

USC School of Dentistry researchers uncover link between osteoporosis drugs and jaw infection

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A group of University of Southern California School of Dentistry researchers says it has identified the slimy culprits killing the jawbones of some people taking drugs that treat osteoporosis.

Microbial biofilms, a mix of bacteria and sticky extracellular material, are causing jaw tissue infections in patients taking bisphosphonate drugs, said Parish Sedghizadeh, lead researcher and assistant clinical professor at the USC School of Dentistry.

Sold under brand names such as Fosamax, Boniva and Actonel, bisphosphonates are prescribed to millions of patients to combat osteoporosis, a bone-wasting disease that increases the risk of fractures.

Sedghizadeh said there have been increasing reports of osteonecrosis (bone death) of the jaw in patients who have been taking the drugs for osteoporosis or for treatment from the bone-wasting effects of cancer. He said he decided to investigate further after seeing patients in USC dentistry clinics who had the unusual jaw infection.

“This is the first study that identifies microbial biofilms in the bone of bisphosphonate patients who have osteonecrosis of the jaw,” Sedghizadeh said.

Jaw osteonecrosis occurs when bacteria-laden biofilms infect the jaw

after the bone is exposed, typically because of a tooth extraction or injury.

The USC research team includes renowned biofilm expert J. William Costerton, director of the Center for Biofilms at the USC School of Dentistry.

Pioneered by Costerton, biofilm theory has moved scientists beyond thinking of bacteria as free-floating organisms. Instead, bacteria build biofilm communities, attaching to surfaces and communicating and defending against antimicrobial invaders.

The team used powerful scanning electron microscopes to study patients' jawbone samples. The images revealed biofilm bacteria sprawling over pitted tissue.

The scientists are now trying to determine why bisphosphonate drugs seem to open the door for biofilm-associated infections of the jaw.

“Now that we’ve know biofilms are behind the infection of the jaw, we are studying ways to effectively treat or prevent the osteonecrosis,” Sedghizadeh said.

Source: University of Southern California

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