Medical geology

The impact of the geological environment on health

by Fiona Fordyce, *Edinburgh*

Medical geology is the study of geoenvironmental impacts on human, animal, and plant health and involves medical, veterinary, agricultural, biological, and geological scientists. Due to the increasing importance of this subject area, the International Union of Geological Sciences (IUGS) Co-geoenvironment Programme recently initiated a Medical Geology Working Group to improve networking amongst the various disciplines. The Group, which is led by Dr Olle Selinus of the Swedish Geological Survey, will also produce a definitive textbook on Medical Geology. Linked to this initiative, a new International Geological Correlation Programme (IGCP) Medical Geology Project (project number 454) provides an opportunity for scientists from developing countries to work together with colleagues from other parts of the world to identify and tackle real problems of geoenvironment and health.

In recognition of the BGS's leading expertise in this field over the past 30 years, five BGS scientists are serving on the Working Group. The BGS's Chief Scientist, Professor Jane Plant CBE gave a keynote lecture on Breast and prostate cancer, epidemiology, and environment at the second meeting of the Group held in Sweden in 2000.

Geology can affect plant, animal, and human health in the physical sense. Examples are the problems and risks associated with volcanoes, earthquakes, subsidence, and lack of water or too much water. Perhaps less obvious are the effects of naturally occurring substances in the environment. For example, elements such as calcium are essential for healthy teeth and bones, whereas elements such as arsenic and mercury are toxic at high doses. These substances are not distributed evenly across the planet and different rock types and geological factors often determine the chemical composition of essential nutrients and toxic elements in the soils and waters that form the basis of the plant–animal–human food chain. Equally, the mobility of harmful man-made substances in the environment is commonly controlled by geological factors.

The BGS is addressing many of the issues related to water quality and geochemistry and health via projects sponsored by the UK Department for International Development (DFID), the World Bank, the United Nations Environment Programme (UNEP), and the European Union. Recent investigations include links between cancer and high-arsenic groundwater in Bangladesh; mercury and arsenic contamination associated with gold mining in Africa and Asia; heart disease and cerium in Africa; dental and skeletal deformities caused by high fluoride groundwaters in Africa, Asia and Central Europe; high uranium groundwater in Jordan; heart disease induced by insufficient selenium in China; and goitre resulting from iodine deficiency in Sri Lanka and China.

In her talk, Professor Plant highlighted the need for more information on the distribution and mobility of natural and man-made substances in the environment, an issue being addressed in part by the IUGS/ International Association of Cosmochemistry and Geochemistry (IAGC) Project on Global Geochemical Baselines. This project, led by the BGS and the United States Geological Survey (USGS), aims to provide standardised information on potentially harmful and essential substances at the global scale.

Geoscientists have an important role to play in the understanding of medical geology issues, which require a holistic and multidisciplinary approach to develop effective resolutions. The new international initiatives in this field provide an excellent framework for scientists of many disciplines around the world to work together.

More information is available from:

IUGS Co-geoenvironment Working Group on Medical Geology

IGCP Project 454 Medical Geology
Dr Olle Selinus,
Geological Survey of Sweden,
PO Box 670,
SE 75128 Uppsala,
Sweden
e-mail: olle.selinus@sgu.se

The project web site is at:
http://home.swipnet.se/medicalgeology

IUGS/IAGC Global Geochemical Baselines Project

Professor Jane Plant,
British Geological Survey,
Keyworth, Nottingham NG12 5GG,
United Kingdom
e-mail: japl@bgs.ac.uk

Dr Dave Smith,
United States Geological Survey,
Denver Federal Center Mailstop 973,
Denver, Colorado, USA
e-mail: dsmith@usgs.gov

The project web site is at:
http://www.bgs.ac.uk/iugs/home.html

BGS Medical Geology Projects

Professor Barry Smith,
British Geological Survey,
Keyworth, Nottingham NG12 5GG,
United Kingdom
e-mail: bsmi@bgs.ac.uk

BGS Water and Health

Dr Dennis Peach,
British Geological Survey,
McLean Building,
Crowmarsh Gifford,
Oxfordshire OX10 8BB,
United Kingdom
e-mail: dwpe@bgs.ac.uk

Web site at: http://www.bgs.ac.uk/dfid-kar-geoscience/summaries.html