

A New Advance in Baldness Surgery Using Platelet-Derived Growth Factor

Carlos O. Uebel, MD *Porto Alegre, Brazil*

We have performed an experimental study in 23 male patients with pattern hair loss using follicular units (FUs) and growth factors derived from autologous platelet-rich plasma to assess the effectiveness of those factors in the growth and density of transplanted FUs.

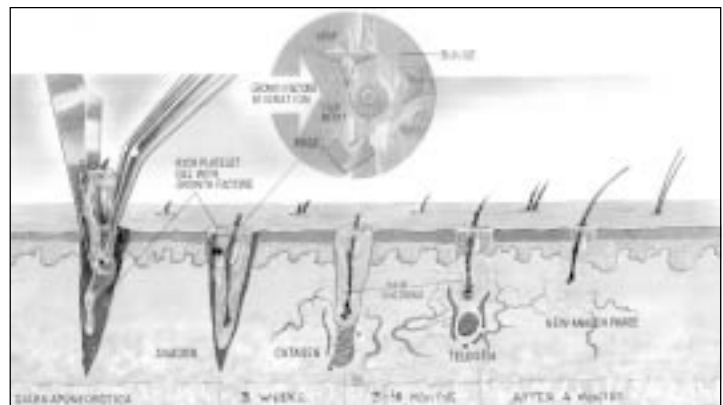


Figure 1. Schematic view of micrografts being implanted with platelet-derived growth factors.

Introduction

The first works on growth factors, derived from plasma, originate from the 1970s and 1980s, and they demonstrated usefulness in the healing process of ulcers and wounds. The growth factors contained in platelets of blood plasma are primarily of three types: the platelet-derived growth factor (PDGF), the transforming growth factor beta 1 (TGF beta 1), and the vascular endothelial growth factor (VEGF). These protein molecules interact with their respective receptors and enhance tissue angiogenesis. Their anti-inflammatory effects stimulate healing and the growth of new organic structures. Clinical use of growth factors consists of obtaining autologous platelet-rich plasma and applying it as a concentrate over the wound areas to be treated or implanted. Results have been most promising and are utilized in many plastic surgery procedures.

The action of growth factors on the germinative hair cycle has already been studied both in its embryological phase and in its adult phase, however, not in hair micrograft surgery. Growth factors are present in the bulge area, where stem cells are found, and they interact with cells of the matrix, thus activating the proliferative phase of the hair. Stem cells are more primitive and of ectodermal origin; they give origin to epidermal cells and sebaceous glands. Cells of the dermal papilla, which are found at the capillary base, are of mesenchymal origin. Both cells need each other, and when they interact through the action of various growth factors they will give rise to the future follicular unit.

In the first seven days after hair transplantation, there occurs an inflammatory process involving neutrophils, eosinophils, macrophages, platelets, fibroblasts, and growth factors. Both edema and erythema occur in the scalp. After this period, apoptosis occurs and the micrograft enters into an involution phase resulting in hair shedding. The next growth cycle begins after the third month and continues up to the seventh month. Up to 15% of these micrografts do not survive; they become atrophic and are absorbed or expelled.

In our research, we added platelet-rich plasma including growth factors to the FUs with the intent of activating the proliferative phase and increasing the survival of the FUs (Figure 1).

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President's Message

E. Antonio Mangubat, MD *Seattle, Washington*

Give, Connect, Elevate:
Lessons Learned from the Starbucks Coffee Company



E. Antonio Mangubat, MD

During my return from our annual Live Surgery Workshop in Orlando, Florida, I was seated next to a young woman from Florida in her early 20s, professionally dressed, going to Seattle, Washington, to attend her first Starbucks Leadership Conference. Laura Ruiz had only been managing her Starbucks store for 3 years but had grown the store's profitability so significantly that she was chosen for this honor at such a young age. After asking the obvious question, "How did you do this?", she was eager to share her secret for success: the Starbucks Values, Purpose, and Mission, all written on a tri-fold card about the size of a credit card. I was so intrigued that she gave me her little card of wisdom. I'd like to share the highlights of how a small coffee store in an open-air market in Seattle transformed itself into a world power of 9,000 retail stores in 35 countries serving 30 million customers and generating \$5 billion in revenues annually, and, more importantly, how the Starbucks philosophy (paraphrased below) applies to the ISHRS and to each and every one of our members.

