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Projections for nanomedicine into the next decade: But is it all about pharmaceuticals?

It is clear that many “think tanks” have projected high growth for nanomedicine in the coming decades (Visiongain 2006). But ask yourself this question: In what commercial areas will nanomedicine make the largest impact? Are there any hidden nanomedicine technologies yet untapped? Most people following this field will say pharmaceuticals (or the more effective delivery of drugs) will constitute the largest commercial growth and the most revenues in nanomedicine for the next decade. However, please do not forget the impact that nanomaterials are having on redesigning biomedical devices used for imaging and diagnostics (simultaneously), tissue reconstruction, molecular assembly (for which many believe is the “Holy Grail” of nanomedicine), high resolution microscopy, nanopores to detect single molecules, immunohistochemistry, DNA detection, RNA-based drug delivery, lab-on-a-chip incorporating micro and nanofluidics, nanobiosensors, and the list goes on.

One particularly high impact area in the above list that does not seem to attract as much attention (as of yet) is the use of nanomedicine in tissue reconstruction. Clearly, the implant market for returning function to damaged or diseased tissues is large and will only become larger as high percentages of people will be entering their elderly years in the coming decade and want to remain active. With implant lifetimes (such as the hip implant, the most commonly replaced joint) less than 10–15 years, it is clear that such devices need help. As the US (via the US National Nanotechnology Initiative), European, and Japanese governments are leading public investors in nanotechnology today (US and Japan are the first and second largest supporters of nanomedicine government funding worldwide [Visiongain 2006]), much of these funds are going exactly to nanotechnologies that can improve the function of numerous implantable devices.

However, a forgotten investor in nanomedicine-related research that is integral in the tissue reconstruction arena are venture capitalists who supply seed funds to promote the translation of “bench-top” research to a “real” commercial product. Nanomedicine receives an estimated 40% of its funding from private investment (Visiongain 2006). Thus, while government funding is important, private funds to translate such research to commercial sectors are equally as important and play an extremely large role in creating better tissue constructs from nanotechnology.

There are daily exciting reports on the use of various nanostructured materials that can regenerate bone, vascular, bladder, nervous system, cartilage, muscle, skin, etc., tissues more effectively than what we are using today. While much work is needed (ie, few conclusive toxicological studies have been performed on nanomaterials and some believe that certain nanoparticles may cause pulmonary damage), when compared with the pharmaceutical industry, nanomedicine research in tissue reconstruction is more open and publicly reported. Since public relations and public support of new technologies is critical for continued government or private funding in nanomedicine, this may suggest that the use of nanotechnology to improve today’s implants may become one of the strongest commercial sectors in all of nanomedicine in the coming decade.

References

Visiongain. 2006. Nanomedicine 2006–2011 [online]. Accessed on February 4, 2008. URL: www.marketresearch.com.

