# UNIT 9
# New Deadly Septic Shock Treatment Could Save Millions


敗血症という病気を聞いたことがありますか？　敗血症は、血液中に細菌やウイルス、真菌が侵入することで起こります。では、日本での敗血症の死亡率はどれぐらいだと思いますか？　内容に入る前に、ペアで相談してみましょう。

## I VOCABULARY

CD 1-26

**A.** *Match each word with its definition.*

| | | | |
|---|---|---|---|
| **1.** confusion | [ ] | **2.** trigger | [ ] |
| **3.** absorb | [ ] | **4.** capture | [ ] |
| **5.** phase | [ ] | | |

選択肢

ア. to catch something
イ. to make something happen
ウ. to take in liquid, gas, or another substance
エ. one of the stages of a process
オ. a situation in which people are uncertain about what to do

**B.** *Match each medical word with its meaning.*

| | | | |
|---|---|---|---|
| **1.** sepsis | [ ] | **2.** inflammation | [ ] |
| **3.** inflammatory | [ ] | **4.** blood pressure | [ ] |
| **5.** pathogen | [ ] | **6.** cell wall | [ ] |
| **7.** fungus | [ ] | **8.** infected | [ ] |

選択肢

| | | | |
|---|---|---|---|
| ア. 菌 | イ. 炎症性の | ウ. 敗血症 | エ. 細胞壁 |
| オ. 炎症 | カ. 病原体 | キ. 感染した | ク. 血圧 |

## II COMPREHENSION

DVD CD 1-27

### Step 1 Listening Comprehension

*Watch the news and discuss the main topic with your partner.*

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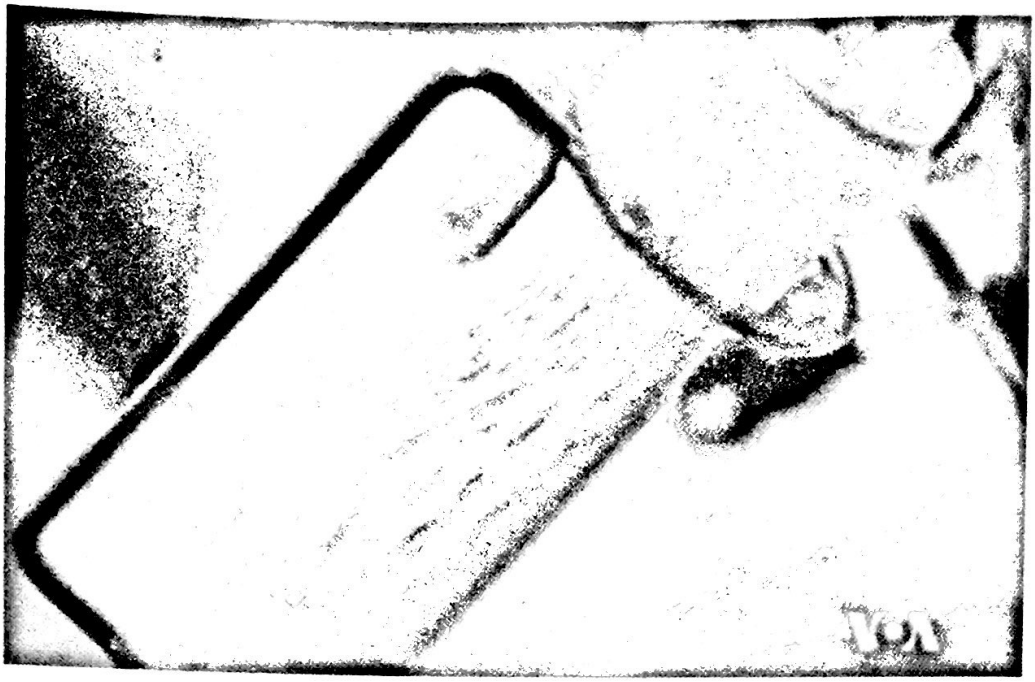
.....



