

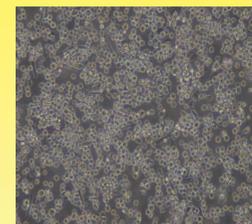
Introduction

Tendinosis occurs when type-I collagen that composes the tendon degenerates through repetitive motion and ageing. Current treatments of tendinosis include non-steroidal anti-inflammatory drugs, which may have certain side-effects. As studies have shown that daily use of *Cissus quadrangularis* increases collagen production in the body, *C.quad* has great potential to be an active ingredient for an alternative cure for tendinosis. In addition, *Rhizoma Homalomenae* and *Erycibe obtusifolia* are common herbs used in Traditional Chinese Medicine to promote tendon health and could be used in combination with *C.quad* to treat tendinosis. Findings from our project can provide information to find a new natural herbal treatment for tendinosis which will have fewer side effects.



Materials

- Schneider Line 2L (*Drosophila* epithelial cell)
- Cissus quadrangularis* extract
- Rhizoma Homalomenae* extract (Qian Nian Jian)
- Erycibe obtusifolia* extract (Ding Gong Teng)
- IGF-1
- Tissue Culture flask – 25cm²
- ATCC complete growth medium
- Vortex mixer
- Centrifuge machine
- Spectrophotometer
- Sircol™ Collagen Assay Kit



Drosophila epithelial cells



Cissus quadrangularis

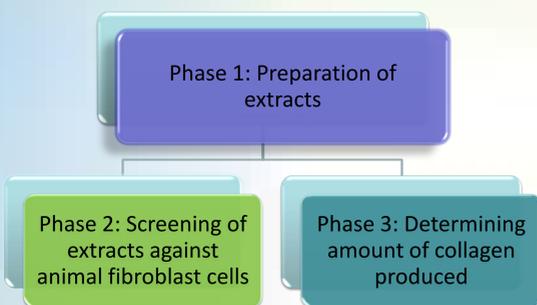


Rhizoma Homalomenae



Erycibe obtusifolia

Methodology



Phase 1

Preparation of *C.quad* solution

Dried powder of *C.quad* was mixed with deionized water at concentration 4mg/ml

Preparation of TCM solution

TCM materials were weighed before being boiled in 150ml of deionized water for 30 minutes

Preparation of IGF-1 solution

IGF-1 powder was weighed and mixed with 100ml of deionized water

Preparation of IGF-1 solution

All solutions were centrifuged and sterile filtered using a 0.22µm sterile filter

Phase 3

Determining amount of collagen produced

Sircol™ collagen assay was used to quantify the amount of collagen produced by the *Drosophila* epithelial cells after treatment with the different solutions

Phase 2

Treatment of cells

The different extracts were added to the *Drosophila* cell cultures at different concentrations

Incubation of cells

The cells were then incubated at 22°C for 3 days in an incubator

Combination treatment

The optimum concentrations for IGF-1 and *C.quad* were determined before the combination treatments were done

Overview of experiment

Results and Discussion

Effect of varying concentration of *Cissus quadrangularis* on collagen production in *Drosophila* epithelial cells

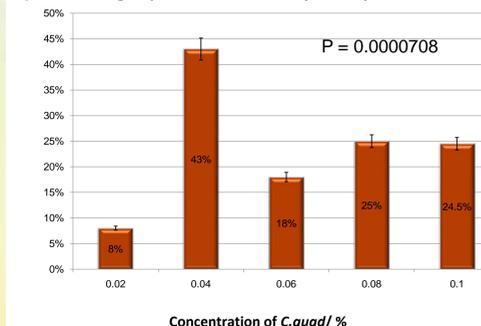


Fig. 1 shows effect of *C.quad* extract on collagen production. It was observed that at *C.quad* concentration of 0.04% (v/v), collagen production was stimulated to the greatest extent, with a 43% increase.

