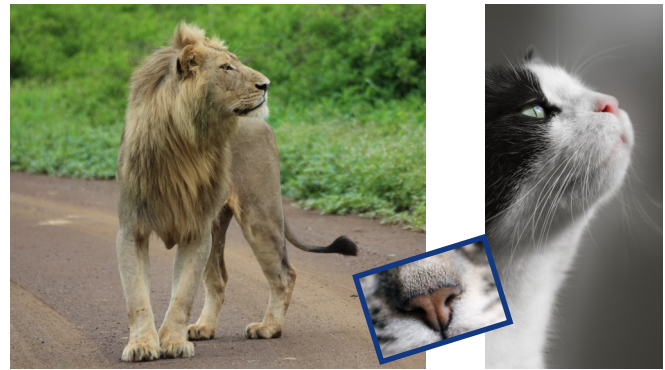




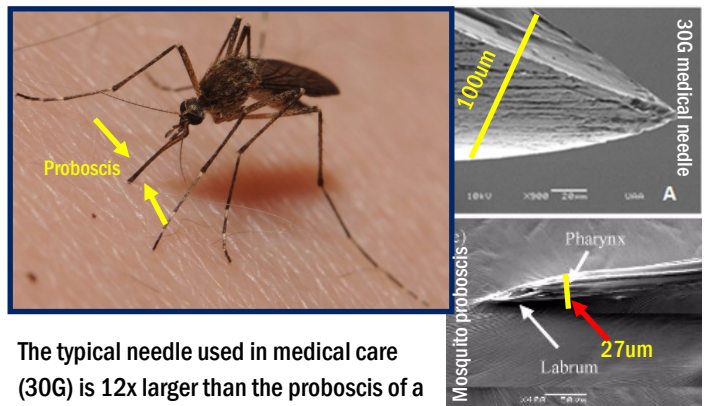
Veterinary technicians use protective walls and lead shields to avoid exposure to harmful x-ray radiation when performing x-rays on animals. Determine a design for an x-ray sensor to detect, and protect, veterinary technicians during animal care!



Animals can detect new things around them! Cats, for example, notice a new scent at concentrations lower than humans. The shape of a cat's nose traps scents inside. This gives a feline more time to smell the scent before clean air is inhaled, diluting the scent. Theories claim that cats may even be able to detect x-ray radiation... as a sour smell!



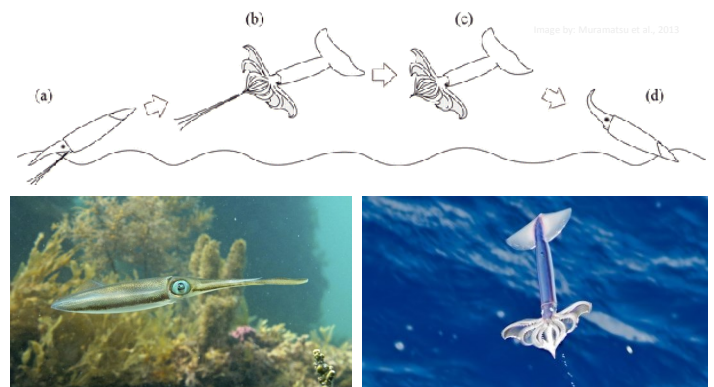
No one, not animals or humans, likes the feeling of a needle into their bodies! When the needle is inserted into the skin, it can be very uncomfortable. How can we redesign the needle of medical syringes so that they are less painful for us and our animal friends?



The typical needle used in medical care (30G) is 12x larger than the proboscis of a mosquito! The needle is 300 micrometers; the mosquito beak is 25 micrometers. When the mosquito pierces our skin and takes our blood for a meal, we hardly feel a thing: a pain-free injection! Some of us may itch afterwards, but this is from the mosquito saliva, not from the insertion into the skin.



Can we improve the way we get medication from the syringe to the patients? Dispensing medications faster provides better patient care by keeping them comfortable as much as possible.

