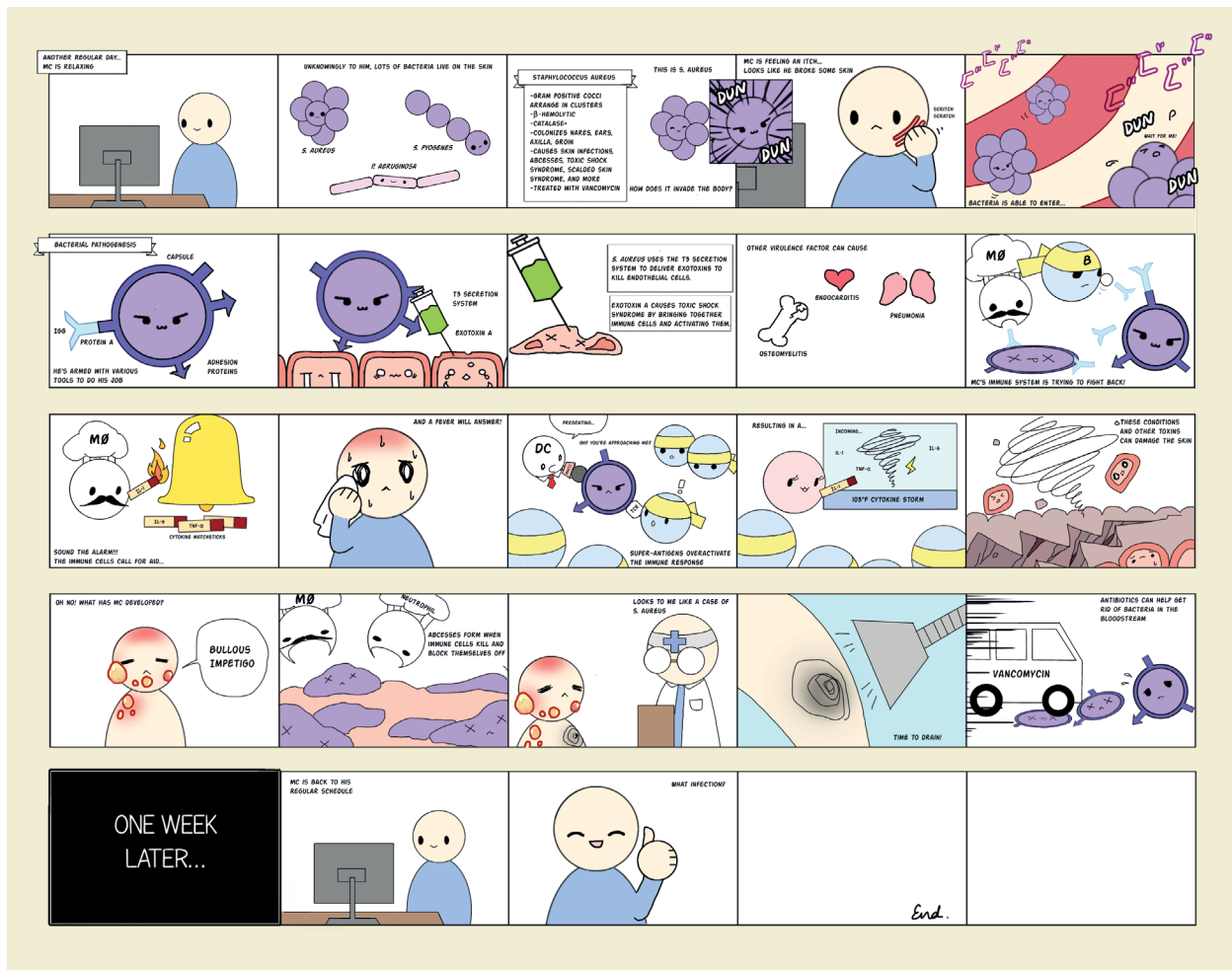


## **Using an anime module as a fun way to teach microbial pathogenesis in medical microbiology**

Utilización del anime como una manera divertida de enseñar patogénesis microbiana en microbiología médica

### **MR. EDITOR:**

Learning research has demonstrated that visualizing processes in three dimensions aids learning, and animations are effective educational tools that can help integrate molecular, cellular, and clinical processes<sup>1,2</sup>. Animations are extremely popular in Japan, where they are known as *anime*, some involving medical content. They are increasingly being incorporated into multimedia teaching tools in medical education, being particularly useful when teaching cellular and molecular processes which play out in four dimensions<sup>2</sup>.



We developed an anime, to introduce medical microbiology concepts in a fun but informative manner. *Staphylococcus aureus* was selected as it is one of the first bacteria students learn during the first unit. A storyboard on the progression of the story was developed in Photoshop. Symbolism was utilized to relate technical terms with everyday objects, as well as the addition of cultural references with the aim of creating easy-to-remember associations. Animation and text-to-speech for voices was carried using Storyline 360. Content covered bacterial aspects, pathogenesis, mechanisms of virulence factors, diseases that can arise from the infection, and treatment aspects.

Animations are useful in motivating learning, helping learn difficult material through visual aids. Medical students have reported reading more of the material and achieved higher post-learning

test scores when provided with cartoon-style material, compared to handouts with a traditional-style<sup>3</sup>.

Gazing at sequential illustrations and recognizing them, leads to a better recall, and possibly a deeper mental elaboration of the illustrations<sup>4</sup>. Animation also facilitates the construction of objects, metaphors, and characters which may serve as advance organizers. Since anime may rely on visual metaphors to communicate its message, the content does not need to be fully realistic. It rather relies on useful representations, promoting critical thinking skills involving interpreting and filtering information. The accuracy of the story's content, nevertheless, must be revised when considering using animation in medical education, as some facts may be stretched for dramatic effect.

Simple two-dimensional animations can be eas-

ily created at a relative low cost by educators, and they do not require sophisticated software. An interdisciplinary approach that provides opportunities for the application of knowledge in communications arts and technology would be beneficial in medical education. We should encourage medical education faculty to use creative teaching methods, and consider anime as an effective tool for teaching and learning the biomedical foundations of Medicine.

### AUTHOR'S CONTRIBUTIONS

DLZ, QT, DD, VG, and EO developed the animation. DLZ, QT, DD, VG, and JC wrote the manuscript.


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### CONFLICTS OF INTEREST

No interest to declare. 

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