**Purpose:** An estimated $170 billion is spent annually on biomedical devices including pacemakers, implants for reconstructive surgery and biosensors around the world. Implantable materials used in biomedical devices elicit a host response termed foreign body response (FBR). FBR begins as a wound healing response but progresses into a fibrotic reaction resulting in the formation of a fibrous capsule, which isolates the implant from the surrounding microenvironment leading to implant failure. As advances are made in materials sciences, electronics, and design of sophisticated biomedical devices, modulating FBR remains the final frontier in developing durable man-machine interfaces. One key component of fibrosis that is often overlooked in the study of FBR is mechanical signaling. We have previously shown that fibrotic wound healing does not occur under normal conditions in mice, but when healing wounds are subject to high levels of mechanical stress, they produce human-like fibrotic scar tissue. Since wound healing and FBR are very closely related pathologies concluding in a fibrotic reaction characterized by increased collagen deposition, we hypothesized that mechanical signaling is a critical component of FBR to implantable materials.

**Methods:** FBR capsules from humans (breast implants, pacemakers, and neurostimulator batteries) and mice were analyzed using immunohistochemistry. Subsequently, we quantified the local mechanical stress patterns that emerge at the implant-tissue interface in both mice and humans using computational finite element modeling. To further test our hypothesis, we developed vibration-enabled implants (VEIs), which recapitulate human levels of mechanical stress in mice via in situ vibration of silicone implants. We then compared FBR in control mice, VEI model, and humans. Next, we used mass spectrometry to identify the mechanotransduction pathways that are upregulated in the VEI model. Finally, experiments using WT and IQGAP1 KO mice verified the critical role of mechanotransduction in FBR. Single cell sequencing experiments and immunostaining of FBR tissue were employed to study FBR in WT and KO mice.

**Results:** We demonstrate that the differences in FBR between mice and humans is a result of differential mechanical stress at the implant-tissue interface. Applying human levels of mechanical stress around murine implants using VEIs results in human-like robust FBR, which proves that mechanical stress is a critical component of human FBR. Proteomics analyses revealed that IQGAP1, which is a scaffolding protein involved in multiple mechanotransduction pathways is upregulated in VEI capsules as compared to control subcutaneous tissue. Here we show that IQGAP1 KO mice reverse the effect of mechanically enhanced FBR. Finally, single cell sequencing experiments identified critical mechanoresponsive subpopulations of macrophages and fibroblasts that were underrepresented in the KO mice, further confirming that targeting mechanotransduction is a viable means to reduce FBR to biomedical implants.

**Conclusion:** Here we demonstrate the central role of mechanical signaling at the implant-tissue interface in human FBR. Further studies are underway to develop therapeutic strategies to limit FBR. These findings reveal the importance of modulating the mechanical environment to improve the in vivo biocompatibility of biomedical devices.

**QS8**

**A Prospective Analysis Of Opioid Prescription, Consumption, And Psychometric Correlations In Outpatient Plastic Surgery Procedures**

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**Purpose:** The number of deaths due to opioid overdose is increasing annually in North America. Plastic Surgeons prescribe opioids after outpatient surgery based on anecdotal training rather than evidence; thus, excess opioid tablets may be available for diversion and abuse. The primary purpose of this study is to determine the factors predicting the decision to prescribe an opioid, and the secondary purpose is to determine the factors which predict the use of opioid tablets after outpatient Plastic Surgery procedures.

**Methods:** Data was collected prospectively using two surveys: (1) one pre-operative and (2) post-operative at approximately day 14. Participants were included if they were over the age of 16, could provide their own consent, and underwent an outpatient procedure. The primary outcome was type of prescription given (opioid versus non-opioid). The secondary outcome was the number of opioid tablets consumed at the second survey. Additional information gathered included: demographic variables, the pain catastrophizing scale (PCS) and patient health questionnaire-4 (PHQ-4) for depression and anxiety. Statistical analyses included Chi-Square and Student’s t-test for dichotomous and continuous variables respectively, univariable, and...
multivariate regression analysis. Alpha level was set to 0.05 for statistical significance.

