

Single injection of autologous, blood-derived product rich in DKK-1 protein, a Wnt pathway inhibitor is clinically effective in patients with osteoarthritis for up to 12 months

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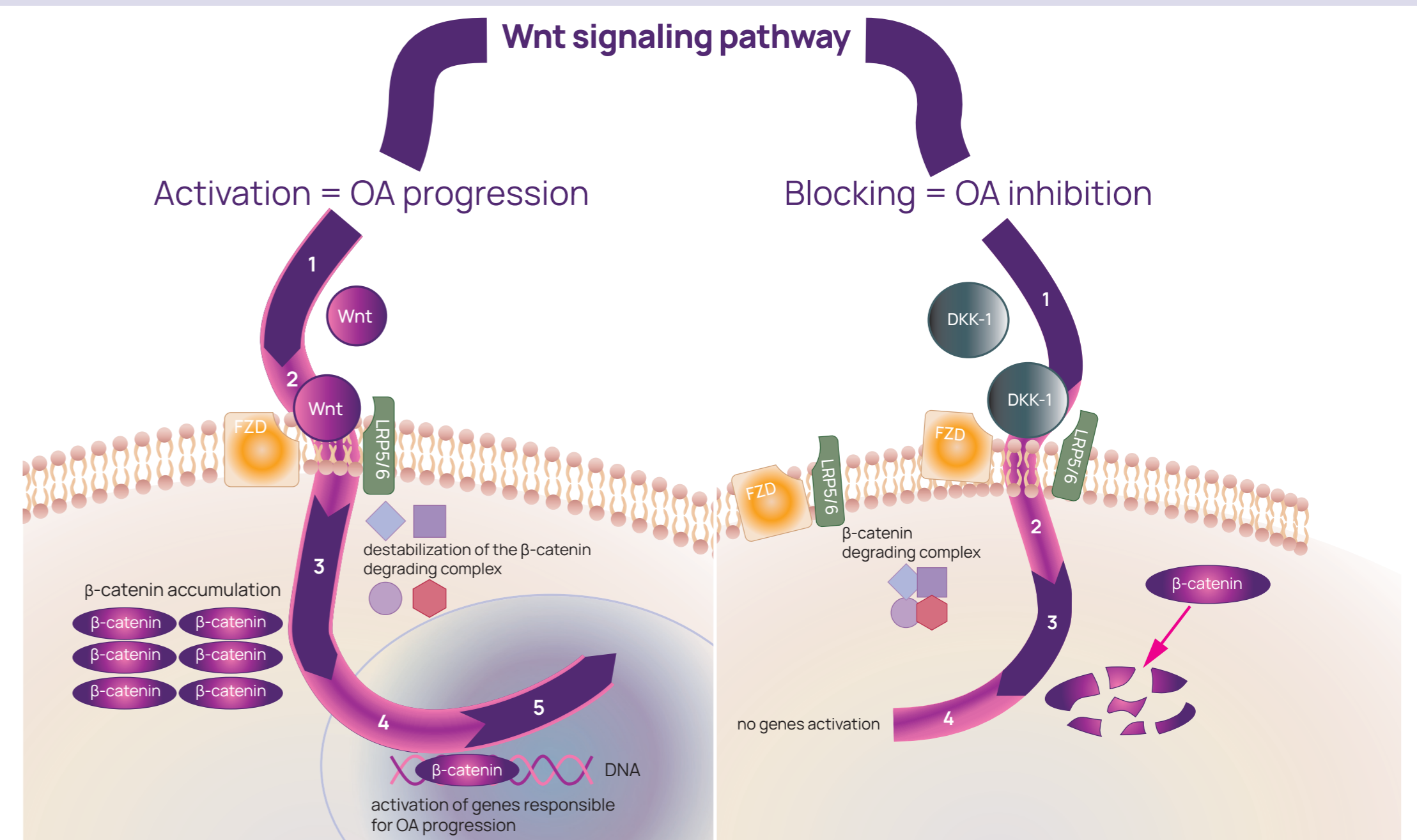
Introduction

Recent scientific data have shown that activated Wnt signaling pathway is one of the key drivers in osteoarthritis (OA) development and progression^{1,2}.

