

A quantum leap in medicine

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For today's Canadian family physicians, free time can be steadily eroded by active clinical practice. With rounds, office work, on-call duties, continuing medical education, and so on, our voice usually resonates within the limited horizons of our medical culture. This myopia can be remedied by peering over the fence into neighbouring sciences.

Fortunately, scientists—like Lauterbur and Mansfield (2003 Nobel Laureates), with their curiosity for the images produced by the magnetic resonance of tiny particles—can sometimes change the landscape of medicine. To family practitioners, these academic leaps in the frontiers of medicine can appear far-fetched. Opportunities might exist with our sister sciences, however, to regain perspective on our own field.

Uncertainty

Like medicine, the somewhat mysterious field of quantum physics often poses more questions than answers. The quantum world is founded on the principles of uncertainty and probabilism. Max Planck and Albert Einstein gave birth to the field in the early 1900s by exploring the concept that light exists as packets, or "quanta," of energy. The nature of quantum mechanics took a turn for the abstract when the advent of particle accelerators uncovered some peculiar characteristics of fast-moving particles. They appear to behave like waves; these particles more closely resemble a ripple in water than a traveling baseball. Further, we cannot even precisely determine a quantum particle's position and momentum simultaneously. Herein lies the foundation of the Heisenberg uncertainty principle.

Looking back to our side of the fence, our backyard doesn't seem so bad. Uncertainty has long characterized the art of medicine. Diagnostic uncertainty is common when physicians attempt to delineate human illness.

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Perhaps the fabric of our very existence is the culmination of multiple subatomic uncertainties. If this were true, then would Heisenberg's uncertainty apply to the variability and unique qualities we observe as students of the human condition? Further, is the unpredictability a measurable consequence of our intrinsic human limitations as observers?

Probabilism

The equally compelling concept of probabilism allows both fields to rationalize nature's unpredictability. We physicians, being master prognosticators, routinely spew probabilities at our patients. From cancer survival rates to medication efficacy, we are the "bookies" of morbidity and mortality. Is this unique to medicine or rather a function of the probabilistic nature of biological systems?

Guarding the front lines of health care, family practitioners typically engage pathology early in its diagnostic pathway. Thus, we are routinely confronted with a disproportionately large degree of uncertainty. Practically, obvious parallels between the quantum and medical worlds are unlikely to alter our entrenched practice styles in the near future. Yet, engaging our sister sciences, as visionaries in the past did, might afford us the luxury of perspective and perhaps enlighten our insight into the human condition. 🍁

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