B133 Comparison of the anti–inflammatory properties of farmed and wild *Stichopus mollis* sea cucumber

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Digestion, extraction and analysis of farmed and wild *Stichopus mollis* was carried out to assess any differences between the two materials, and to identify any novel bioactives.

Farmed material was obtained from an aquiculture research centre and wild material was acquired from a commercial fishery source. Both samples were digested with papain; high molecular weight materials isolated by dialysis and freeze dried to produce a fibrous material that demonstrated anti-inflammatory properties. Pepsin and Autolyse (kiwifruit enzyme) were also assessed with this outlined procedure (1).

An extraction of the glycosaminoglycan-like constituent of farmed *Stichopus mollis* was carried out by acetone extraction followed by papain digestion and ethanol precipitation (2). The extract was assessed for anti-inflammatory activity and showed improved anti-inflammatory properties above the initial digest only samples. Anti-inflammatory assessed in either a rat paw odema or polyarthritis model, or in a neutrophil bioassay.

Finally, biomass extraction with methanol of both farmed and wild *Stichopus mollis* was carried out and the extract separated on reverse phase with varying polarity elution carried out. Fractions were then assessed by NMR and TLC.

Variations between the two samples from extraction, TLC, NMR and bioactivity assessment were observed which suggest that there are significant differences in the two *Stichopus mollis* sources.

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B134 Total synthesis and antimicrobial activity of (5*Z*,9*Z*)-5,9-hexadecadienoic acid

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The Δ5,9-diunsaturation is not common in natural fatty acids. Most known examples are of marine origin, in particular arising from the phospholipids of sponges, where the (5*Z*,9*Z*)-5,9-hexacosadienoic acid predominates (1). Another interesting example of a naturally occurring Δ5,9 fatty acid is the shorter-chain analog (5*Z*,9*Z*)-5,9-hexadecadienoic acid, which was originally reported from the cellular slime mold *Dictyostelium discoideum*, but later identified in several marine sponges (2). Work from our laboratory with the *iso*-branched analog (5*Z*,9*Z*)-14-methylpentadeca-5,9-dienoic acid revealed that the compound is antimicrobial against pathogenic Gram-positive bacteria, such as *Staphylococcus aureus*, but inactive against Gram-negative bacteria (3). Therefore, the question arises as to the antimicrobial potential of the normal-chain (5*Z*,9*Z*)-5,9-hexadecadienoic. For this purpose we developed two synthetic routes for the (5*Z*,9*Z*)-5,9-hexadecadienoic. In one approach a four-step synthesis was developed starting from 2-(2-bromoethyl)-1,3-dioxolane which was based on acetylide coupling to generate the Δ9 double bond and Wittig coupling to generate the Δ5 double bond (4). However, this methodology afforded a 10:1 mixture of the 5*Z* and 5*E* isomers. The second approach, although longer (six steps), only afforded the (5*Z*,9*Z*)-5,9-hexadecadienoic and it was based on a double acetylide coupling starting with 1,5-hexadiyne. The title compound displayed antimicrobial activity, specifically against Gram-positive bacteria such as *Staphylococcus aureus* (MIC 0.2 μmol/ml) and *Streptococcus faecalis* (MIC 0.08 μmol/ml). It was not, however, active against such Gram-negative bacteria as *Escherichia coli*. Hexadecanoic acid (16:0) showed no activity (MIC > 100 μg/ml) against any of these four microorganisms.

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