the marginal mandibular branch of the left facial nerve and the marginal mandibular branch of the right facial nerve. A CFNG was transplanted in 8 rats (designated the control group), a CFNG coated with an ASC suspension \( (1.5 \times 10^6 \text{ cells/1,000 ml}) \) in 8 rats (a suspension group), and a CFNG wrapped in an ASC sheet \( (1.5 \times 10^6 \text{ cells/3.5-cm diameter dish}) \) in 8 rats (a sheet group). Nerve regeneration was then compared histologically and physiologically between the groups.

**RESULTS:** The time to reinnervation, assessed by observing the rate of contraction of the vibrissae muscles using a facial palsy scoring system, was significantly shorter in the sheet group than in the other 2 groups. Evoked compound electromyography showed significantly higher amplitude in the sheet group \( (4.2 \pm 1.3 \text{ mV}) \) than in the suspension group \( (1.7 \pm 1.2 \text{ mV}) \) and the control group \( (1.6 \pm 0.8 \text{ mV}; P < 0.01) \). Toluidine blue staining showed that the number of myelinated fibers was significantly higher in the sheet group \( (2,455 \pm 603) \) than in the suspension group \( (1,379 \pm 588) \) or control group \( (590 \pm 586; P < 0.01) \).

**CONCLUSIONS:** CFNG in combination with ASC sheets prepared using temperature-responsive dishes promoted axonal outgrowth in autologous nerve grafts and reduced the time to reinnervation. ASC sheets may improve the therapeutic effect of CFNG in patients with facial palsy.

**Functional Influence of Breast Implant Surface Texture With Micro Topographic Features on Capsular Contracture**

**Presenter:** Chan Yeong Heo, MD, PhD

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The shell texture of a breast implant is an important factor associated with a risk of capsular contracture often necessitating additional surgery. The objective of this study was to characterize differences of commercial available implants in terms of texture, topography, and wettability and the behavior of capsular contracture. The implants utilized in this study were BellaGel Smooth, BellaGel Textured, BellaGel Micro, or Motiva SilkSurface. The shell texture of these implants was characterized using a scanning electron microscopy, x-ray microtomography, 3-dimensional confocal laser scanning microscope, and contact angle goniometer. In addition, silicone breast implants were explanted beneath the panniculus carnosus muscle on the dorsum of Sprague Dawley rats and observed for up to 8 weeks postoperative days. The fibrous capsule around silicone implants was explanted for histologic, immunohistochemical examination, and western blotting. BellGel Micro and Motiva SilkSurface textures resulted in significant decreases in capsule thickness \( (P < 0.05) \) and collagen production \( (P < 0.05) \) at 8 weeks with respect to the BellaGel Smooth and BellaGel Textured group. Fibrous tissue formation markers \( (\text{Vimentin, } \alpha\text{-SMA, and TGF-} \beta) \) were significantly reduced in BellaGel Micro and Motiva SilkSurface textures with respect to the BellaGel Smooth and BellaGel Textured group. Significant \( (P < 0.05) \) decreases in inducible nitric oxide synthase, an inflammation marker, were observed in the BellaGel Micro and Motiva SilkSurface textures. In summary, surface texture with microtopographic features led to decreased fibrotic capsule formation compared with other surfaces. This finding may offer to design an improved silicone breast implant, which could alleviate capsular contracture.

**Searching for an Ideal Preclinical Model to Analyze Oncologic Safety of Breast Lipofilling: Preliminary Results**

**Presenter:** Francisco Claro, Jr, MD, PhD

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**INTRODUCTION:** Preclinical studies aiming to evaluate the microenvironment of breast cancer (BC) are very important for analysis of risk and the behavior of this disease to treatments proposed in humans, such as breast lipofilling. Laboratorial studies used so far for this purpose present serious methodologic problems. They are based on models that use cancer-induced carcinogens that have a residual systemic effect or through the use of nonluminal human BC implanted in immunosuppressed murine hosts. This article, although, presents preliminary results of a big project aiming to develop a preclinical studies capable of assessing risks. The primary objective here was to analyze the effectiveness of cafeteria diet (CD)—a known risk factor for BC in humans—to stimulate the mammary gland and the time required for this to trigger some effect over the murine breast tissue.

**METHODS:** Eighteen Sprague-Dawley rats with 28 days of life were randomly divided into 4 groups: 2 controls (C1 and C2), where rats were fed with standard diet, and 2 groups that received CD (D1 and D2). CD was introduced at rats’ age of 6 weeks, what is similar to the human age (HA) of 7 years old. The following variables were collected...
and analyzed: weight, naso-anal length, Lee index—what is similar to the human body mass index, fasting glycermia, perigonadal fat pad weight, and groin fat pad volume. Six thoracic breasts, adipose tissue of omentum and subcutaneous of each rat were harvested for analysis. These samples were studied through histologic analysis with hematoxylin/eosin staining. Statistical analyses were performed on SPSS software using paired t-tests, analysis of variance (analysis of variance, 1 way) for ordinal variables, and McNemar’s test for categorical variables.

