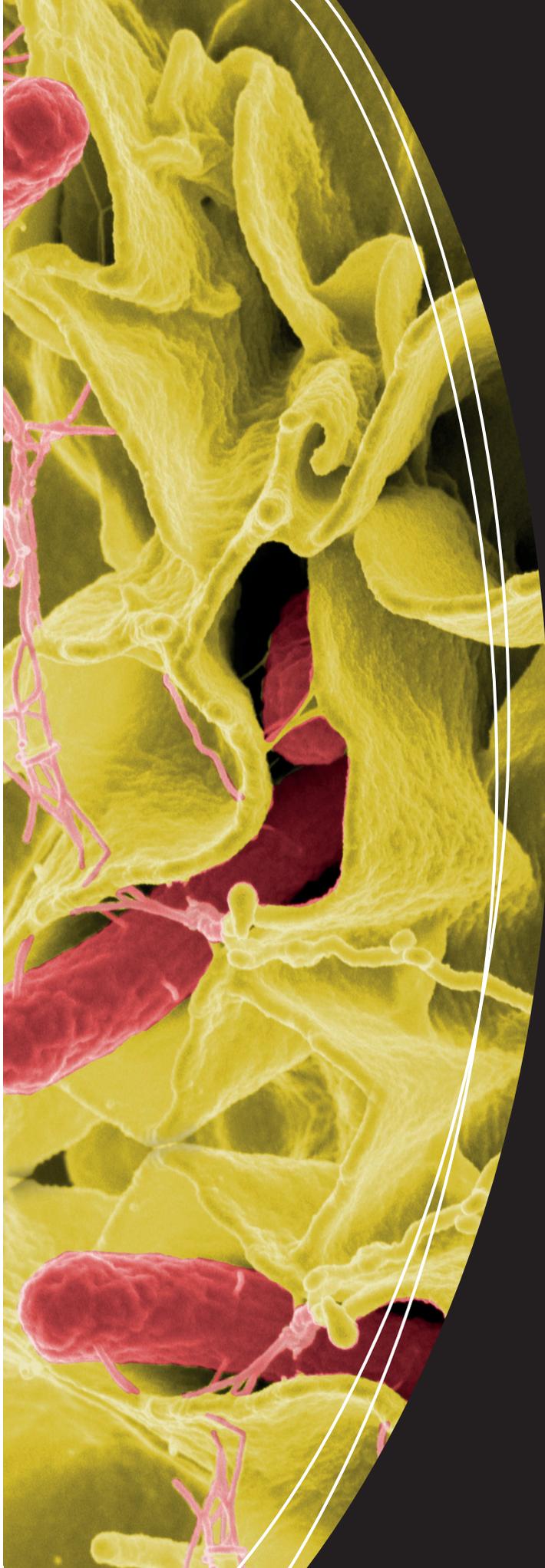


**ZOOM**  
in on...

# BODY INVADERS







ZOOM  
in'on...

# BODY INVADERS



Richard Spilsbury



WAYLAND



First published in 2012 by Wayland  
Copyright Wayland 2012

Wayland  
Hachette Children's Books  
338 Euston Road  
London NW1 3BH

Wayland Australia  
Level 17/207 Kent Street,  
Sydney, NSW 2000

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Commissioning editor: Victoria Brooker  
Project editor: Alice Harman  
Designer: Paul Cherrill for Basement68  
Picture research: Richard Spilsbury  
and Alice Harman  
Proofreader and indexer: Alice Harman

Produced for Wayland by  
White-Thomson Publishing Ltd

[www.wtpub.co.uk](http://www.wtpub.co.uk)

+44 (0)843 2087 460

British Library Cataloguing in Publication Data

Spilsbury, Richard, 1963-  
Zoom in on body invaders.  
I. Parasites--Juvenile literature.  
I. Title II. Body invaders  
578.6'5-dc23

ISBN-13: 9780750267298

#### Picture credits

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Printed in China

Wayland is a division of Hachette Children's Books  
an Hachette UK company  
[www.hachette.co.uk](http://www.hachette.co.uk)

