

NEWS SCIENCE SPACE The pseudoscience of creating beautiful (or ugly) water Thu, Feb 17, 2011, 00:00 A Japanese 'doctor of alternative medicine' claims to be able to think good or bad thoughts when looking at a glass of water and form appealing or ugly ice crystals, writes WILLIAM REVILLE SEVERAL PEOPLE recently asked me what I think of the work of Masaru Emoto. Emoto claims that human speech or thoughts have dramatic effects on water. He claims that, depending on the nature of the speech or thoughts directed at water, when the water is frozen its crystals will be "beautiful" or "ugly" depending on whether the thoughts were positive or negative. If Emoto is right, we have a most amazing phenomenon here with dramatic implications, as illustrated by the simple fact that 75 per cent of all biological tissue, including the human body, is water. Emoto was born in Yokohama in 1943. He is not a scientist. He studied international relations at Yokohama Municipal University and in 1992 was certified as a Doctor of Alternative Medicine by the Indian Board of Alternative Medicine. Emoto has written several volumes of a book called Messages from Water and he sells "healing" water products. He is also president emeritus of the International Water for Life Foundation, a non-profit organisation based in Oklahoma. Emoto's experiments involve exposing glasses of water to various words, pictures or music, then freezing the water and examining the frozen crystals under a microscope. Emoto claims that positive words and emotions, classical music and positive prayer directed at the water produce beautiful crystals, while negative words and emotions and crude music, such as heavy metal, produce ugly crystals. Water is a very special chemical. All biochemical reactions in the biological cell, the unit of life, take place in water. The second chapter in most biochemistry textbooks is devoted to water. The smallest portion of water that can exist is the molecule of water. A molecule of water contains two atoms of hydrogen each bonded to the same atom of oxygen – the formula for the water molecule is H_2O . The molecule of water is V-shaped with the oxygen atom at the point of the V. The oxygen atom has a slight negative charge and each hydrogen atom has a slight positive charge. Opposite electrical charges attract each other and, consequently, in the liquid state, water molecules cluster together weakly, constantly making and breaking attachments with neighbouring molecules in the flickering cluster. As water freezes at zero degrees Celsius, the molecules line up in a regular array, under the influence of the mutual attraction of the opposite charges, to form crystals. This "lining up" process means that a given number of water molecules take up more space in the solid phase than they do when slipping and sliding over each other in the liquid phase. Ice is, therefore, less dense than liquid water and floats on liquid water. Consequently, open bodies of water freeze from the top down as they cool. The ice on top insulates the liquid water beneath and the water body rarely freezes all the way down to the bottom. Consequently, the living organisms in the water can survive in the liquid phase through severe winters. It is very unlikely that there is any reality behind Emoto's claims. A triple blind study of these claims failed to show any effect. Also, the phenomenon he describes has never been published in a peer reviewed science journal, which almost certainly means that the effect cannot be demonstrated under controlled conditions. But, you may say, perhaps nobody has tried to replicate this effect under controlled conditions. I very much doubt that. After all, Emoto's phenomenon would be amazing, if true, and the demonstrator of the phenomenon would achieve instant fame and, probably, fortune. Many factors in the work described by Emoto do not appear to be well controlled – ice crystal formation is known to be

affected by many factors, such as rate of cooling. Also, the photographers of the crystals are told to pick “the most pleasing” looking, strongly raising the possibility of subjectivity affecting the results.

Apparently, the main “scientific” paper published to date to demonstrate the phenomenon is a photo-essay written by Emoto himself and published in a journal of “alternative” science. This cuts little ice (pun intended) in mainline science. I have no reason to doubt Emoto’s sincerity but his work bears many hallmarks of a pseudoscience – the phenomenon is based on claims made by a charismatic leader and is described by an amalgam of science and mumbo-jumbo, there is no credible hypothesis as to causation, no development of the idea, no fruitfulness in the concept, and, above all, no clear scientific demonstration. There is always an audience for this kind of thing. Some people just want to believe in strange phenomena. Emoto’s followers are also likely to be into New Age phenomena like Chakras, out of body experiences and past lives. If Emoto is right, you certainly don’t want people thinking badly of you! However, I think we can relax. In my opinion, Emoto has the traditional two chances of being right – slim and none. William Reville is professor of biochemistry and public awareness of science officer at UCC – understandingscience.ucc.ie MORE FROM THE IRISH TIMES Crime & Law Floral tributes and messages outside Scoil Naomh Colmcille, Durrow, the school where Ashling Murphy taught.

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