PROTECTIVE ACTIONS OF MICROBIOTA INTERVENTION IN TWO ANIMAL MODELS OF OSTEOARTHRITIS: COMPLEMENTARY APPROACHES IN SPONTANEOUS OA IN DUNKIN HARTLEY GUINEA PIGS AND SURGICALLY INDUCED IN RABBIT

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PURPOSE The aim of this study was to evaluate for the first time the potential protective effect of a lyophilized inactivated culture (LIC) or a lipoprotein extract (LIP) from Bifidobacterium longum CBII0703 which modulate microbiota regulation in both a spontaneous model of osteoarthritis (OA) in Guinea pigs and a surgically-induced OA model in rabbit. This kind of intervention with microbiota was shown to act on dysbiosis in chronic conditions. Histology of cartilage and synovial membrane and macroscopy of the articular structures were the primary endpoints. Soluble biomarkers were also considered to evaluate the treatment efficacy.

METHODS LIC and LIP (1 µg/kg/day) with or without vitamin C (1 mg/kg/day) were tested in Dunkin Hartley Guinea pigs (GP) spontaneously developing OA. Treatment was administered daily via oral route between 16 and 28 weeks. LIP (1–100 µg/kg/day) was further tested in a more aggressive model in rabbit after anterior cruciate ligament transection (ACLT) surgery of the right knee (7 weeks of treatment initiated 7 days after surgery, 8 weeks post-surgery follow up). It was administered daily in drinking water. All treatment groups were compared to placebo group. Macroscopy of the articular structures (rabbit only) and histology (cartilage and synovial membrane) were performed according to OARSI recommendations4,5. The kinetic of several biomarkers (Coll2–1, PIIANP, Fib3–2 and osteocalcin) was determined in Guinea pigs sera throughout the study.

CONCLUSIONS This study produced interesting and promising results by the dual approach in two complementary models of OA. The results provided by biomarkers assays were interesting and valuable for the interpretation of the study results in addition to the gold standard approach recommended by OARSI. LIC could be considered as a preventive treatment such as dietary supplement to protect against OA development and can be foreseen as a new non-pharmacological treatment against OA with or without the addition of vitamin C. This study is the first one to demonstrate a potential effect of microbiota acting most probably on dysbiosis during the disease pathogenesis and open a new therapeutic approach.