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Editorial

Continued improvement of translational medicine – A cohesive approach

When one talks about the three pillars of translational medicine, we often refer to them separately and their individual links and interactions. However, as translational medicine becomes more prominent and gradually evolves to a standard approach within academia and patient care, the interactions between the pillars have become entwined – improving the outcomes for patients. In this issue, several articles demonstrate the cohesive approaches of basic science and clinical knowledge, in order to achieve better orthopaedic care.

Bone cancer is a complex disease requiring resection of bone. If total resection is conducted, the patient may lose more tissues, resulting in inferior post-surgical function. Incomplete resection on the other hand may lead to cancer recurrence. Wong et al. present a computer navigation and 3D printing solution that may result in least tissue loss with total tumour resection [1]. Similarly, Xu et al. demonstrate the use of 3D printing to create patient-specific prostheses after tumour resection, aiding post-surgical recovery and limb function [2]. Total knee arthroplasty has become a standard surgical procedure to treat severe knee osteoarthritis (OA). Similar to the above, using an individualised approach to surgery aids in recovery and limb use. Xia et al. present a novel "Skywalker" robotic system to assist in osteotomies for total knee arthroplasty [3]. Patients with adolescence idiopathic scoliosis undergo numerous x-ray imaging throughout their life. These pre-surgical x-rays are particularly important for surgery in order to determine surgical parameters. Lee et al. have developed a 3D ultrasound system in order to achieve the same imaging requirements, without exposing the patients to radiation [4].

OA and osteoporosis remain two of the biggest and most expensive orthopaedic challenges to both clinicians and researchers. Three articles in this issue present novel treatment options for OA. Wang et al. demonstrate in an *in vivo* model how andrographolide may alleviate synovial inflammation, which may slow down or prevent OA progression [5]. An *in vitro* and *in vivo* study by Deng et al. demonstrates the mechanisms involved in losartan's ability to slow down or stop the progression of OA [6]. Metals are frequently used in orthopaedic surgeries, often acting as physical support throughout healing. In the past few years, research has focused on bioactive metals in orthopaedics that aid recovery in numerous ways. Wang et al. present a review detailing and comparing different metals for orthopaedic surgery and treatment, with a particular focus on the use of copper and its alloys [7].

RNA is becoming a topic of interest for researchers and clinicians alike for their potential diagnostic and treatment solutions. Kang et al. recruited patients with osteoporotic hip fractures and sarcopenia to determine if there were unique RNA profiles [8]. Drug targets of diseases are also of interest to clinicians and researchers who may be able to find or create a drug for the specific target. Li et al. conducted a systematic review in order to identify known target of osteoporosis [9]. A retrospective study was conducted on patients with HIV to determine the effect of antiretroviral therapy on bone, in order to identify and possibly prevent adverse events [10]. In vivo models are essential to basic research, but all have limitations. Rodent models are affordable and well-established; however, it remains controversial as to how closely it can model human disease. Wu et al. present a model of cervical spinal cord injury in a non-human primate, that more accurately models the human condition and may be used for late-stage drug or treatment testing [11].

Experts in the medical field refer to the individual pillars of translational medicine, but by their nature, they work together through effective coordination, rather than individually. The complex relationships between the pillars helps to build better research-based patient care. When researchers and clinicians continue to bridge gaps between these pillars, the overall structure of medicine and patient care improves.

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