# Researchers find proof that oysters turn pearls as part of development process

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Credit: NOAA

(Phys.org)—A team of researchers with members affiliated with institutions in French Polynesia, France and Qatar has finally proved that pearls do spin inside of oysters as they develop. In their paper published in *Royal Society Open Science*, the team describes their technique and other aspects of peal development they were able to observe.

For many years researchers and others have speculated on the process that goes on inside of an oyster that results in the formation of a pearl (the only gem produced by an organism), especially the ones that are very nearly perfectly round. Many have suggested that in order for such

pearls to come about, it must have been rotated inside the oyster—also markings on many pearls have suggested spinning. But until now, no one has been able to definitively prove that the pearl was turned.

Pearls are created in many mollusks, not just oysters, and their development is due to a reaction by the mollusk to an invading bit of material. Because the insides of mollusks are delicate, they need to protect themselves against material that can cause harm—when a bit of sand or silica is detected in the mantel tissue, the mollusk creates a cover for it (called the pearl sac) and adds a material it secretes called nacre (made up mostly of calcium carbonate)—then, according to the researchers, they spin the material to smooth out rough edges.

The researchers were able to make this discovery by using a specially modified magnetometer to watch the pearl inside of an oyster as it developed—it allowed for registering magnetic field variations inside the oyster due to magnetic material that was inserted into the pearl center. The setup allowed the researchers to "see" the developing pearl being turned starting after 40 days had passed and continuing on until the pearl was harvested after approximately a year. They report that the pearl was turned at a rate of $1.27°\ min^{-1}$ (averaged over four pearls) and that pearl shape and defects appeared to be impacted when rotating was interrupted.

The team also used high magnification techniques to examine patterns that appeared on the surface of pearls during the development process and found that when bumps and grooves appear, the result is irregular notches, whereas those pearls that were more rounded tended to have more precise spiral shapes.

**More information:** Yes, it turns: experimental evidence of pearl rotation during its formation, *Royal Society Open Science*, DOI: 10.1098/rsos.150144

## Abstract

Cultured pearls are human creations formed by inserting a nucleus and a small piece of mantle tissue into a living shelled mollusc, usually a pearl oyster. Although many pearl observations intuitively suggest a possible rotation of the nucleated pearl inside the oyster, no experimental demonstration of such a movement has ever been done. This can be explained by the difficulty of observation of such a phenomenon in the tissues of a living animal. To investigate this question of pearl rotation, a magnetometer system was specifically engineered to register magnetic field variations with magnetic sensors from movements of a magnetic nucleus inserted in the pearl oyster. We demonstrated that a continuous movement of the nucleus inside the oyster starts after a minimum of 40 days post-grafting and continues until the pearl harvest. We measured a mean angular speed of 1.27° $min^{-1}$ calculated for four different oysters. Rotation variability was observed among oysters and may be correlated to pearl shape and defects. Nature's ability to generate so amazingly complex structures like a pearl has delivered one of its secrets.