Fluid dynamics explain how quickly a vampire could drain your blood

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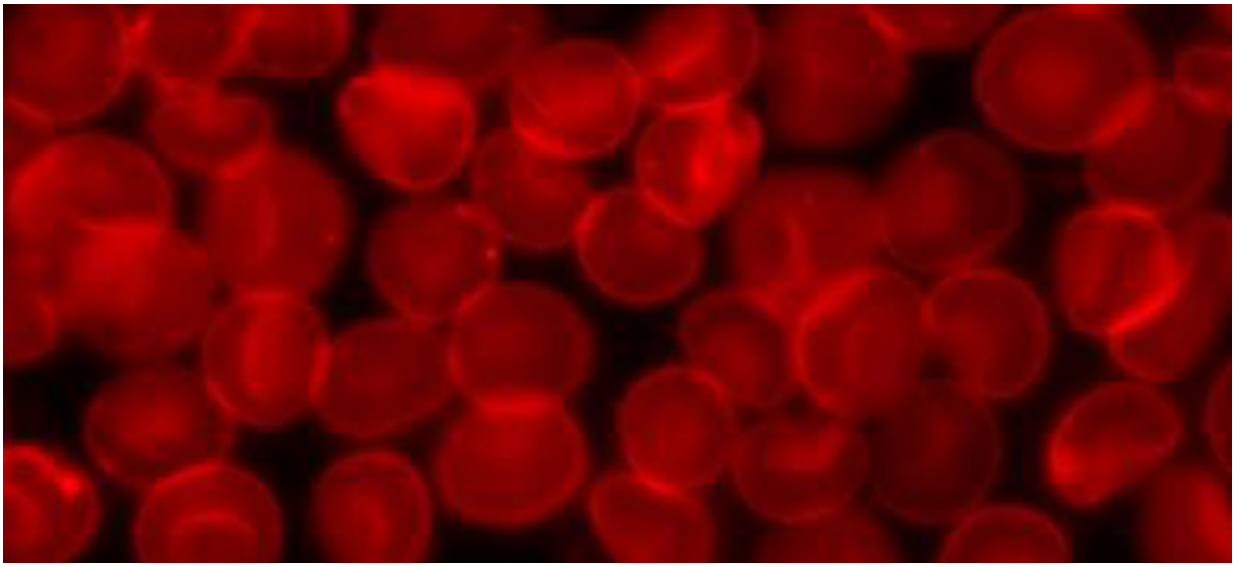

Credit: Wikimedia Commons

Throughout human history there have been tales of vampires – bloodsucking creatures of folklore that prey on their victims by draining their life essence, usually via the blood.

To coincide with the 85th anniversary of Universal Pictures' 'Dracula' starring Bela Lugosi, should you (unfortunately) be assailed by a vampire, students from the University of Leicester's Department of Physics and Astronomy have used fluid dynamics to examine how long it

would take for the undead fiend to drain an average human's blood – and have calculated that it would take only 6.4 minutes to drain 15 per cent of the blood from the external carotid artery in a human's neck.

15 per cent was used as the benchmark as any more blood loss causes the heart rate to change, while less can be taken without affecting the circulatory system of a human.

The aorta, the main artery of the body, splits into five other arteries. For the purpose of the study the team was concerned with the velocity of blood flowing into only the common carotid artery.

They also assumed the five arteries are of even thickness, enabling them to calculate the velocity of blood flowing into the common carotid artery.

By examining the average human blood pressure in arteries measured relative to the air pressure, this gave the students the pressure difference.

They then worked out average density of blood at room temperature and were able to deduce how much blood would come out of a puncture in a human's neck (with vampire fangs assumed to leave puncture holes with a width of 0.5mm each).

Considering the human body has an average of 5 litres of blood and that a vampire might feasibly take 15%, in the study a vampire would drain 0.75 litres of blood, and by their calculations it would take 6.4 minutes to do so.

The students presented their findings in a paper for the *Journal of Physics Special Topics*, a peer-reviewed student journal run by the University's Department of Physics and Astronomy. The student-run journal is designed to give students practical experience of writing,

editing, publishing and reviewing scientific papers.

Course tutor, Dr Mervyn Roy, a lecturer in the University of Leicester's Department of Physics and Astronomy, said: "Every year we ask each student to write around 10 short papers for the *Journal of Physics Special Topics*. It lets the students show off their creative side and apply some of physics they know to the weird, the wonderful, or the everyday."

The paper 'The Draining of a Lifetime' is available here: physics.le.ac.uk/journals/inde … article/view/855/624

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