The Starbucks Lesson

Values

Passion for everything we do
 Integrity, pride and success
 Respect for each other
 Entrepreneurial spirit and drive



Purpose

To provide an uplifting experience that enriches people's lives daily

Mission

To be the best in the world without compromising principles as we grow

How We Do It

Together

In legendary ways, big and small
 By living our values that guide us: passion, integrity, entrepreneurial spirit, pride and respect

Be Welcoming

Offer everyone a sense of belonging

Be Genuine

Connect, discover, and respond
 Always make it right, do whatever it takes for every person every time.

Be Knowledgeable

Love what you do. Share it with others.
 Each of us is responsible for being knowledgeable.

Be Considerate

Take care of yourself, each other, and our environment. Help each other.
 Always deliver high quality products

Be Involved

In the store, in the company, and in your community
 Connect with one another, with the company and with your community

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Co-Editors' Messages

Robert S. Haber, MD *South Euclid, Ohio*



Robert S. Haber, MD

“Everything that can be invented has been invented.” So spoke Charles H. Duell, Commissioner, U.S. Office of Patents, in 1899. We know this statement was short-sighted, to be kind. But only a few years ago, members of the ISHRS were saying that there couldn't possibly still be major advances to be made in our field. How wrong they were! In this issue of the *Forum*, Carlos Uebel presents an exciting new concept in using growth factors to enhance graft survival and growth, Mike Beehner shares his techniques for transplanting women, we hear more about the recent Live Surgery Workshop in Orlando, and we learn about how to protect new intellectual property (sorry Mr. Duell), among other interesting items. My only concern with Tony Mangubat's enthusiastic embrace of the Starbucks philosophy in his President's Message is that Starbucks is a nationwide chain that has moved into every city and virtually eliminated locally owned and operated coffee shops. Hmmm.

It's time to discuss an exciting new direction for the *Forum*. As we as a Society and as a field of expertise have continued to mature, so has the quality of the submissions to this journal. As those of us who peruse the medical literature are aware, there is a dearth of quality articles about hair restoration surgery. We are ready to take the next step, and begin to solicit articles for the *Forum* that will be evaluated by the peer-reviewed process. If we are successful in this endeavor, at some point in the future we may qualify

for inclusion in Index Medicus, and researchers will be able to find the *Forum* when conducting searches. Many of our members already periodically submit articles to peer-reviewed journals for publication, and this is an opportunity to submit directly to your most receptive readers.

Have no fear! The *Forum* will not change. All of the current features will remain, and the rapid dissemination of ideas and commentary will always be possible. Only the peer-reviewed articles will need to adhere to the rigid academic process. From the standpoint of you, the reader, the only change will be the inclusion of articles that have the standard format of peer-reviewed articles, including abstract, introduction, method, results, and discussion. The difference is that these articles may take many months to appear in print, as they wind their way through the process. Many of our current members currently serve as reviewers for major journals, and the *Forum* editors would like to invite those members to volunteer for this new task. We welcome your comments about this exciting concept.

The *Forum* looks forward to publishing reports from the upcoming meetings of the Italian Society of Hair Restoration in Modena, Italy, and the European Society of Hair Restoration Surgery in Brussels, Belgium. Hopefully, every reader is planning to attend the ISHRS annual meeting in Sydney, Australia, and include extra time before or after the meeting to leisurely explore one of the most extraordinary destinations in the world!

Keep your articles, ideas, letters to the editors, and other contributions coming!

Bob Haber, MD

Jerry E. Cooley, MD *Charlotte, North Carolina*



Jerry E. Cooley, MD

What is the best holding solution for hair follicles during a hair transplant? First, let's put this topic in perspective. If the goal is to produce the best graft growth, we have to avoid physical trauma (transection, crushing, dehydration) and respect the vascular integrity of the recipient bed. After consistently doing this, we can look at using the best holding solution as the “icing on the cake.” In my opinion, our current state of knowledge does not allow us to definitively state which solution is best.

Dermatologists sometimes speak about the characteristics of the ideal filling agent for wrinkles and soft tissue defects. Likewise, I think we can talk about the ideal holding solution. **Hydration and osmotic balance** is the first requirement. We don't want our grafts to shrink or explode because the osmolarity of our solution is wrong. **Protection from pH changes** while out of the body requires that an effective buffer is present. **Nutrients and metabolic support** (e.g., glucose, insulin, amino acids) may be important to keep cellular machinery going while outside the body. **Antioxidants** (e.g., vitamin E, glutathione) help protect the grafts from ischemia-reperfusion injury. **Temperature appropriateness** is another consideration because chilling tissue causes pathophysiologic changes compared to storage

at body temperature or room temperature. Hypothermic tissue storage solutions are specifically designed to hold cells, tissues, and organs at cold temperatures. Finally, the ideal holding solution should be **cost-effective** to justify a switch from cheap old saline.