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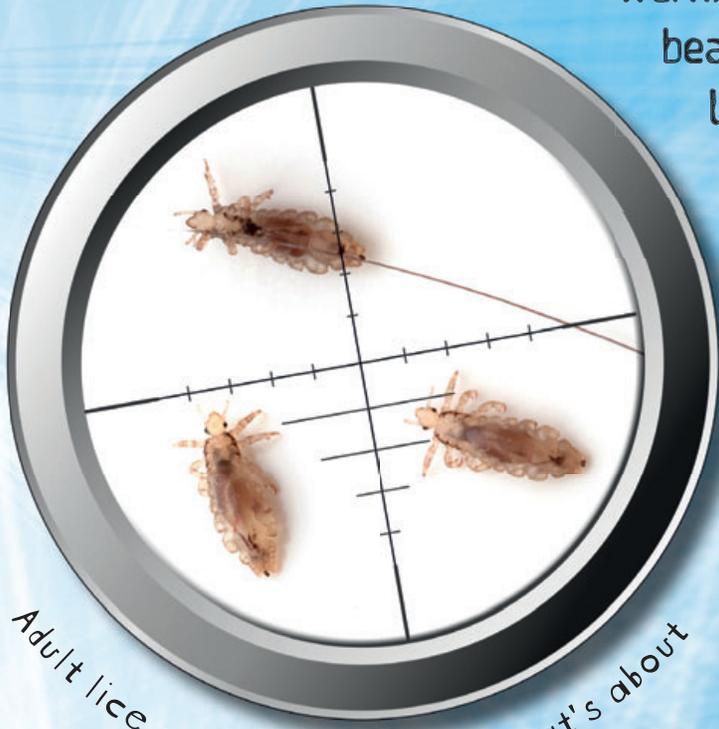


# Lice on the loose

Warning! It will be hard to read about this beast without scratching your head! Head lice are tiny, wingless insects that live on human hair. They feed on blood several times a day.

## Itchy invaders

Itching is often the first sign of head lice. These creepy crawlers only suck tiny amounts of blood but they also inject some of their saliva, which is what makes people itch. Lice are hard to spot because, although they cannot hop or fly, they crawl quickly. Head lice need human blood to survive. Once removed from a head, they starve in one or two days.



Adult lice are 1-3 mm long - that's about the size of a sesame seed!

## Know your foe

Head lice love all hair - long, short, dirty or clean! They crawl from person to person when heads touch. To get rid of head lice, use a special lotion and comb from the chemist.

## Look out for lice

Close-up, the first thing you notice about a head louse is its huge claws! These help it cling onto human hair and crawl about to feed and to lay eggs. Female head lice lay eggs, or nits, that are smaller than a pinhead. They glue the eggs to the base of a hair. The temperature here is just right for keeping eggs warm until they hatch. The eggs hatch after seven to ten days. After another ten days, these young lice become adults and they start laying eggs too!

Head lice have a large, hook-like claw on each of their six legs.

This head louse is

**80  
TIMES**

its actual size

**Fearsome  
fact**

Head lice live for about 30 days on a head if left untreated.

# Hop aboard the Flea Express

A few centuries ago, almost everyone was covered in little red itchy bumps from human flea bites. Today the human flea mostly lives on pigs and some other animals, but it still likes the taste of human blood when it can get it!

## Filling up fleas

Human fleas have a small head and a large abdomen, or stomach. This gets bigger to hold more blood when the flea feeds! This flea is a nuisance because the saliva in its bite makes people itch, and it can also pass on diseases from other animals.



A flea's long and springy back legs help it leap aboard its victims!

## Champion jumper

A human flea can leap 30 cm – that's 200 times its own height! If you could do that, you could jump over the Eiffel Tower in Paris, France!

## Fearsome fact

A flea has backward-pointing hairs all over its body, which help it to cling to a victim's skin.

Flea bites are itchy, but it's important not to scratch them as they can get infected.



Human fleas like this are found all over the world!

eye

This human flea is

**430  
TIMES**

its actual size

palp

mouthparts

## Fearsome flea!

When you zoom in on a flea's head, it looks pretty fearsome! The flea's pointed head and flat body help it to move quickly through human body hair. Its eyes are quite large so it can see at day and night. It has sticking-out parts called palps around its mouth, which are used for feeling and tasting. They test whether something they touch is food or not. Between the palps, you can see the mouthparts that pierce human skin and greedily suck blood.

