



Fat-Derived Stem Cells Show Promise for Regenerative Medicine, Says Review in Plastic and Reconstructive Surgery®

But Reviewers Urge Caution in Development and Clinical Use of Adipose Stem Cells

Arlington Heights, Ill. (May 29, 2012) – Adipose stem cells (ASCs)—stem cells derived from fat—are a promising source of cells for use in plastic surgery and regenerative medicine, according to a special review in the June issue of [Plastic and Reconstructive Surgery®](#), the official medical journal of the [American Society of Plastic Surgeons \(ASPS\)](#).

But much more research is needed to establish the safety and effectiveness of any type of ASC therapy in human patients, according to the article by ASPS Member Surgeon Rod Rohrich, MD of University of Texas Southwestern Medical Center, Dallas, and colleagues. Dr. Rohrich is Editor-in-Chief of *Plastic and Reconstructive Surgery*.

Adipose Stem Cells—Exciting Possibilities, but Proceed with Caution

The authors present an up-to-date review of research on the science and clinical uses of ASCs. Relatively easily derived from human fat, ASCs are "multipotent" cells that can be induced to develop into other kinds of cells—not only fat cells, but also bone, cartilage and muscle cells.

Adipose stem cells promote the development of new blood vessels (angiogenesis) and seem to represent an "immune privileged" set of cells that blocks inflammation. "Clinicians and patients alike have high expectations that ASCs may well be the answer to curing many recalcitrant diseases or to reconstruct anatomical defects," according to Dr. Rohrich and co-authors.

However, even as the number of studies using ASCs increases, there is continued concern about their "true clinical potential." The reviewers write, "For example, there are questions related to isolation and purification of ASCs, their effect on tumor growth, and the enforcement of FDA regulations."

Dr. Rohrich and co-authors performed an in-depth review to identify all known clinical trials of ASCs. So far, most studies have been performed in Europe and Korea; reflecting stringent FDA regulations, only three ASC studies have been performed in the United States to date.

Many Different Uses, But Little Experience So Far

Most ASC clinical trials to date have been performed in plastic surgery—a field with "unique privileged access to adipose tissues." Plastic surgeon-researchers have used ASCs for several types of soft tissue augmentation, such as breast augmentation (including after implant removal) and regeneration of fat in patients with abnormal fat loss (lipodystrophy). Studies exploring the use of ASCs to promote healing of difficult wounds have been reported as well. They have also been used as a method of soft tissue engineering or tissue regeneration, with inconclusive results.

In other specialties, ASCs have been studied for use in treating certain blood and immunologic disorders, heart and vascular problems, and fistulas. Some studies have explored the use of ASCs for generating new bone for use in reconstructive surgery. A few studies have reported promising preliminary results in the treatment of diabetes, multiple sclerosis, and spinal cord injury. No serious adverse events related to ASCs were reported in either group of studies.

Although many of the results are encouraging, the reviewers emphasize that all of these applications are in their infancy. Around the world, for all uses, less than 300 patients have been treated—with no standard protocol for the preparation or clinical applications of ASCs.

Nor is there any consensus as to the number of ASCs required per treatment, or how many treatments are needed to show clinical improvement. Consequently, Dr. Rohrich and coauthors conclude, "further basic science experimental studies with standardized protocols and larger randomized controlled trials need to be performed to ensure safety and efficacy of ASCs in accordance with FDA guidelines."

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The American Society of Plastic Surgeons (ASPS) is the world's largest organization of board-certified plastic surgeons. Representing more than 7,000 Member Surgeons, the Society is recognized as a leading authority and information source on aesthetic and reconstructive plastic surgery. ASPS comprises more than 94 percent of all board-certified plastic surgeons in the United States. Founded in 1931, the Society represents physicians certified by The American Board of Plastic Surgery or The Royal College of Physicians and Surgeons of Canada. ASPS advances quality care to plastic surgery patients by encouraging high standards of training, ethics, physician practice and research in plastic surgery. You can learn more and visit the American Society of Plastic Surgeons at PlasticSurgery.org or Facebook.com/PlasticSurgeryASPS and Twitter.com/ASPS_news.