**Scientists Make Jellyfish Faster**

**科学研究让水母更快更强**

Researchers have used very small electronic devices to make jellyfish stronger and faster.

研究人员利用很小的电子设备就让水母变得更快更强。

The scientists say they developed these electronic jellyfish in the hopes of sending them to study and explore the world’s oceans.

科学家们声称，他们研发出这种电子水母是希望将它们送去研究和探索海洋世界。

A report on the experiment was published in the journal Science Advances.

关于该实验的报告发表在《科学进展》杂志上。

The study

科研

Jellyfish are unusual creatures. They move through seawater by contracting, or reducing the size of, their muscles.

水母可不是一般的生物。它们通过自我收缩或减小自己的肌肉尺寸在海水中移动。

For the experiment, the researchers put an electronic device, about 2 centimeters in length, inside a moon jellyfish, a common kind of jellyfish.

研究人员在实验中将一种长度约2厘米的电子设备放在一种常见的水母——海月水母里面。

The researchers said the device caused the creatures to move their bodies more often. They swam around three times faster than usual. These jellyfish use “10 to 1000 times less external power per mass than other aquatic robots reported in literature,” noted Nicole Xu and John Dabiri, the two lead authors of the report.

研究人员称，这种装置使它们更频繁地移动身体，且它们的游泳速度也比平常快三倍。报告的两位主要作者妮可·徐和约翰·达比利指出，与其他文献中报道的水生机器人相比，这些水母每质量所消耗的外部功率少10到1000倍”。

Jellyfish are known to release mucus at times when they are tense or feeling stressed. No such reaction was noted during the study. The jellyfish swam normally after the electronic device was removed, the researchers said.

已知水母在紧张或感受到压力时会释放粘液。然而在研究过程中并未发现水母有此类反应。研究人员称，在移除电子设备后，水母的游动会恢复常态。

“Care is taken not to harm the jellyfish,” Dabiri explained.

“为避免伤害到水母，我们采取了措施，”达比利解释道。

The future

未来

The next step will be to test ways to control where the jellyfish go. Another possible step: to develop small sensors that could take long-term measurements of ocean conditions, added Xu and Dabiri.

研究的下一步是测试控制水母去向的方法。徐和达比利补充道，可能进行的一个步骤是：开发能够对海洋状况进行长期测量的小型传感器。

“It’s very sci-fi futuristic,” said Xu, a bioengineer at Stanford University in California. “We could send these bionic jellyfish to different areas of the ocean to monitor signs of climate change or observe natural phenomena.”

“这看起来非常科幻，”加州斯坦福大学的生物工程师徐工程师表示。“我们可以将这些仿生水母送到海洋的不同区域，以监测气候变化或观测自然现象。”

One of the first goals will be deep dives, added Dabiri, who studies mechanical engineering and serves as a professor at the California Institute of Technology. Deep dives are important because of a major gap in human understanding of the deep oceans.

达比利补充说，其中一个首要目标是深潜。他的研究领域是机械工程专业，时任加州理工学院教授。深度潜水之所以重要，是因为人类对深海的了解还存在很大缺口。

“Basically, we’d release the bionic jellyfish at the surface, have it swim down to increasing depths, and see just how far we can get it to go down into the ocean and still make it back to the surface with data,” he said.

他说：“通常我们将仿生水母放到水面，然后让它渐渐游到较深的水下，测试我们能把它放到多深的海里，同时仍然能带回所需的数据”。

“Jellyfish have existed for over 500 million years, and over that time, their body structure has remained largely unchanged, said Xu. “So it’s interesting to figure out what makes them so special and how we can learn from them.”

“水母已经存在了超过5亿年，且一直以来它们的身体结构基本保持不变，”徐工程师说道。“因此，弄清楚是什么使它们如此特别以及我们能从它们那学到什么是很有趣的。”

She added, “Because we use animals with natural swimming motions, the hope is that they won’t disturb the environment in the same way that a submarine might, so we can expand the types of environments we can monitor.”

她还补充道：“因为我们利用的是自然游动的动物，所以它不会像潜水艇那样干扰自然环境，这样我们就能扩展能够监测到的环境的类型。”

I’m John Russell.

约翰·罗素报道。

**Scientists Make Jellyfish Faster**

Researchers have used very small electronic devices to make jellyfish stronger and faster.

The scientists say they developed these electronic jellyfish in the hopes of sending them to study and explore the world’s oceans.

A report on the experiment was published in the journal Science Advances.

The study

Jellyfish are unusual creatures. They move through seawater by contracting, or reducing the size of, their muscles.

For the experiment, the researchers put an electronic device, about 2 centimeters in length, inside a moon jellyfish, a common kind of jellyfish.

The researchers said the device caused the creatures to move their bodies more often. They swam around three times faster than usual. These jellyfish use “10 to 1000 times less external power per mass than other aquatic robots reported in literature,” noted Nicole Xu and John Dabiri, the two lead authors of the report.

Jellyfish are known to release mucus at times when they are tense or feeling stressed. No such reaction was noted during the study. The jellyfish swam normally after the electronic device was removed, the researchers said.

“Care is taken not to harm the jellyfish,” Dabiri explained.

The future

The next step will be to test ways to control where the jellyfish go. Another possible step: to develop small sensors that could take long-term measurements of ocean conditions, added Xu and Dabiri.

“It’s very sci-fi futuristic,” said Xu, a bioengineer at Stanford University in California. “We could send these bionic jellyfish to different areas of the ocean to monitor signs of climate change or observe natural phenomena.”

One of the first goals will be deep dives, added Dabiri, who studies mechanical engineering and serves as a professor at the California Institute of Technology. Deep dives are important because of a major gap in human understanding of the deep oceans.

“Basically, we’d release the bionic jellyfish at the surface, have it swim down to increasing depths, and see just how far we can get it to go down into the ocean and still make it back to the surface with data,” he said.

“Jellyfish have existed for over 500 million years, and over that time, their body structure has remained largely unchanged, said Xu. “So it’s interesting to figure out what makes them so special and how we can learn from them.”

She added, “Because we use animals with natural swimming motions, the hope is that they won’t disturb the environment in the same way that a submarine might, so we can expand the types of environments we can monitor.”

I’m John Russell.