# Gut-squatting worms

Without knowing it, people in some parts of the world carry around tapeworms deep inside their bodies. These long, flat worms are parasites that live in human intestines.

## A worm's life

Tapeworms absorb nutrients from the soup of digesting food that constantly washes over them in the intestines. People may know they have tapeworms because they are losing weight – that's because the worms are taking the nutrients from their food!

Tapeworms' bodies are like thin, tapering ribbons of tagliatelle divided into segments. Segments at the end of their body contain eggs. These segments break off and are released in faeces (poo) to spread the eggs.



People take medicines to kill tapeworms inside them, which then come out in their faeces. The longest ever passed was around 10 m (30 ft) long!

## Know your foe

People may get a tapeworm by accidentally eating its eggs. These can get onto fingers and under fingernails from soil, clothing or on animal's fur. Wash your hands before eating!



hook

sucker

## Holding on

Tapeworms need to stay put in the intestine so they can feed. They do this by pushing their head into the intestine wall. Suckers and sharp hooks coming out of the head help them to hold on, and escape being washed out by the digesting food.

This tapeworm is

**40  
TIMES**

its actual size

Fearsome  
fact

There are around 6000 species of tapeworm. More than 50 different types of tapeworm live in humans!

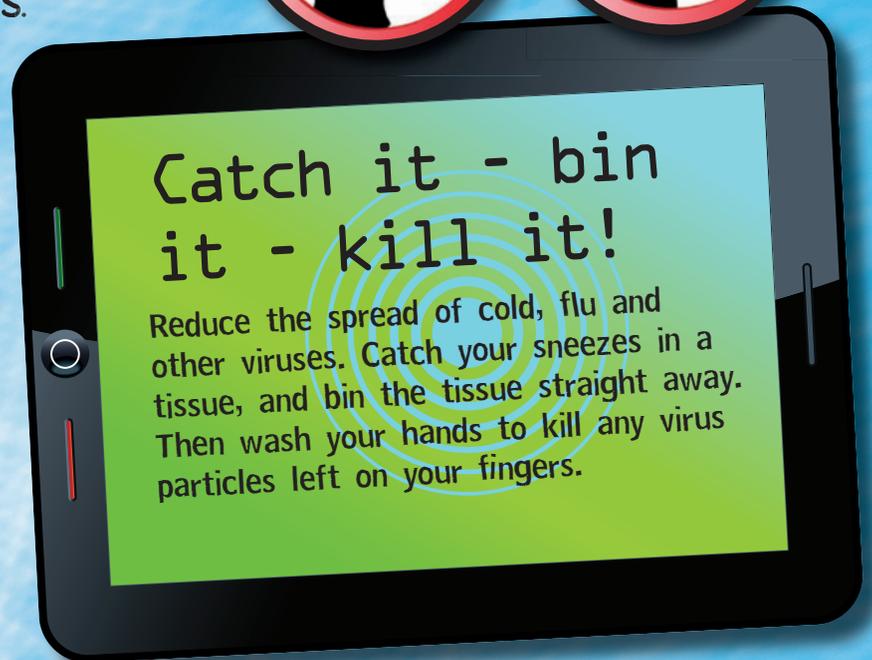
# Viruses hitch a ride

**Viruses** are even smaller than bacteria. In fact, they are the smallest micro-organisms that can invade a body. Viruses give people diseases like colds, flu and measles.



## Viruses on the move

Viruses can move quickly from person to person. People breathe them in from the air, for example after someone who has flu sneezes. People accidentally pick up virus particles on their fingers when they touch a surface, such as a door knob, that has been contaminated by someone who has flu. The virus gets inside the body when the person touches their nose, eyes or mouth.

