a variant near the NCOA3 (nuclear receptor coactivator 3) gene and an 199-candidate gene meta-analysis of GWAS demonstrated association only between COL1A1 and VEGF genes and hip OA. In addition, the effect of the FTO variant on OA risk was found to be mediated through body mass index. In OA genomics, four trans-acting factors were identified that bind to GDF5 and regulate its expression via the OA susceptibility locus rs143383. Gene expression microarray studies in OA synovium showed elevation of collagens and cross-linking enzymes (COL1A1, COL5A1, PLD02, LOX and TIMP1) responsive to TGF-β and also differential expression pattern between different areas of the osteoarthritic synovial membrane. Microarray analysis in peripheral blood demonstrated differentially expressed genes involved in apoptotic pathways between OA patients and healthy controls. Furthermore, gene expression profiling in OA subchondral bone revealed differentially expressed genes involved in cartilage and bone development and OA pathogenesis. In epigenetics, a number of studies identified the role of several microRNAs (miRs) in regulation of gene expression in chondrocytes and highlighted their use as potential drug targets. Among them, miR-125 was implicated in ADAMTS-4 regulation, miR-127b in MMP-13 regulation and IL-1β induced catabolic effects, miR-1247 was shown to directly target SOX9 and overexpression of hsa-miR-148a in OA chondrocytes inhibited hypertrophic differentiation and increased COL2A1 production. Future studies must focus on the integration of genetics and genomics for the identification of signaling pathways and regulatory networks responsible for OA development.

I-13
YEAR IN REVIEW - BIOMARKERS IN OA
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Currently, OA diagnosis is mainly symptomatic, resting on the description of pain symptoms, stiffness of the affected joints, and radiography, which has been the reference technique to determine the grade of joint destruction. This is of key importance, since radiography provides only indirect information about the joint tissue and it has poor sensitivity to detect changes. This lack of diagnostic tools is especially important in OA, since there is currently no effective therapy for this disease. A major pursuit in OA research relies in the definition of early diagnostic strategies, which would also aid to enable an accurate monitoring of the progression of the disease. OA remains silent at its initial stages in most patients, and there is already an extensive deterioration of cartilage at the time of diagnosis. All this background is the reason for the substantial interest in finding new specific biological markers of osteoarthrits that will facilitate not only early diagnosis of joint destruction (which will enable early interventions intended to slow the progression of the disease), but also disease prognosis or evolution studies (which will facilitate the development of alternative therapeutic strategies). Over the years there have been proposed a series of biochemical markers which may reflect the synthesis or degradation of the three main joint tissues (cartilage, synovial membrane and bone), and this list is continuously expanding. However, despite the active research in this field, no single biomarker stands out as the gold standard or is sufficiently validated and qualified for its systematic use in OA diagnosis or anti-OA drug development. The most promising diagnostic approach would be the study of combinations of biomarkers. New multiplexed approaches have emerged in the recent years for the identification and verification of novel OA biomarkers, employing genomics, proteomics and metabolomics tools. In this review I will present the most relevant proteomic and metabolomics results published since April 2013 to April 2014 focused in the early and consolidated diagnosis of OA, in to predict how it will develop, or respond to therapy.

I-14
THE YEAR IN REVIEW: REGENERATIVE MEDICINE
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Regenerative medicine is an emerging area that will influence the treatment of joint diseases in the future. It involves the use of bio-materials, cell therapy, and bioactive factors such as growth factors, drugs and small molecules to regenerate damaged tissues. This multidisciplinary field is extremely active, with rapid development of new technologies that emerge from basic sciences as well as by the increasing number of clinical studies of ever increasing quality. A pubmed search revealed over 2000 hits in the past year on regeneration/repair of joint tissues (excluding bone regeneration in its own right) and over 25 new clinical trials on joint regeneration therapies were registered. This “year in review” will highlight a personal selection of promising studies in biomaterials, stem cell biology and the transition from the lab to the clinic published in the past year and will inform on the direction in which this field is moving.

I-15
OSTEOARTHRITIS YEAR 2014 IN REVIEW: CLINICAL
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A systematic literature review was conducted using PubMed for the period between April 1, 2013 and March 31, 2014. Research articles that focused on the epidemiology, clinical management - both non-pharmacologic and pharmacologic - or access to and outcomes of treatment for people with osteoarthritis were reviewed. Selected articles in these areas are discussed in this narrative review article.

I-16
OSTEOARTHRITIS YEAR 2014 IN REVIEW: REHABILITATION AND OUTCOMES
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Purpose: The purpose of this review will be to highlight research studies examining rehabilitation for hip and knee osteoarthritis, as well as to outcomes used to assess treatment effectiveness, published between January and December 2013.

Methods: A systematic literature was performed in Medline, CINAHL, and Embase databases from January 1, 2013 to December 12, 2013. Key words used in the searches included osteoarthritis, knee; osteoarthritis, hip; rehabilitation; physical therapy modalities; physical therapy; physiotherapy; and exercise. The search was limited to 2013, human studies and English. Rehabilitation intervention studies included in the review were prospective controlled designs that enrolled study participants with a diagnosis of knee or hip osteoarthritis. Uncontrolled, qualitative and retrospective studies, protocols, as well as reviews, meta-analyses and case studies were excluded. Studies of outcomes after surgical interventions, oral or injectable medications, and neu- traceuticals were also excluded. Publication titles and abstracts were reviewed for inclusion by both authors. Discrepancies for inclusion were discussed and full papers reviewed to reach agreement on inclusion. Papers were evaluated for quality of evidence using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system by both authors. This system rates the quality of evidence as high (A), moderate (B), low (C), and very low (D) based on study limitations, consistency, directness, precision and publication bias. The authors reached consensus on quality of evidence ratings for each article.

Results: Of 502 titles reviewed, 36 studies were identified for inclusion. Of these 36 papers, only two papers were dedicated to hip OA. Five studies included participants with both knee and hip OA and 29 studies included only knee OA. An assessment of the quality of evidence revealed that articles were of high (n=2), moderate (n=14), low (n=10) and very low (n=10) quality. Papers were grouped based on outcome measures: disease/tissue markers, pain, self-reported physical function, mobility performance, general health, and participation quality of life. Interventions reflected exercise (strengthening, walking, yoga, gaming), physical agents and electrotherapy (ultrasound, phonophoresis, short wave diathermy, truncatable electrical nerve stimulation, neuro-muscular electrical stimulation), manual therapy (mobilizations, traction), Chinese medicine (acupuncture, meridians) and other (pain coping, counseling, whole body vibration). High quality studies highlight rehabilitation strategies that improved markers of OA disease and general health, in addition to improvements in clinical outcomes, over both the short term and long term. For example, in a randomized, double-blind, controlled trial, phonophoresis was superior to traditional ultrasound for symptomatic knee OA in reducing pain over 2 weeks of therapy. A randomized controlled trial (n=431) compared the effectiveness of an intensive diet-induced weight-loss, exercise, or diet-induced weight loss combined with exercise on mechanistic and clinical outcomes in knee OA over a follow-up period of 6 and 18 months. After 18 months, data from 399 participants demonstrated that diet combined with exercise and diet alone resulted in greater declines in body weight, mobility, pain, and general health, with exercise alone resulting in greater improvements in disease markers.