Sepsis can be triggered by pneumonia, surgery, even childbirth. Symptoms include fever, increased breathing, and confusion. The body's defense system goes out of control, causing widespread inflammation, organ failure※ and septic shock※, where blood pressure drops to a dangerously low level. Scientists at Harvard University's Wyss Institute are working on a new dialysis system※ that cleans the blood of poisonous pathogens before they trigger that deadly inflammatory response※.

organ failure／臓器不全
septic shock／敗血症性ショック
dialysis system／透析装置
inflammatory response／炎症反応

*—Mike Super, senior scientist:*

"The current standard of therapy is to give antibiotics and fluids, but what we are talking about here is treatment for sepsis."


The researchers are filtering※ blood through a tube with tiny mesh fibers coated with an engineered protein called fcMBL.

filter／ろ過する

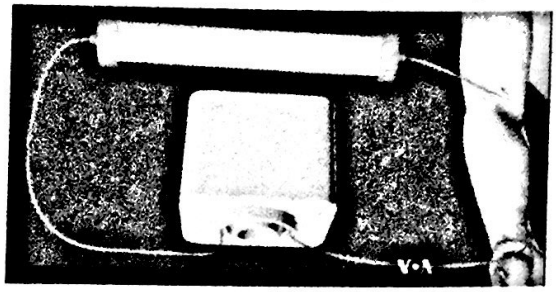
*—Mike Super, senior scientist:*

"They bind the cell wall of bacteria, of fungi, of many viruses, of many parasites and they bind the toxins as well."

Mike Super describes the procedure.

*—Mike Super, senior scientist:*

"We're coating the inside of the tubes with that protein and then we are running the infected blood from the patient through that, through the filter and binding, absorbing, capturing the pathogens that are in that blood, so that the blood that is going back to the patient after the dialysis is cleansed."



In a trial phase using rats, the dialysis treatment was more than 99 percent effective in filtering out deadly bacteria. The research team hopes to begin human trials soon, in hopes of saving many lives around the world.

*Read the passage and write T if the statement is true or F if it is false. Then, explain with evidence why you chose your answer.*

**1.** Sepsis is a serious disease that causes respiratory infections such as pneumonia.

T | F　根拠 [ ]

**2.** For patients with sepsis, their immune system becomes uncontrollable, and this can lead to serious conditions like organ failure.

T | F　根拠 [ ]

**3.** The administration of fluids and antibiotics is a basic therapy for patients with sepsis.

T | F　根拠 [ ]

**4.** Mike Super's special weapon for sepsis treatment is an engineered protein called fcMBL.

T | F　根拠 [ ]

**5.** The innovative system described in this passage is more than 99 percent effective in filtering out deadly bacteria in patients' blood.

T | F　根拠 [ ]

## Step 3 Summary

CD 1-28

*The following is a short explanation of the new technology for treating sepsis. Read the passage again and fill in the blanks.*

Sepsis is a deadly immune response triggered by infection, which can cause widespread ( [1] ), blood clotting, organ failure, and death. It can ( [2] ) from ( [3] ), surgery and even childbirth. A new device developed by Mike Super and his colleagues may radically transform the way doctors ( [4] ) sepsis. The device is able to cleanse human blood tested in the laboratory and increase survival in rats with infected blood. It can filter live and dead ( [5] ) from the blood, as well as dangerous toxins that are released from the pathogens. The researchers hope to start human ( [6] ) in the near future.

## III CRITICAL THINKING CHALLENGE

*What's your opinion about the following question?*

What is sepsis?

Collect information from the Internet and explain it.