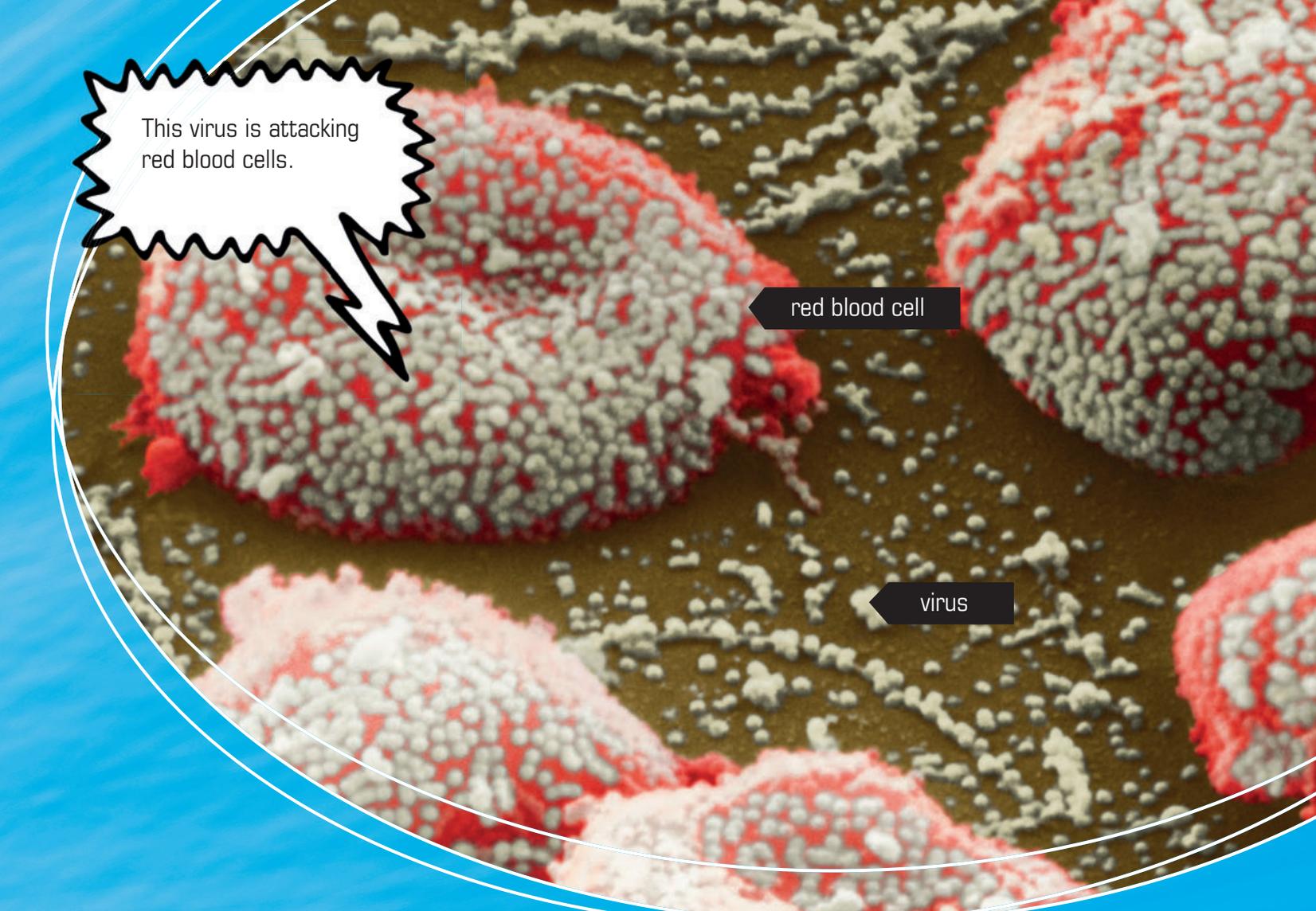


Fearsome fact

A sneeze can carry around 200 million viruses!



A single sneeze can fill the air in a room with cold or flu viruses.



This virus is attacking red blood cells.

red blood cell

virus

## Virus villains

When viruses get inside a body, they start to attack healthy cells. Flu virus cells have a covering of minuscule spikes that help them cling to individual cells. Viruses cannot reproduce by themselves like bacteria.

They have to move inside the cell, and use the cell to make more viruses. The viruses eventually kill the cell they have been using. The new viruses leave and attach to other, healthy cells, and infect them too.

### Know your foe

Many bacterial infections can be treated with **antibiotics**, but these are useless against viruses. You can be vaccinated against some disease-causing viruses, like flu. You just have to wait to recover from others, such as the cold virus.