Possible alternatives to chilled normal saline include lactated ringer's solution, cell culture media (e.g., DMEM with or without additives), hypothermic tissue transplant media (e.g., HypoThermosol, BioLife Solutions, Inc.), and platelet-rich plasma described by Carlos Uebel in this issue. We need a convincing comparative study to sort this out. The problem with doing these studies on our day-to-day patients is that there are so many other variables involved in the typical procedure that to arrive at statistically significant, clinically meaningful results requires a large-scale, long-term study that is beyond the scope of most of us.

An *in vitro* or animal model can overcome these problems. One such approach was used by Chinese researchers who implanted human hair follicles under the skin of nude mice, studying the survival of follicles soaked in lactated ringer's solution vs. cell culture media (DMEM).¹ In my opinion, this animal model appears to have numerous advantages over other study designs in that it removes most of the variables besides the one in question and yet closely

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President's Message

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I found these principles to be simple, yet they are not second nature to many of us. We have to consciously elevate them into our daily lives if they are to become a part of our lives. Continuous, unrelenting growth requires the commitment to our values and our goals. Not all of Starbucks' lessons apply to us, but I am surprised how much of their corporate philosophy would benefit our Society and each of our practices.

If we are to grow as a Society and as a specialty, we will need to live these principles every day. *Have passion for our specialty, make everybody welcome, always make it right, be knowledgeable, be considerate, and be involved.* If every ISHRS member lived this philosophy, I believe we would have success beyond the imaginable—both individually and as a Society—because it can only lead to sustained growth, expansion, and success. Be involved by learning the latest in HRS by attending every Annual Meeting, sharing your knowledge with others, welcoming newcomers to HRS, connecting with your colleagues to solve difficult problems, connecting with your community by providing pro bono

reconstructive services to those who cannot afford it, and sharing yourself every day.

In any competitive environment, it is often easier to ignore these principles, but the results are short-lived. We have certainly seen this in our specialty and we all have to be vigilant each day to guard against compromising our principles and ethics for the sake of profit. Starbucks' president, Orin Smith, alluded to this in a magazine interview and I paraphrase his comment to fit our Society: *Ethics cannot be an add-on to our business; it must be an essential part of who we are.*

Unethical behavior has been an issue in HRS for years and we have made significant progress in educating our members; however, if a small coffee company can live by these principles and grow to be a worldwide powerhouse, it should be second nature for physicians who have taken the Hippocratic Oath.

I learned a lot from this young executive during the five-hour plane ride back to Seattle, and I started implementing most of the Starbucks philosophy in my own office. Thank you, Laura Ruiz, for sharing your company's vision. If any of you happen to be in Seattle, stop by my office and have a cup of coffee!

E. Antonio Mangubat, MD

Cooley Message

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resembles an actual transplantation procedure. One theoretical advantage of this approach over *in vitro* assays is that it also includes the ischemia-reperfusion injury, which grafts are subject to after transplantation.

I would like to see a study using this animal model repeated looking at the various candidate solutions mentioned

above. Then we would have much more convincing reasons to make a change.

Jerry Cooley, MD

1. Qian JG, Li WZ, Zhang GC, Yan LB. Is delayed micrograft hair transplantation possible? Evaluation of viabilities of hair follicles preserved in two storage media. *Br J Plast Surg*. 2005 January; 58(1): 38–41.

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Any person submitting content to be published in the *Forum* agrees to the following: 1. The materials, including photographs, used in this submission do not identify, by name or otherwise, suggest the identity of, or present a recognizable likeness of any patient or others; or, if they do, I have obtained all necessary consents from patients and others for the further use, distribution, and publication of such materials. 2. The author indemnifies and holds harmless the ISHRS from any breach of the above.

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Submission deadlines:

July/August, June 10 • September/October, August 10

Notes from the Editor Emeritus

William M. Parsley, MD *Louisville, Kentucky*



William M. Parsley, MD

One of the primary concerns of the ISHRS is the education of new doctors and their assistants. For many years the process was far simpler than today. Plug grafts required very little preparation before reinserting them into the scalp. Usually only 100 to 200 grafts were placed, and a team of 2 or 3 could perform the procedure quite adequately. Now we are transplanting 2,000 to 3,000 grafts at a single session, and in some offices over 5,000 grafts. Often a team of 6–8 assistants are necessary to help the hair restoration surgeon. Smaller grafts, such as follicular unit grafts, are usually prepared using a stereomicroscope, and skill demands are much greater. Are new doctors being scared away? Are they confused about how to prepare to enter this field? I am sure in some cases, the answer to both questions is yes.