Effect of varying concentration of IGF-1 on collagen production in *Drosophila* epithelial cells

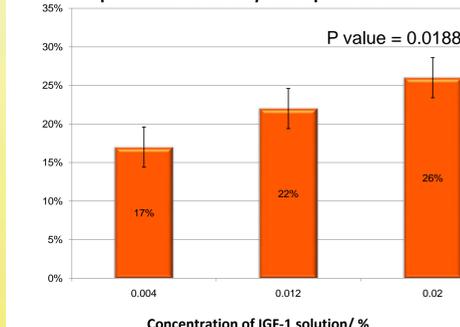
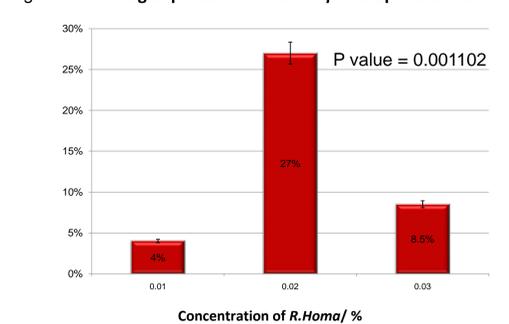


Fig. 2 shows the effect of IGF-1 extract on collagen production. At IGF-1 concentration of 0.02% (v/v), collagen production was stimulated to the greatest extent, with a 26% increase.

Effect of varying concentration of *Rhizoma Homalomenae* on collagen production in *Drosophila* epithelial cells



Effect of varying concentration of *Erycibe obtusifolia* on collagen production in *Drosophila* epithelial cells

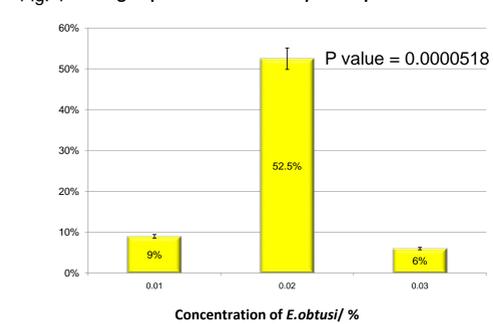
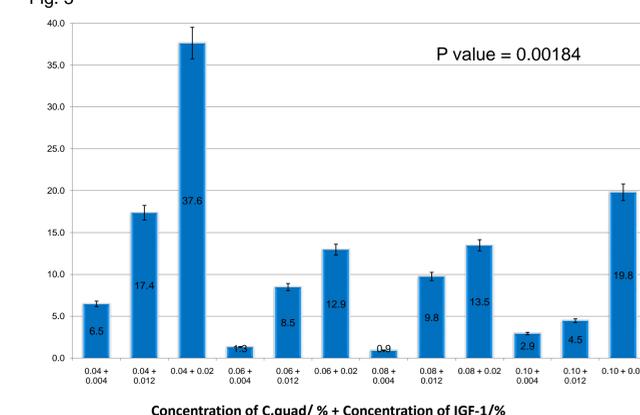


Fig. 3 and 4 shows the effects of *R.homa* and *E.obtusi* on collagen production respectively. It was observed that both *R.homa* and *E.obtusi* concentration of 0.02% (v/v), collagen production was stimulated to the greatest extent, with a 27% and 52.5% increase respectively.

Effect of varying concentrations of *Cissus quadrangularis* and IGF-1 on collagen production in *Drosophila* epithelial cells



The cells were also treated with a combination of *C.quad* and IGF-1. Fig. 5 shows the effect of this combination treatment on collagen production. For the combination treatments, it was observed that at *C.quad* concentration of 0.04% (v/v) and IGF-1 concentration of 0.02% (v/v), collagen production was stimulated to the greatest extent, with a 37.6% increase.

Conclusion

Our findings showed that the amount of collagen produced, as a result of treatment with the different herbal extracts, was significantly greater than the amount of collagen produced in control trials (absence of herbal extracts).

Hence our hypothesis was supported because all 3 herbal extracts were observed to increase collagen production by the *Drosophila* epithelial cells. Furthermore, we found out that the stimulatory effect of a combination of *C.quad* and IGF-1 on collagen production is less than the effect of *C.quad* extract at concentration of 0.04%.

Applications & Future work

Application of *C.quad*, *R.homa* and *E.obtusi* could be used as a natural herbal treatment for tendinosis. They have the potential to be administered in the forms of injections or oral pills to treat tendinosis in the future.

Our project can be extended by identifying the active compounds in *C.quad*, *R.homa* and *E.obtusi* that are responsible for the effects observed as well as investigating the effects of *C.quad*, *R.homa* and *E.obtusi* on cell growth.

References

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