

Gone today, hair tomorrow the clone wars that are coming to a head

Stephen Cauchi / Courtesy of The Age

YEAH, yeah, it's cloned hair. Melbourne scientists are trying to cure baldness once and for all by using stem cells to grow a potentially endless supply of new hair. If successful, cloning would overcome the shortcomings in existing hair-loss treatments.

Hair transplant surgery, for example, can redistribute hair over balding areas but does not create new hair. Drugs such as minoxidil and finasteride can stop balding in men, but can't reverse it and need to be taken indefinitely. Other options tend to involve fake hair, including "yeah, yeah" Shane Warne hair, which is a technically advanced hairpiece. Scientists from St Vincent's Hospital and Melbourne University, headed by St Vincent's dermatology director Rod Sinclair, have extracted adult stem cells from hair follicles and are trying to coax them to spawn new hair follicles in a culture dish.

"We've now got three stem cell scientists in our department working on hair follicle stem cells," said Professor Sinclair. "They're working out what's involved in cloning hair follicles for hair transplantation."

That's harder than it sounds. A full hair, including its follicle, is an entire organ by itself. The body will reject hair transplanted from somebody else, just as it will reject other transplanted organs. Professor Sinclair said the stem cells were extracted from the base of the hair follicle, the dermal papilla.

"You can dissect out a tiny ball of about 3000 cells. If you put that ball into a culture dish, that ball will flatten out into a thin sheet of cells," Professor Sinclair explained. Ideally, that sheet of cells should "aggregate to form new balls (so) you can take out those balls and reimplant them to form new hairs".

Unfortunately, he said, the sheet of cells was only producing one ball instead of many balls.

"The state of play at the moment is that I can cut some hairs off the back of your head, grow them in culture, and get enough back to replace the hairs that I took from the back of your head. We can't amplify them to produce more hairs. That's the problem," he said.

The other major challenge is implanting the baby hair follicles back into the skin once that's done.

"You have to put the stem cells in a scaffold, insert the scaffold into the skin, the scaffold makes the hair follicle grow in the right orientation and direction, and then disintegrates . . . Just growing a hair is not enough.

"You want one that grows in the right direction with the right colour and curl and wave so that it looks natural."

Professor Sinclair's group is one of a number of research bodies in the world investigating hair cloning, each using a slightly different method. British group Intercytex reported last June that early trials in humans had proved promising, with some of the subjects regrowing hair. "What Intercytex are doing is very similar to what we're doing but I think they have a lot of problems trying to get the cells to reaggregate," Professor Sinclair said Other baldness research is focused on trying to re-invigorate the hair follicles that shrink on top of the head and cause baldness in the first place. Scientists are trying to pin down the genes that cause baldness with the goal of blocking their expression in young men who have those genes.

Intercytex got a rush of male volunteers for its clinical trials. But if the follically challenged have thoughts about being guinea pigs for St Vincent's, be patient. Animal trials, due in about a year, must come first.

Researchers are currently using scalp tissue that has been discarded from people undergoing surgery.

"It would be possible to start animal implantation experiments in one to two years, but human experiments are at least three to five years away," said Professor Sinclair. So, by 2020, will the

age-old baldness problem be licked permanently - at least for those who can afford it? "Yes, it's a possibility."

Credit: The Age June 14 2009 'Gone today, hair tomorrow – the clone wars that are coming to a head' by Stephen Cauchi