Consequently, inhibition of this pathway is able to ameliorate this process^{3,4}.

Wint™ is a new generation medical device intended for blood processing, in order to obtain autologous blood derived product, rich in DKK-1 protein - an endogenous inhibitor of Wnt signaling pathway.

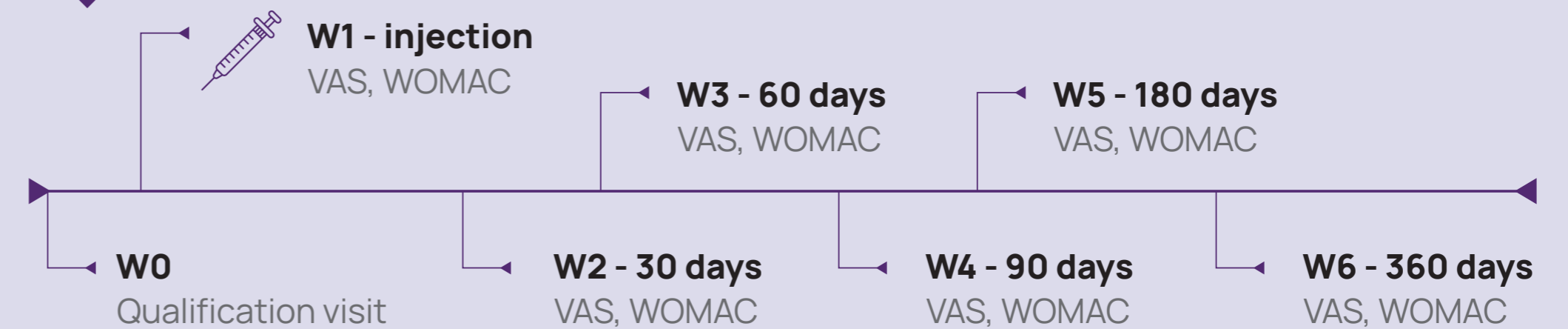
Borosilicate activator in a form of beads present in the body of the Wint™ separation device stimulates platelets, inducing secretion of mentioned DKK-1 protein. Subsequently, intra-articular (IA) injection of the blood derived product rich in DKK-1 protein inhibits Wnt signaling in OA affected joint, contributing to reduction of the disease symptoms.



Aim of the study

The objective of the study was to assess the safety and efficacy of one IA injection of the autologous blood-derived product rich in DKK-1 in treating the primary clinical symptoms of pain and functional capacity in subjects with symptomatic knee OA.