The ISHRS has fellowship training programs that have steadily been growing in number. Dow Stough, MD, Walter Unger, MD, Damkerng Pathomvanich, MD, Dan Rousso, MD, and Marc Avram, MD, all have approved programs in addition to at least 3 fellowships being run by Medical Hair Restoration (Matt Leavitt, DO, Melvin Mayer, MD, Bob Niedbalski, DO, and Carlos Puig, DO). Fellowships can run from 1–2 years and require exposure to at least 100 hair restoration cases. In addition, an educational and reading program is involved. Dr. Carlos Puig has spent countless hours nurturing these programs and deserves much credit. Contact the ISHRS office or Dr. Puig if you have an interest.

For many, however, their life and career situations will not allow this type of sacrifice. For those doctors, there are still ways to develop your knowledge and skills to a level where a hair restoration practice can begin. I would like to make a few suggestions to those interested in pursuing hair restoration.

Step 1. Join the International Society of Hair Restoration Surgery and also your national hair restoration society, if you have one. If you are reading this, more than likely you have already accomplished the first step.

Step 2. Begin reading. The *Hair Transplant Forum International* and the *Dermatologic Surgery* journal are musts. The most recent textbook is *Hair Transplantation* by Drs. Walter Unger and Ron Shapiro. While there are over 900 pages, it is loaded with pictures and diagrams—so it reads pretty easily. In addition, *Disorders of Hair Growth* by Dr. Elise Olsen and *The Structure of the Human Hair Follicle* by Dr. David Whiting are excellent informational sources.

Step 3. Attend the ISHRS Annual Meeting at least twice and the Live Surgery Workshop in Orlando at least once. No, you are still not ready to start.

Step 4. Visit some offices. Most doctors will allow you to visit for a day or two and try to give you helpful exposure. Remember, they are “helping” you, not “training” you.

If possible, and if they permit, take some of your assistants with you. Their education is as important as yours. Some of the more renowned doctors are very busy and too many observers can impede their practices, so be understanding if they turn you down. Some might request payment or a donation to an ISHRS fund. Doctors in your immediate region might be wary about letting a potential competitor into their office, so a little travel might be necessary. Ideally, one should visit at least 3 offices. Make sure you know how to design a proper hairline. You are getting closer.

Step 5. Get your office setup and staff in place. Keep in mind that if you buy cheap equipment, you might be replacing it soon. Make sure you are committed before making these purchases, because paying them off might be down the road a bit. If you are going to do follicular unit transplantation, get a two-headed teaching stereomicroscope (Motic is good and has the best price). You are almost ready.

Step 6. Let people know that you are ready to start. Send some letters to doctors in your region. Talk to hair salons or hair stylist organizations. Consider advertising—phone book, radio, newspapers, and TV.

Step 7. Perform your first few cases. This can be the tough part. Whatever you do, don't do the first cases with both novice assistants and a novice doctor. If it is possible, try to find an established doctor working part-time or a doctor on vacation who will let you pay his assistants to help you for a few days. Additionally, there are some independent assistant teams who can fly in to help. Line up some cases and have these visiting assistants help teach your staff. Another possibility is to take a patient to an established office with the idea that you can give hands-on assistance during the surgery. Ideally, they would also allow your assistants to do some cutting. Pick small easy cases at first, avoiding females and very young men.

These steps will help you get started with your plunge into hair restoration, but please remember some important rules. First, don't try to hire any of the office's staff—bad behavior. Second, don't ever visit someone for a few days and make claims that you were trained by them. Third, no gifts are necessary. The most sincere “thank you” is to do the same when you develop experience. Anything else is inadequate.

Orlando Workshop

I was able to watch Alan Bauman, MD, and Jim Harris, MD, perform follicular unit extraction in Orlando during the March Live Surgery Workshop. How refreshing to see them trying their best to teach their skills to others. Jim Harris has developed an excellent technique using a sharp punch to “score” the skin very superficially and then finish removing the graft with a dull punch. It is by far the most effective technique for follicular unit extraction that I have seen to date. He had less than 5% transection in the grafts that I

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checked under the microscope and was moving with good speed. He still has some problems with buried grafts, but the overall technique was surprisingly good. We will certainly be hearing more about this technique in the future.

Join Us in Sydney

Finally, one last appeal to attend the Annual ISHRS Meeting in Sydney, August 24–28, 2005. The Australian surgeons for years have traveled all over the world to meetings, and their contributions are too numerous to count. They have been indispensable members of the Society. Now, this is their day. We owe it to them to show our commitment. Plus, I suspect it will be the best meeting ever.

William M. Parsley, MD



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