### Step 1

*Exchange ideas with your partner.*

# Targeted Treatment May Improve Odds for Breast Cancer Patients

がんを治療するには適切な抗がん剤を選ぶ必要があります。このUnitでは乳がんの抗がん剤治療を扱います。内容に入る前に、日本で乳がんの患者数はどれぐらいでしょうか？　ペアで考えてみましょう。

## I VOCABULARY

CD 1-29

**A.** *Match each word with its definition.*

**1.** complete [ ]
**2.** eliminate [ ]
**3.** survival [ ]
**4.** predict [ ]
**5.** automatically [ ]

**選択肢**

ア. to declare or tell in advance
イ. the state of continuing to live or exist
ウ. without thinking about what you are doing
エ. used to emphasize that situation is as great as it could possibly be
オ. to completely get rid of something that is unnecessary or unwanted

**B.** *Match each medical word with its meaning.*

**1.** breast cancer [ ]
**2.** cancerous [ ]
**3.** toxic [ ]
**4.** toxicity [ ]
**5.** tumor [ ]
**6.** petri dish [ ]
**7.** microscopic [ ]
**8.** fluorescent [ ]

**選択肢**

ア. 毒性　イ. 腫瘍　ウ. 乳がん　エ. 有害な
オ. がん性の　カ. 蛍光性の　キ. 微小な　ク. シャーレ

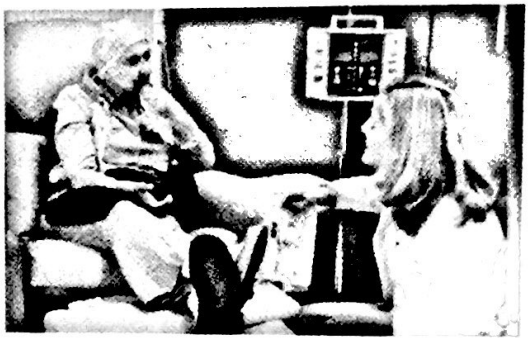
## Step 2 Reading Comprehension

When Shante Thomas was first diagnosed with Stage 2 breast cancer, it came as a complete shock.

*—Shante Thomas:*

"Am I going to die? I mean, that's the first thing you think."

With the right treatment, many women can expect to beat※ the disease; but, with more than 50 drugs to choose from, it's hard for doctors to know which ones will work. Another problem is that drugs used to fight cancer are highly toxic and they kill healthy cells along with the cancerous ones. Right now, choosing the right drug is a guessing game※; but it may not always be. Researchers at Vanderbilt University are using lasers to study tumor particles called organoids※. Alex Walsh spoke to VOA by Skype.



beat／(病気などを) 打ち負かす

guessing game／推測ゲーム

organoid／オルガノイド

*—Alex Walsh, Vanderbilt University:*

"Organoids are small pieces of tumor that we grow in a petri dish, and they're about 100-to-300 micrometers in diameter."

They're microscopic. When given a collagen gel, the cancer cells grow as they would inside a human body. They are naturally fluorescent. So when the researchers add a cancer-fighting drug, they can tell how well the drug works by measuring the amount of fluorescence.

Professor Melissa Skala is the lead researcher※.

lead researcher／研究主任

*—Melissa Skala, Vanderbilt University:*

"Our idea was to try to eliminate toxicities from ineffective treatments and then use drugs that are more effective in treating breast cancer."

Skala spoke via Skype. She says the hope is to ultimately

improve the survival of breast cancer patients.

—*Melissa Skala, Vanderbilt University:*

"We know a lot of breast cancer patients initially respond to their therapy and then later, their tumor starts to grow and they succumb to※ their disease."

Skala says the next step is to see if doctors can accurately predict which drugs will work in advance of the patient getting treatment. The hope is that this type of targeted therapy※ could be available to breast cancer patients in five to ten years. Then, people like Shante Thomas won't automatically think a diagnosis of breast cancer is a death sentence.

succumb to／～で死ぬ

targeted therapy／標的療法（患部に限定して薬剤を送り込み、副作用を防ぐ治療法）

## Step 3 Summary

CD 1-31

*The following is a short explanation of the targeted treatment. Read the passage again and fill in the blanks.*

Experiments conducted at Vanderbilt University are vital in the fight against ( [1] ). Alex Walsh is using a ( [2] ) to make what she calls organoids glow. Organoids are small pieces of a patient's ( [3] ) that are about 100-to-300 micrometers in diameter. Organoids that are grown in a petri dish are dosed with cancer drugs and placed under a microscope. The tiny tumor is then blasted with a laser. That laser light makes the organoids glow because they are naturally ( [4] ). The organoids glow to different ( [5] ) based on their response to the chemo drugs. It means that the result tells the researchers which drugs are ( [6] ) for a patient.

