



fund several initiatives recommended by a citizens' group. Included are an analysis of the amount of contamination of the tanks, other structures and piles of coal, coke and sulphur on the site of former coke ovens. The funding will also pay to design a collector system to reduce discharges of raw sewage and to monitor the flow of contaminated water into the watershed. Updating the area's cancer registry is another priority; *CMAJ's* 1995

article noted that Sydney reports unusually high rates of cancer, including leukemia and stomach, lung, colon, kidney and pancreatic cancers.

Temporary overseas postings available for volunteer MDs

Medical professionals looking for overseas work experience in tropical or travel medicine are invited to participate Youth Challenge International

(YCI) project placements in Costa Rica and Guyana; they last from 4 to 6 months. YCI medical staff are responsible for the health and safety of international youth in remote situations, and also coordinate community-health projects. YCI is a nonprofit organization that fosters youth development while completing grassroots community- and health-improvement projects; for information, call 416 971-9846 ext. 300; info@yci.org.

Research Update • Le point sur la recherche

Never alone with a clone

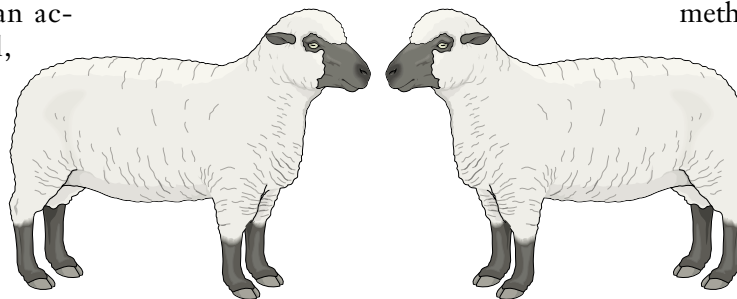
By now everyone has heard of Dolly the cloned sheep, an exact genetic replica of a donor Finn Dorset ewe. Apart from opening a Pandora's box of ethical questions, Dolly's healthy birth and growth have answered fundamental questions about the nature of the genome.

As reported by Ian Wilmut and associates of the Roslin Institute of Edinburgh, Scotland, (*Nature* 1997;385:810-3) and discussed by Colin Stewart in an accompanying editorial, until Dolly's arrival it was thought that growth and development caused irreversible modifications to the genome. Animals have been cloned before, mainly from early-stage embryos, but cloning from adults had hitherto met with failure. Dolly is unique in that she was cloned from a cell from the udder of a mature, 6-year-old ewe, proving that cellular differentiation does not irreversibly modify the genome.

Wilmut and associates created viable offspring from cell populations taken from an embryo 9 days old, a

fetus 26 days old and the mature ewe. The nuclei of the cells were implanted in enucleated oocytes from other sheep. The oocytes were then activated by electric pulses. The embryos thus created were transferred to ewes for gestation. In all, 8 lambs were born, although 1 died immediately.

The success of this nuclear-transfer method appears to hinge on the



cell-cycle phase. The researchers used oocytes rather than zygotes as the "recipient" cells. Before transferring the nuclei, the donor cells were induced into quiescence (G0 phase) by serum starvation. Stewart believes that the use of sheep, in which transcription of the embryonic genome does not begin until the 8- to 16-cell stage, may have also aided the researchers. These

measures improved the chances for "reprogramming" of the new cells. The researchers were thus able to overcome the hurdles that had faced other experimenters.

Wilmut and associates believe that it is now possible to achieve normal development from a wide variety of differentiated cells. Stewart points out that, because of differences in the genome transcription process among species, the method may not work in all

animals. However, the editors of *Nature* estimate that the ability to clone human beings is 1 to 10 years away. — *C.J. Brown*

[Cloning of human beings is one of the issues addressed in Bill C-47, the Human Reproduction and Genetic Technologies Act, which was introduced in the House of Commons last June and received second reading in November. The legislation is currently before a Commons subcommittee. Physicians are worried about several of its provisions, but the bill could die on the order paper if a federal election is called. — Ed.]