**Results:** Four hundred and forty patients were recruited, of which 214 (49%) received an opioid prescription. The following factors were independently associated with receiving an opioid prescription: surgery of the upper limb (OR 4.0 [1.7-9.3], p=0.001), breast and abdomen (OR 11.1 [1.2-101.1], p=0.032), dermatologic surgery (OR 0.2 [0.1-0.5], p=0.001), and surgery in the main operating room (OR 23.6 [10.0-55.2], p<0.001). Patients consumed more opioid tablets if they were on pain medications prior to surgery (p=0.03), and if they scored higher on the PHQ-4 (p=0.002) but not the PCS (p=0.732). Plastic Surgeons prescribed significantly less opioids over time in minor procedures (p<0.001), without an increase in pain crises. The mean number of tablets per opioid prescription was 22, and the mean number of tablets consumed per specific procedures were: 15.9 opioid tablets over 8.6 days after bilateral breast reduction, 8 tablets over 2.5 days after carpal tunnel release, 6.4 tablets over 3.3 days after palmar fasciectomy, 2.6 tablets over 5 days after trigger finger release, 2.1 tablets over 1.2 days after subcutaneous cyst or mass excision, and 1.2 tablets over 1.2 days after skin cancer surgery. The number of unused tablets were: 888 Tylenol 3, 156 Tylenol 2, 46 Oxycodone, 30 Percocet, and 24 hydromorphone. Only 18% of patients who received opioid prescriptions were instructed on proper disposal of unused tablets.

**Conclusions:** The patterns of opioid prescription and consumption patterns after outpatient Plastic Surgery are elucidated. Plastic surgeons globally over-estimate opioid requirements across all procedures studied. Surgeons could potentially prescribe less opioids in the minor procedure room without an increase in pain crises. Large sample, procedure-specific studies are required to determine opioid requirements. The lack of patient information on proper disposal of unused tablets represents a gap in knowledge which needs to be addressed.

**QS9**

**Plastic & Reconstructive Surgeons’ Views On A Single Payer Health Care Alternative: Implications For Patients And Practice**

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**Purpose:** As health care costs become an increasingly large share of the U.S. economy while millions remain uninsured, a single payer alternative has been increasingly espoused, even by leading presidential candidates. We examine the views of U.S. plastic and reconstructive surgeons on a single payer healthcare system and its implications for patients and practice.

**Methods:** 3,431 U.S. plastic and reconstructive surgeons were sent a 28-item Qualtrics survey from September 1st to November 1st, 2019. Demographic and opinion data were analyzed.

**Results:** There was a 11.16% response rate (n=383). The majority of respondents were male (84% compared to 85% of plastic surgeons nationally) with an average age of 55.2; 64% of respondents were in private practice (significantly lower than the 80% national proportion, p < 0.0001), and 17% in academic practice (significantly higher than the 4% national proportion, p < 0.0001). Among survey respondents, there is a significant relationship between respondents’ practice region and practice type (p=0.0005), with the Northeast having the highest percentage of academic practitioners (29.7%), and the Southeast having the highest percentage of private practitioners (100%). There is also a significant relationship between political affiliation and practice type (p = 0.0085). Among private practitioners, 43.3% identify as Republican and 16.2% Democrat, compared to 24.6% Republican and 33.9% Democrat among academic practitioners. Forty three percent believe it is the government’s responsibility to ensure that care is provided for all. The proportion of plastic surgeons that chose single payer as the most optimal health care system is significantly different between academic (41.5%) and private practice (24.6%, p=0.011). Among academic plastic surgeons, 22% would consider leaving if single payer were enacted and 59.5% would decrease the reconstructive portion of their practice (p <0.01). Seventy percent of all respondents, regardless of practice type, agreed that losing the economic incentive of doing more cases would adversely affect how hard they work, with 63 percent saying they would not work the same number of hours under single payer (p<0.05). Thirty four percent are willing to give up income in order to reduce their paperwork and administrative burden.

**Conclusion:** Most U.S. plastic and reconstructive surgeons in 2019 do not support the enactment of a single payer health care system, and the majority believe that losing the economic incentive associated with doing