## III CRITICAL THINKING CHALLENGE

*What's your opinion about the following question?*

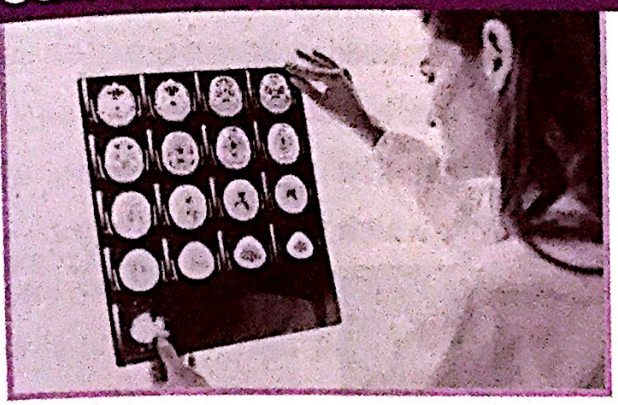
Cancer treatment is often a painful process for patients and their families to go through.

Which is more important, the doctor's decision or the patient's wishes?

Collect information from the Internet and explain your ideas.

# UNIT 11

# Doctors Unveil Potential New Tool to Fight Brain Cancer



科学の世界では偶発的な大発見があります。みなさんの身近に使うものも偶発的な発見から生まれたものがあります。どのようなものがあると思いますか？　本文の内容に入る前に、ペアで意見交換してみましょう。

## I VOCABULARY

CD 1-32

**A.** *Match each word with its definition.*

| | | | |
|---|---|---|---|
| **1.** deliver | [　] | **2.** potentially | [　] |
| **3.** opportunity | [　] | **4.** experimental | [　] |
| **5.** compromised | [　] | | |

**選択肢**

ア. possibly but not yet actually
イ. to take something to a particular place
ウ. based on or used in scientific tests
エ. a chance to do something when it is easy for you to do something
オ. unable to function optimally

**B.** *Match each medical word with its meaning.*

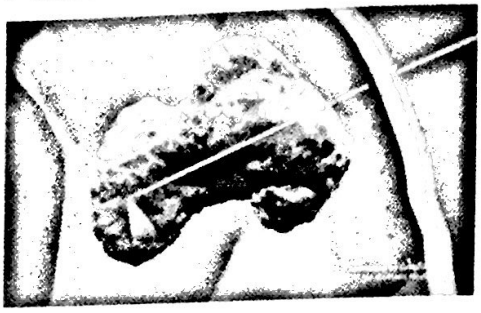
| | | | |
|---|---|---|---|
| **1.** chemotherapy | [　] | **2.** ovarian | [　] |
| **3.** laser therapy | [　] | **4.** probe | [　] |
| **5.** unintended effect | [　] | **6.** circulation | [　] |
| **7.** peripheral system | [　] | **8.** neurosurgeon | [　] |

**選択肢**

ア. レーザー治療　イ. 意図していない効果　ウ. 循環　エ. 卵巣の
オ. 周辺系・末梢系　カ. 化学療法　キ. 脳神経外科医　ク. 探針

## Step 2 Reading Comprehension

Neurosurgeons※ have been using lasers to treat brain cancer since 2009, but now they say the technique may also allow them to deliver chemotherapy drugs directly into the brain. The key is getting past the protective blood-brain barrier※, which does its job so well it also keeps out potentially lifesaving chemotherapy drugs. Kathy Smith has ovarian cancer that spread to her brain, a type of brain cancer called glioblastoma※.



neurosurgeon／神経外科医

blood-brain barrier／血液脳関門（血液と脳の組織液との間の物質交換を制する働きをする）

glioblastoma／膠芽腫（こうがしゅ、脳腫瘍の一種）

*—Kathy Smith, brain cancer patient:*

"And there were I believe three tumors at that time and I was not at all happy about those critters."

