

## Cancer Switch Observed

Researchers at the Garvan Institute of Medical Research have observed the switch that turn off the *P16* gene, allowing cells to become cancerous. Their work may settle a long-running debate as to whether DNA methylation - the replacement of a hydrogen atom with a methyl group - precedes or follows gene silencing in tumour development. Methylation in the wrong parts of genes is associated with cancer.

Prof Susan Clark says that the question has been hard to answer because "aberrant processes have already occurred by the time a tumour is large enough to study". To get around this Clark and her PhD student took cells removed during a breast reduction and grew them in a tissue culture under conditions that allowed a high proportion to continue growing.

"We believe these are breast cancer cells, and using this we can observe how the *P16* gene is silenced," Clark says. "We stained them for *P16* and used laser capture to select single cells."

The finding was that *P16* was silenced before methylation had occurred. However, as time went on methylation spread through the cell. As methylation occurred, more gene suppression occurred, more gene suppression followed. "This is the first study to clearly show that silencing occurs before methylation, and then methylation is initiated and consolidates the silencing," Clarks says.

Although the work was done on breast cancer cells, Clark is confident it applies to other forms of cancer even though the silenced genes vary. "The basic biology is common to all malignancies," she says.

The findings may not be good news for novel cancer treatments. "There are a lot of trials of epigenetic drugs in the United States at the moment," Clark says. "These aim at reversing the DNA repression, but our work shows that even if you take off the methyl group the genes are being silenced by another mechanism, so we need to look for another way. We need a novel regime of drugs."

## Cleaner Fish Uniforms Stand Out

Advertisers may be proud of the colours they use for branding, but cleaner fish beat them to the idea by a few million years. The colours of most cleaner fish make them particularly visible in the reef environment, but larger fish recognise that they offer a service that is more valuable than their potential as a meal.

Cleaner fish eat parasites from larger fish. "It's a really important service if you don't have hands," says Prof Justin Marshall of the University of Queensland's School of Life Sciences. "How do you get rid of parasites otherwise?"

The service is so useful that the larger fish allow cleaners to swim into their mouths without eating them, although Marshall acknowledges this doesn't always work. He's seen a photograph of a lizardfish eating a cleaner, but this must happen rarely for the relationship to continue.

Marshall and colleague Dr Karen Cheney noticed that most cleaner fish around the world are yellow and blue. Those that are not have a longitudinal stripe of one of these colours. To confirm their theory that these colours were chosen to make the cleaners stand out, Marshall and Cheney studied the light receptors in the eyes of three coral reef fish: barracudas, damselfish and surgeonfish.

"For all three visual systems, blue categories were the most contrasting colours against an average coral background, and yellow is the most contrasting colour against a blue water background," Marshall says.

The pair then made model fish from resin and painted them with different colours and patterns. They found that reef fish were more likely to come up to be cleaned when the mock cleaner fish was painted in authentic colours.

"What we think the cleaner fish are saying - with colour - is that they have a service to offer," Marshall says. "What we've managed to do is decode the language of the club."

Naturally some other fish have decided to take advantage of the message that blue and yellow fish are too useful to eat. For example, fang blennies use the same colour scheme to get close to larger fish so they can take a bite out of them.