Study schedule



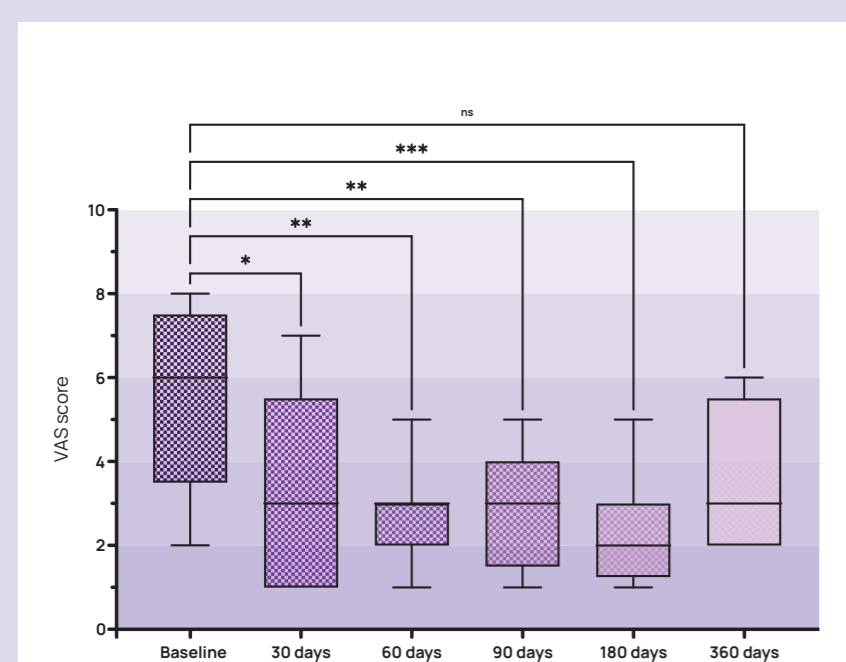
Methods

30 patients with symptomatic OA were enrolled in a pilot, prospective, interventional study during which individuals received a single IA injection of an autologous product rich in DKK-1 protein obtained with Wint™ kit (Biovico Sp. z o.o.) into the knee joint. Blood derived product was prepared according to producer instruction for use. Follow-up visits were conducted at 30, 60, 90, 180 and 360 days after therapy during which patient's clinical status was evaluated with VAS and WOMAC questionnaire.

Prior to the injections the content of DKK-1 protein in autologous blood-derived product has been analyzed using Immunoassay for Human DKK-1 protein (Quantikine®, R&D Systems).

Results

VAS

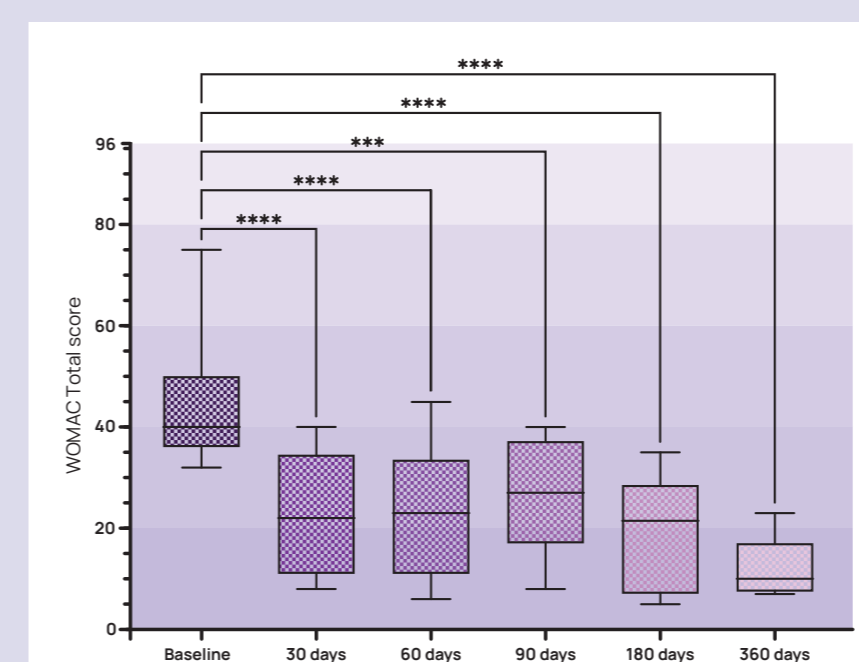


Significant pain reduction was observed at follow-up visits:

- 30 days ($p < 0.05$),
- 60 days ($p < 0.01$),
- 90 days ($p < 0.01$),
- 180 days ($p < 0.001$)

after the injection compared to the baseline.

WOMAC total score



Significant functional improvement in patients was observed at follow-up visits:

- 30 days ($p < 0.0001$),
- 60 days ($p < 0.0001$),
- 90 days ($p < 0.001$),
- 180 days ($p < 0.0001$),
- 360 days ($p < 0.0001$)

after the injection compared to the baseline.

Therapy also reduced pain, stiffness, and improved physical function measured on WOMAC subscale scores.

