

Childhood protein rescues adult teeth

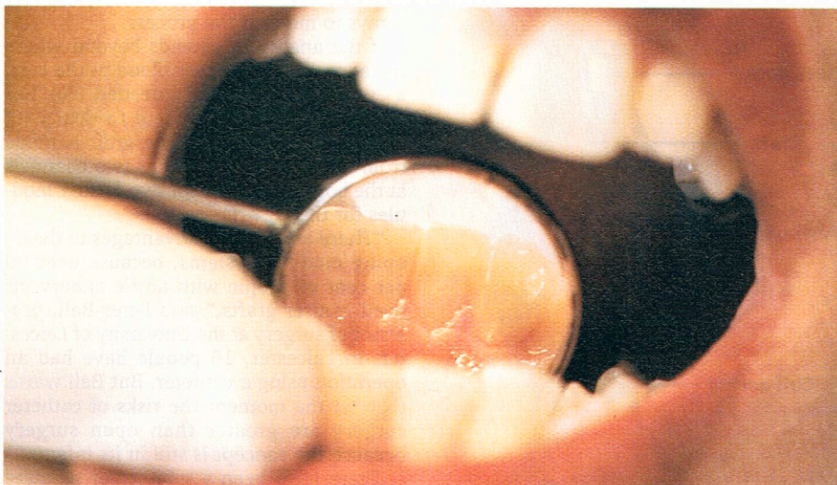
Elizabeth Gardner, Stockholm

THE tooth roots and jawbone of patients with advanced gum disease can be persuaded to regenerate by applying a gel containing a protein that helps children's teeth grow. The structural protein amelogenin is usually only found in the budding teeth of children. It was identified as being largely responsible for anchoring teeth in the jawbone by researchers at Stockholm's Karolinska Institute in 1981. A biotechnology company, Biora of Malmö, Sweden, is now extracting the same protein from pigs.

The gel, made by mixing the freeze-dried

The gel was tested on patients who had lost most of the periodontal ligament holding their affected teeth in place. In trials with more than 130 people undergoing surgery, those who received the protein gel regained an average of 66 per cent of the ligament within 16 months, compared with no gain or a further loss in a control group in which a placebo gel was applied.

Biora last month won approval to sell the gel, under the name Emdogain, throughout Europe. The company has also applied for approval to sell Emdogain in the US and Japan. Ingvar Magnusson, a periodontist and professor of oral biology at the Uni-



Ben Edwards/Tony Stone

protein in a viscous solution, is applied to the surgically exposed and cleaned surfaces of the patient's remaining tooth roots. The gum is then sewn back into place. The gel disappears in about a week, leaving a precipitated protein residue that creates a matrix for regenerating the periodontal ligament—the flexible layer attaching the teeth to the jawbone. The regenerated ligament in turn provides an anchor for collagen fibres to be laid down, which regenerate the tooth root and later the lost jawbone.

versity of Florida in Gainesville, who conducted clinical trials of the gel in the US involving 15 patients, says: "[Emdogain] is at least as good as what's available now, and is easier to apply."

The alternative treatment relies on polymer membranes. These are wound around the root of the tooth after surgery to discourage epithelial gum cells from growing between the root and the jaw, where they would prevent the periodontal ligament from growing back. □

Pouring oil on polluted waters

WHEN oil seeps into water supplies, it is usually a problem rather than a solution. But researchers in the US intend to add vegetable oil to the ground at the bottom of wells to help remove nitrate pollution from the water.

John Hunter and John Cary from the US Department of Agriculture, at Fort Collins, Colorado have found that corn and soya bean oils provide the denitrifying bacteria that live at the bottom of the wells with a rich source of carbon.

When energy-rich oil is injected into the ground under pressure, it stays trapped in the soil. This extra food stimulates the bacteria at the oil-water interface to grow and multiply. As they do so, they break down the nitrate in the contaminated water, turning it into nitrogen, which dissolves in the water.

Fertilisers, animal manure and water treatment systems, all introduce nitrates into the groundwater. Their presence is not generally considered to be a major health threat, but if pregnant women drink water contaminated with high levels of nitrates, it can cause "blue baby syndrome". The condition arises when the nitrate prevents oxygen from binding to the haemoglobin in red blood cells. It is not always possible to narrow down the source of nitrate pollution, which makes it difficult to tackle.

Many underground wells in the US contain much higher levels of nitrate than the accepted drinking water standard of 10 parts per million. Cary says that his oil-guzzling bacteria have reduced nitrate concentrations from 180 parts per million to between 2 and 3 parts per million in pilot experiments.

Hunter and Cary hope to carry out large-scale field trials. They also intend to find out if vegetable oil will prompt other bacteria to break down organic pollutants, such as petrol and solvents.

Lisa Rajan

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