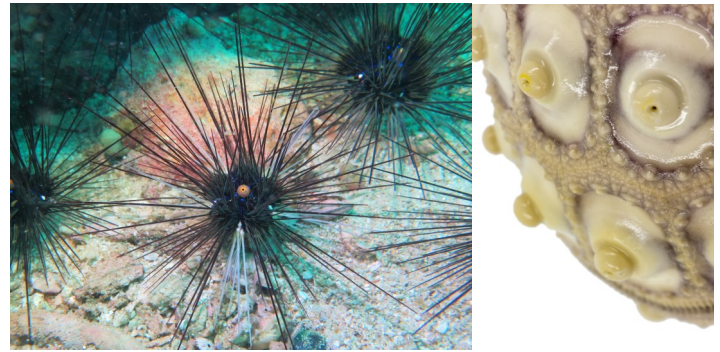


Flying Squid store water in a mantle cavity in their bodies: for flight! This water is forcefully pushed out through a funnel in the top, allowing it to *literally* fly out of and over the water to escape predation!





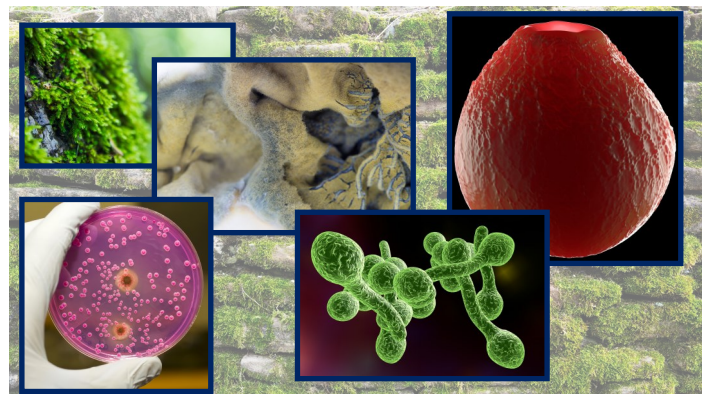
Imagine an improved design of the X-ray machine! These machines are often bulky and cumbersome to use. Maybe we can streamline and fine-tune them to see *what* we want to see, in a non-harmful manner.



Sea urchins have photoreceptors all over their bodies that sense light. The spines covering the sea urchin protect it from receiving too much wide angle light. This allows it to focus on the fine details!



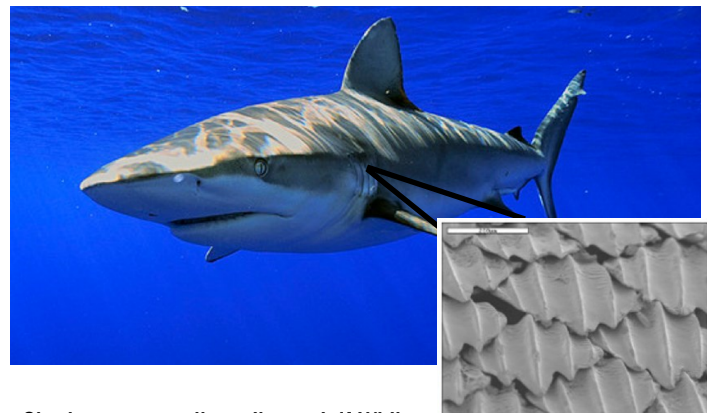
Radiation exposure is a real concern for anyone in an area where x-rays are taken: staff, patients, and visitors. Develop improved radiation protection measures to ensure everyone stays safe.



Moss, fungi, and lichen species appear to absorb some forms of radiation! In sites impacted by nuclear disasters, these organisms survive and thrive by, as one theory believes, converting the toxin into beneficial chemical energy for them. This removes the radiation from the environment!



Medical environments need to be as sterile and clean as possible! This helps to minimize the risk of infection from one person to another. How can we reduce transmission of harmful bacteria, keeping staff, patients, and visitors safe?



Sharks are naturally antibacterial! While they might feel smooth to the touch, shark skin is actually rough—on the microscale! The overlapping pattern creates a rough surface that inhibits bacterial attachment!






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