



INTERREG  
DEUTSCHLAND-NEDERLAND  
MEDUWA VECHT(E)

INTERREG  
Deutschland  
Niederland



# Increased health risks of swimming and bathing in natural waters ?

# 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 x 10 <sup>6</sup>	3 x 10 <sup>6</sup>
waterfowls	336	33 x 10 <sup>6</sup>	54 x 10 <sup>6</sup>

## 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**

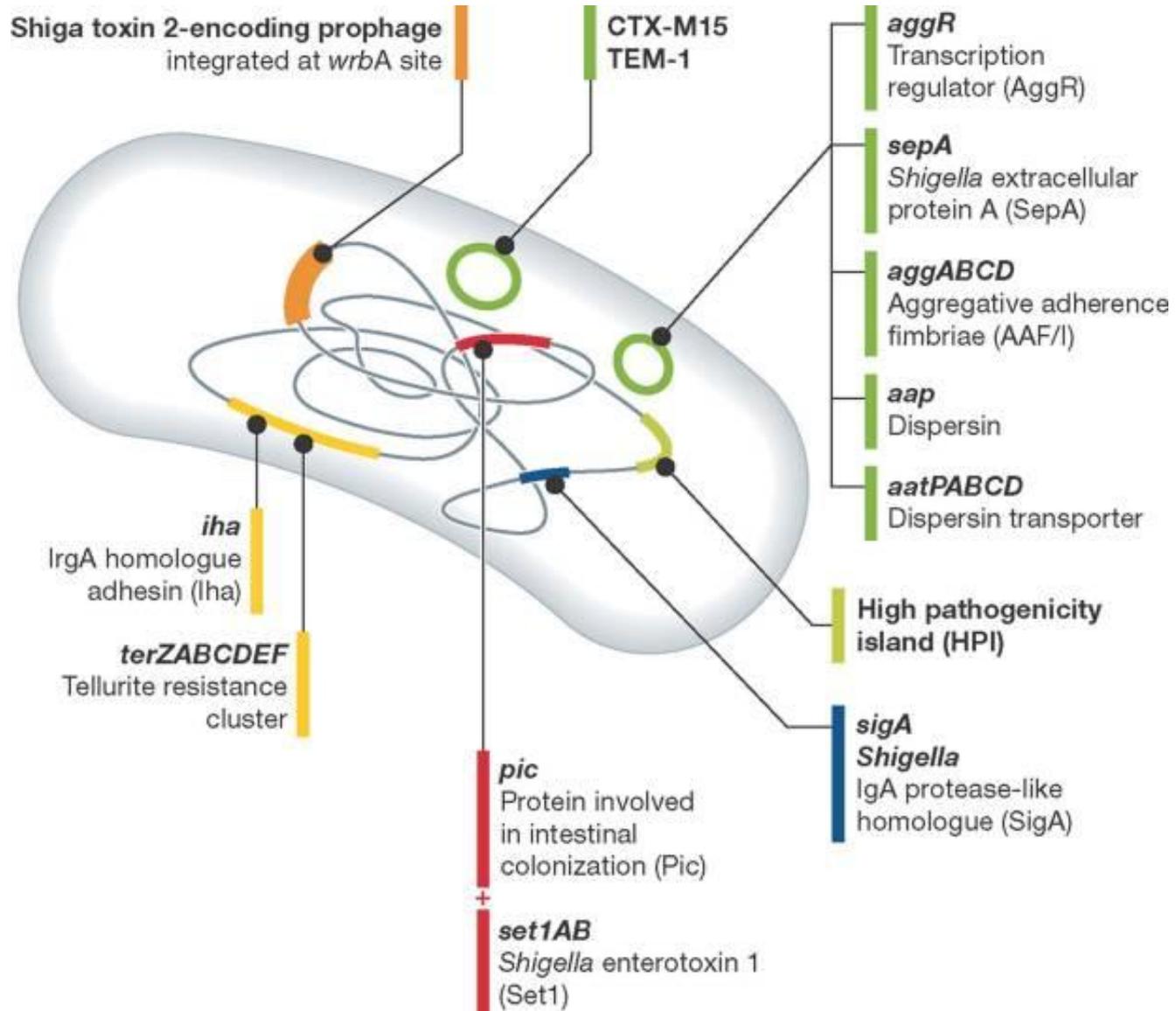
**Clinical symptoms**

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

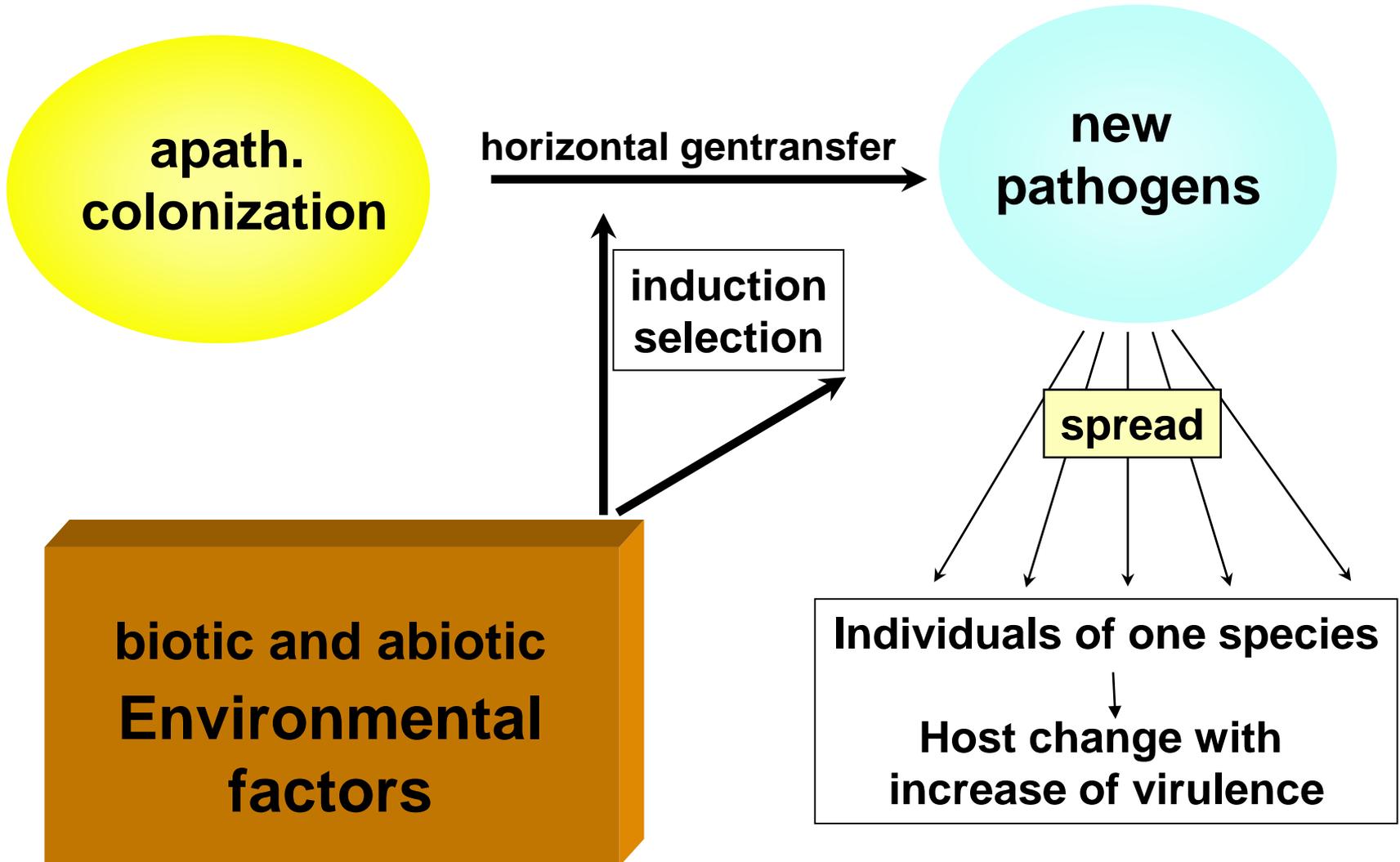
**HUS**

**Apoptosis, autophagy**

# Virulence factors in outbreak strain EHEC O104:H4

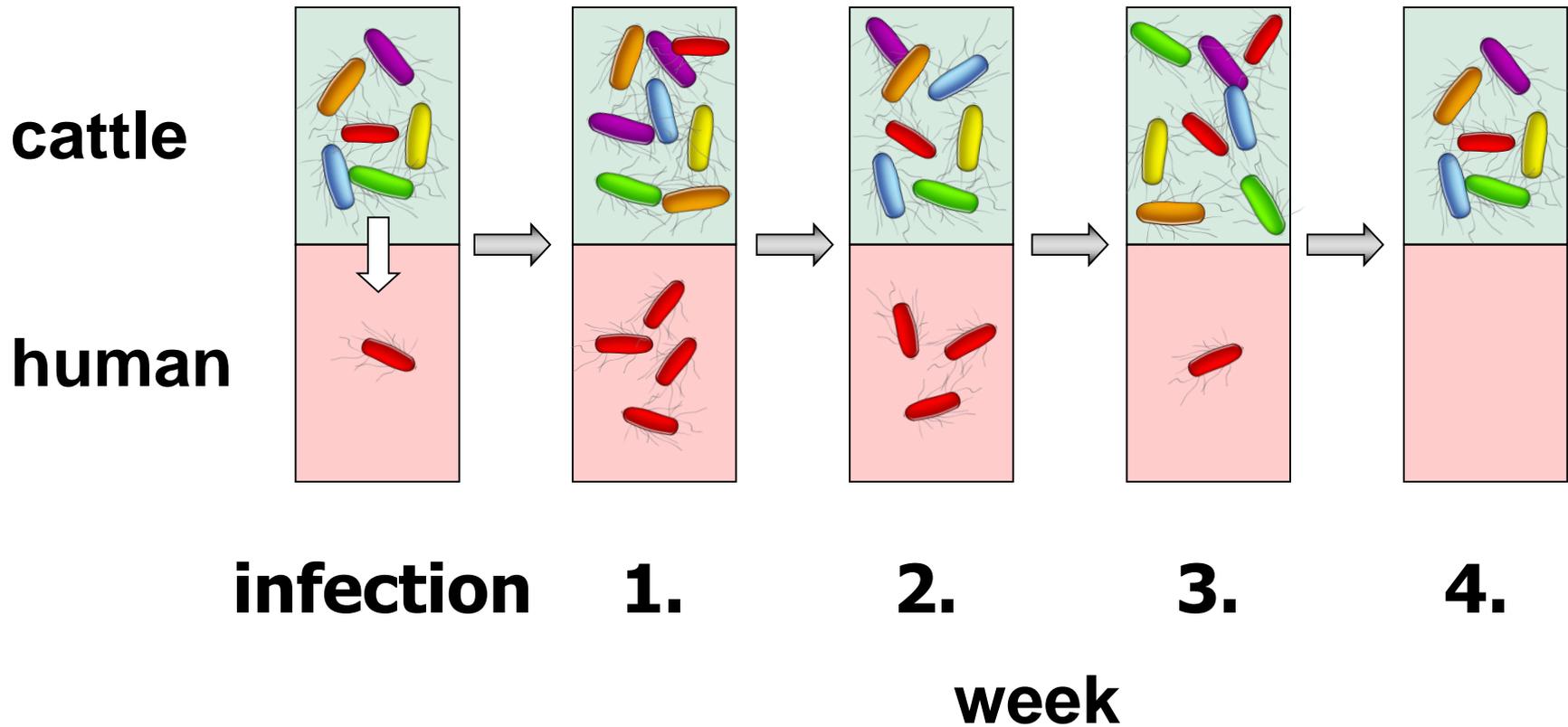


# Development and spread of pathogens



# Residence time and excretion of EHEC in animals and humans

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# Health risk management

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**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**