Fig. 1. Pain measured with VAS in patients treated with blood derived product rich in DKK-1 protein, obtained with Wint™ kit. Significant pain reduction was noted starting from 30 days after the first visit (baseline) and continued to be present at 60, 90 and 180 days.

Fig. 2. Functional improvement scored with WOMAC in patients treated with blood derived product rich in DKK-1 protein, obtained with Wint™ kit. Significant functional improvement was noted starting from 30 days after the first visit (baseline) and continued to be present at 60, 90, 180 and 360 days.

Measurements of DKK-1 protein levels

Measurements of DKK-1 protein concentration in the samples demonstrated that Wint™ medical device is able to provide a blood-derived product with significantly higher DKK-1 content when compared to plasma ($p < 0.0001$) and PRP sample ($p < 0.001$) (Fig. 3).

Blood-derived product rich in DKK-1 protein contained an average of 12811 pg/mL DKK-1 and was characterized with the average 4.7 times higher DKK-1 concentration when compared to plasma samples and 2.3 times higher when compared to PRP samples.

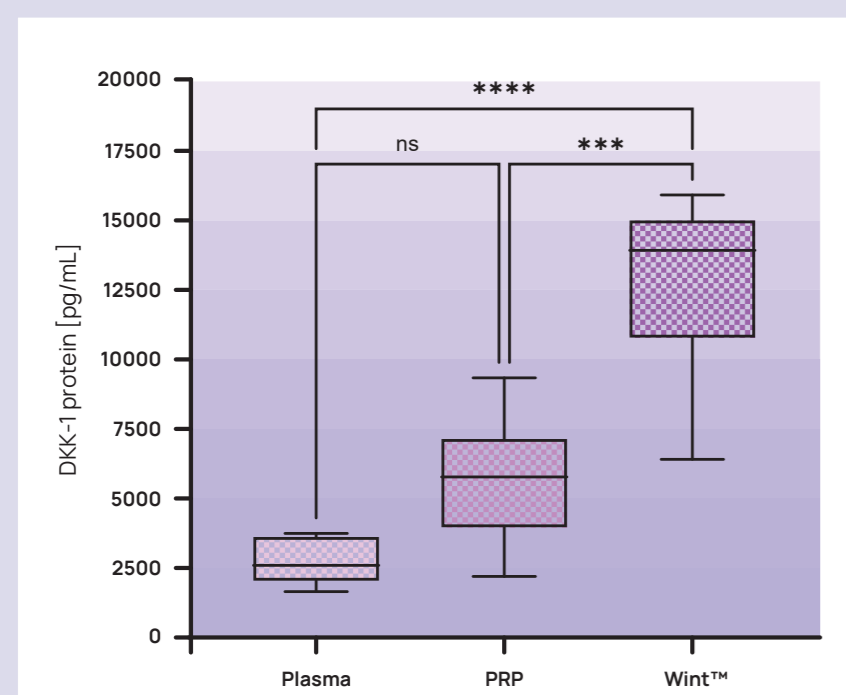


Fig. 3. Measurements of DKK-1 protein levels in samples of plasma, PRP and blood product obtained with the Wint™ kit.

Conclusions

Blood derived product rich in DKK-1 protein administered as a single intra-articular injection is effective in providing fast and clinically relevant reductions in pain and functional limitation. Effect of the treatment was observed starting 30 days after injection and maintained throughout the 360 days follow-up in subjects with painful knee OA. Therapy showed excellent safety profile. This therapeutic strategy opens new perspectives in the area of non-surgical OA management.

Effective

Sustained pain relief
Sustained function improvement

Potent

No need for multiple injections

Safe

Therapy not related to any adverse event or discomfort



REFERENCES

AX.PLA.WNTEN.220802.7

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Disclosure: The authors mentioned with the Biovico's company affiliation hold a position of a Medical Scientific Consultant.

This research was supported by EU funds, grant no. RPPM.01.01.01-22-0080/16.