RESULTS: Ten rats (C1 e D1) were analyzed with 17 weeks old (HA = 20 years old) and 8 (C2 e D2) with 26 weeks old (HA = 32 years old). The mean weight in C1 was 250.14 g and in D1 was 332.65 g (P = 0.01); in C2, it was 263.09 g and in D2, 426.76 g (P < 0.001). The mean Lee index was, respectively, 303.37, 313.43, 298.12, 332.63 in groups C1, D1, C2 e D2 (P = 0.45 between C1 and D1; P = 0.002 between C2 and D2). The mean fasting glycermia value was 76.06mg/dl (P = 0.26); the mean perigonadal fat pad weight was 8.21 g (P < 0.001 between control and CD groups in both times). The mean groin fat pad volume was 5.08 ml, with significant difference between C1 and D1 (P = 0.007) and C2 and D2 (P = 0.001). Regarding the mammary microenvironment, it was observed 20% of duct ectasia in D1 versus 8% in C1 (P < 0.001) within 11 weeks under CD. One adenofibroma was observed in D2 at 12th week after CD onset and other at the 13th.

CONCLUSION: This study showed that the CD was an effective method to induce changes in the breast microenvironment even in young rats without compromising the glycemic status (which might be a bias). These data suggest that CD can be an effective inducer for tumorigenesis in older rats. These preliminary results can lead to the development of future preclinical models for the assessment of BC risk.

Characterizing Nipple Biomechanics: In Search of an Ideal Tissue Substitute

Presenter: Arash Samadi, BS

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INTRODUCTION: Following total mastectomy, nipple reconstruction is an essential, often last step of breast reconstruction. The positive psychological effect is critical to the recovery process, and patients report increased satisfaction, with increased happiness in sexual behavior and their nude appearance. As is the case for most reconstructive surgeries, use of autologous tissue is the ideal reconstructive methodology, eliminating the possibility of rejection, minimizing infection, and maximizing tissue integration and permanence. Autologous costal cartilage (CC) grafts have been used to maintain neo-nipple projection, but this technique is suboptimal due to difficulty of controlling the size and shape of the neo-nipple and stiff biomechanical qualities of resultant neo-nipple. We have previously shown the efficacy of minced CC in preservation of neo-nipple projection when integrated with external biodegradable scaffold. Herein, we assess simple and reliable methodologies for mechanical processing of CC to achieve desired biomechanical characteristics that mimic the human nipple more closely.

METHODS: Excess CC, from patients undergoing deep inferior epigastric flap procedure, was mechanically processed by either shredding or mincing in sterile fashion. Mechanically processed cartilage was either packed into a custom-designed, 3D-printed external scaffolds (made from polylactic acid), or an equal volume was wrapped in Surgicel. The constructs were implant into nude rats by creating a subcutaneous pocket using CV flap technique. The constructs were explanted after 3 months for histologic and biomechanical testing. Biomechanical testing was also performed on native human nipple and premanipulation/implantation CC. Confined compression testing was performed by compressing the samples to 30% of their original height in 6 steps of 5% strain, with 10 minutes between steps to allow for full stress relaxation. Equilibrium modulus was calculated.

RESULTS: After 3 months in vivo, mechanical analysis demonstrated that mincing of the cartilage changed the equilibrium modulus and hydraulic permeability of implants to values closer to native human nipple regardless of presence of the external scaffold. The minced CC possessed almost 4 times smaller modulus than the premanipulation/implantation CC on average (702 versus 2,723 kPa; P = 0.0036). The average human nipple had lower, but not statistically significant, equilibrium modulus than the minced cartilage (257 versus 702 kPa). Hematoxylin/eosin staining and LIVE/DEAD assay showed the presence of healthy and viable cartilage in all groups. There was evidence of fibrovascular tissue invasion resulting in consolidation and incorporation of the implants.

CONCLUSIONS: We demonstrate that autologous CC, usually discarded during a deep inferior epigastric flap procedure, can be used as a viable implant for nipple reconstruction. Because the original CC is firm and nonmalleable, mechanical processing of the CC reduces stiffness and allows for incorporation of individualized engineered constructs tailored to patient desire (sizes/levels of projection). We demonstrated that the mincing of CC resulted in constructs with more similar biomechanical properties to that of the native human nipple without the loss of projection or topography seen with traditional approaches to nipple reconstruction.