

Purpose by Design


Can mindless chance think ahead?

Purpose in living systems is evidence of intelligence applied. Human stem cells are important during both development and adult life. Therefore, one could argue that only intelligence can explain the purpose-driven life of the stem cell. The standard biological explanation, however, is that stem cells evolved by a process devoid of purpose or intelligent direction; that evolution “created” complex living stem cells which serve important purposes but which were, themselves, not created on purpose. Recently, a surprising new purpose has been described for adult stem cells which makes it even more difficult to believe that such critically important cells evolved by purposeless chance.

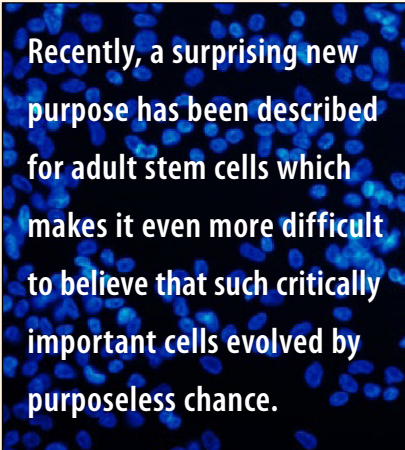
Stem cells are unspecialized cells that can divide and produce highly specialized cells.¹ During embryonic development, stem cells have a clear purpose in producing the cells that eventually become the liver, heart, lungs, and all other organs. Some stem cells remain active into adulthood and throughout an individual’s life. These adult stem cells continuously produce intermediate cells called transient amplifying cells which become replacement bone, blood, and skin cells. But biologically speaking, it would be much less complex, and less expensive in terms of energy, if replacement cells were produced directly from other skin or fat cells by simple cell division instead of through levels of intermediate amplifying cells. Yet, this is not the case. So why then are so many cells replaced by this much less efficient method?

John Pepper of the University of Arizona has recently put forward the surprising explanation that adult stem cells exist in long-lived animals and humans for the purpose of preventing evolution from happening.² Evolution, that is, within a single individual. An individual

can be thought of as a group of cooperating cells. Every time a cell divides, there is an opportunity for genetic errors or mutations to occur (micro-evolution). If skin cells were replaced by division of existing skin cells, there would be billions of opportunities for mutations to occur which could lead to cancer. By contrast, cell replacement using amplified stem cells always starts out with a non-mutated cell which is amplified only a limited number of times. This method prevents the accumulation of harmful mutations. If this were not the case, as people age, their organs would be at risk of breaking down because of the accumulation of mutated cells.

This finding that adult stem cells are needed to prevent evolution within an individual has striking implications. The unexpected choice of amplified stem cell replacement over direct cell division replacement speaks of purpose by deliberate design. But rather than recognize this, Dr. Pepper suggests that millions of years ago, single-celled animals could never have evolved into stable multicellular animals until the mechanism that stops evolution from occurring had also evolved. Is he really saying that for multicellular evolution to have occurred at all there must first have evolved a way to stop evolution? Don’t you think this is asking quite a lot of an evolutionary process which cannot think ahead? 

—MICHAEL G. WINDHEUSER, PH.D.



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1 J. Panno, *Stem Cell Research: Medical applications and ethical controversy* (New York, NY: Facts on File, Inc., 2005).

2 J.W. Pepper, et al., *Animal Cell Differentiation Patterns Suppress Somatic Evolution*, Plos Computational Biology. Vol 3(12) e250; 2532-2545, 2007.