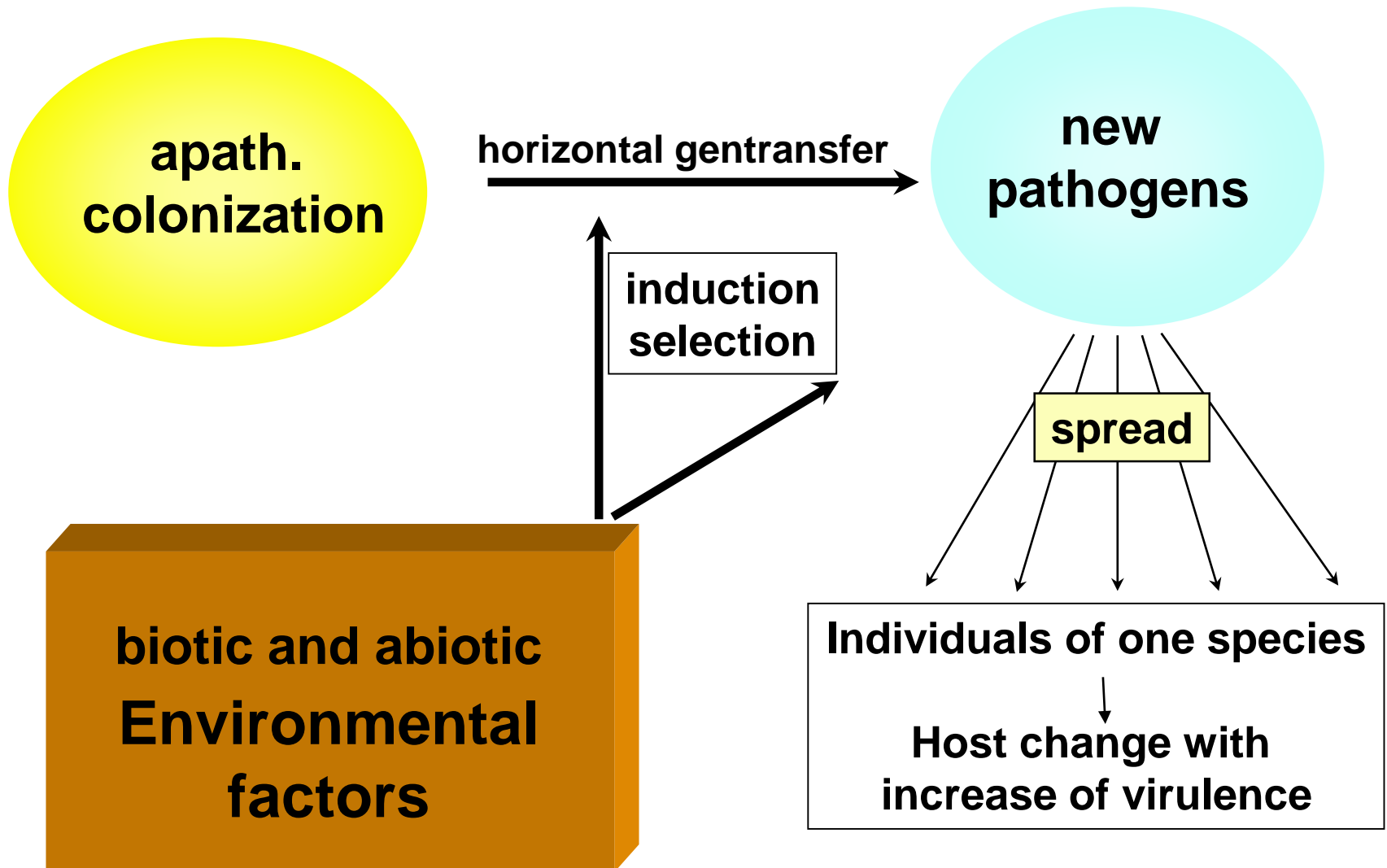
HUS

Apoptosis, autophagy

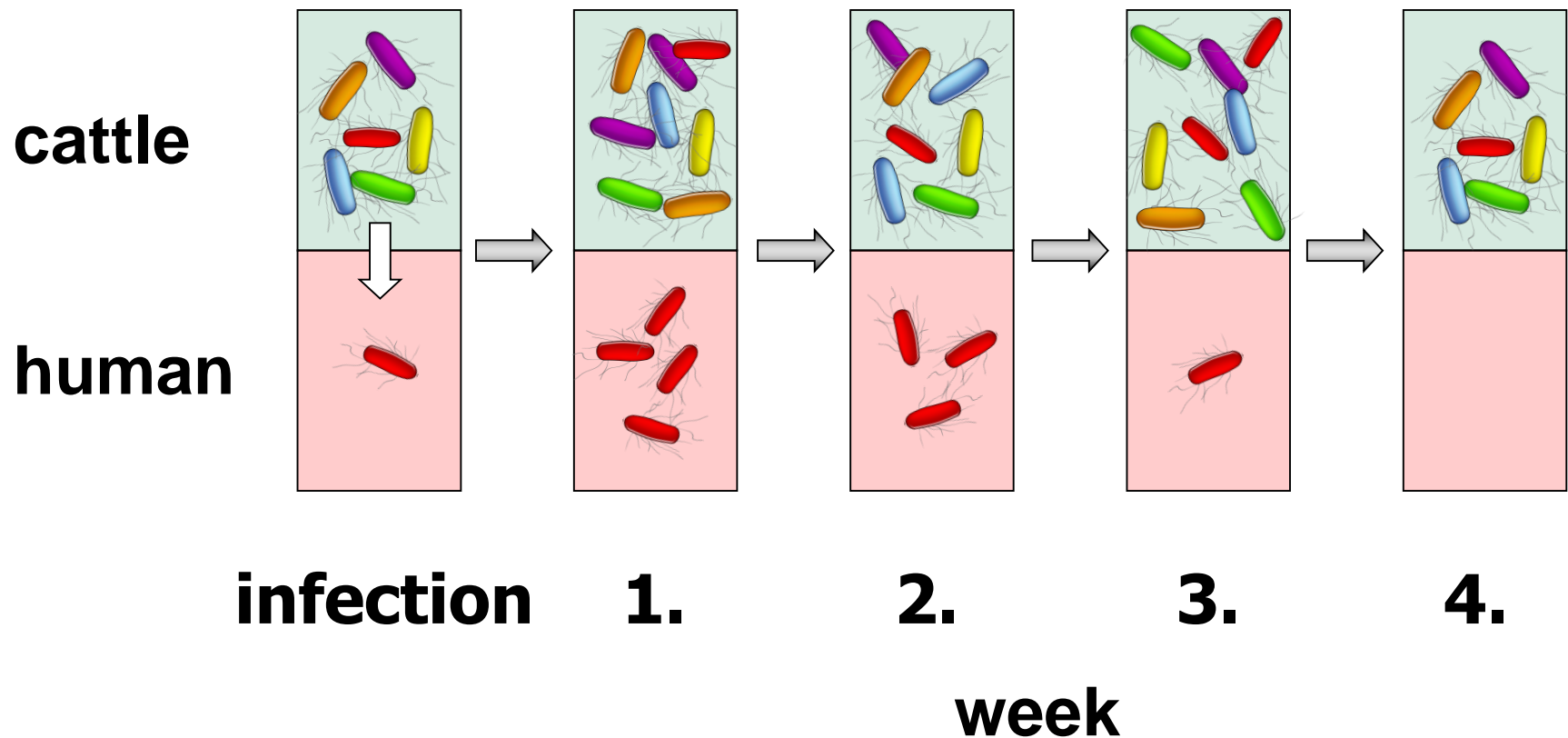
Virulence factors in outbreak strain EHEC O104:H4



Development and spread of pathogens



Residence time and excretion of EHEC in animals and humans



Health risk management

Improved health risk management

Management of entry gaps for contamination

Waste water management

- **Management of waste water of sewage treatment plants**
- **Management of waste water of hospitals**
- **Management of waste water of farmings**

Development of monitoring and cleaning techniques (central, on-site)

On-site inspection and assessment (online monitoring)



Thank you