She was treated with laser therapy. Doctors insert a tiny probe into the brain, directly to the cancer where it burns up the tumor from the inside out. According to Washington University Neurosurgery※ Professor Eric Leuthardt, during the procedure it was discovered the therapy had an unintended effect on the blood-brain barrier.

neurosurgery／神経外科

*—Eric Leuthardt, neurosurgeon, Washington University:*

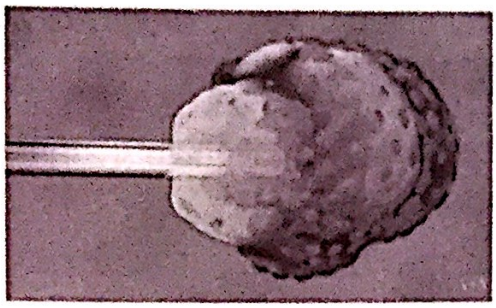
"We were basically able to show that this blood-brain barrier is broken down for around four weeks after you do this laser therapy. So not only are you killing the tumor, you are actually opening up a window of opportunity to deliver various drugs and chemicals and therapies that could otherwise not get in there."


In Kathy's case, a powerful, experimental chemotherapy drug called doxorubicin※, which has been notoriously※ hard to get past the barrier was delivered directly into her brain.

doxorubicin／ドキソルビシン（抗がん剤の一種）
notoriously／～で有名な

*—Eric Leuthardt, neurosurgeon, Washington University:*

"I think what's really interesting is the blood-brain barrier



is a two-way street, by breaking it down you can get things into the brain, but also by breaking it down, now things can go from your brain out into your circulation, to your peripheral system, which includes your immune system."

And the immune system helps fight cancer.

The procedure is dangerous, a compromised blood-brain barrier puts the brain at risk, but so far it's worked well for Smith. Patients diagnosed with glioblastoma tumors usually survive just 15 months after diagnosis. But Smith has been fighting her cancer since 2009.

*—Kathy Smith, brain cancer patient:*

"Kind of makes you smile when they say , "Oh, you are a good candidate for something new," and so I got worked into that study, got worked into that, and it did work out beautifully."

The team of neurosurgeons from Washington University in St. Louis are hoping to publish a more formal report on their work later this year.

*Read the passage and write T if the statement is true or F if it is false. Then, explain with evidence why you chose your answer.*

1. Potentially helpful chemotherapy drugs are blocked by the blood-brain barrier.
   T F 根拠 [ ]
2. Professor Eric Leuthardt intentionally conducted laser therapy to break down a patient's blood-brain barrier.
   T F 根拠 [ ]
3. Laser therapy breaks down the blood-brain barrier but leaves it open for only a short time to effectively deliver chemotherapy drugs.
   T F 根拠 [ ]
4. Doxorubicin is a powerful unapproved chemotherapy drug that is unlikely to penetrate the blood-brain barrier.
   T F 根拠 [ ]
5. The new technique is so safe and effective that it could be a new treatment option for patients with the deadly disease.
   T F 根拠 [ ]

## Step 3 Summary

CD 1-34

*The following is a short explanation of the new technique for treating glioblastoma. Read the passage again and fill in the blanks.*

Glioblastoma is one form of deadly brain ( [1] ). Surgery, radiation and chemotherapy waste patients' precious time and in most cases they do not provide a cure. Now, researchers have found a high-tech laser surgery that may have an added benefit for patients. Laser surgery can open the protective blood-brain barrier, which enables ( [2] ) drugs to reach brain tumors. The laser ( [3] ) the barrier open for about four weeks after the surgery, allowing time for drugs to ( [4] ). Thus, the new technique might improve ( [5] ) of deadly brain cancer. The researchers said the discovery was not ( [6] ) and they are surprised to find that the laser therapy penetrated the protective blood-brain barrier.

## III CRITICAL THINKING CHALLENGE

*What's your opinion about the following question?*

What is the latest technology for treating brain cancer?
Collect information from the Internet and explain your ideas.