Ossifying Bone Marrow Explant Culture

6--2Ď (% °C)¹³ 18,34 ¢ 19 24 • • • • • • • • _ č -4 6 ** \$ j vê j a strange and a second - 2-د **د** 2 -. . (AC).^{35,36} D - 5-5. . • * • • * C. AC) 🛴 🔬 Ċ. ંદકે % C 🚬 🖕 ~ Ċ r ፦ _ር ብ እ፦ • V C • C •C , AC , % 35,36,3942 ç*cç,§, ≛*q, % C ~ 1 . 1 · 2 · 4 s ··· a a ganta i a in vitro 644 S

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124 AC · (B%)-2, .20 ······················· b1.^{1,8^{-10,49} 51} B% (E), . λ. ι. λ. 100 3. د 6 40 647 6 - * 5 8 4 A x ^{/0} 1,52 58 าเว้เรี 1,52 58 % C · ?-?-- · . . ÷ -12-;-(B% -2 • € - 7) • . . . -٦., 5. 59 **6**1 *** *** § 4 % 12-and the Book of the second sec ٤. , . -1x 4¢ . 1 4. 4... -1^{.1,51,62,83} • 5-۰**۲** <u>}</u> + 46 × 6° + 6 in vivo. 64,65 -b. 3 - 1to an a for a strain of the second A the the second se

(, , , , , , , ,), (, , , , , , , ,), /D0/ 0 T .). -· · · · · (B% -2, E , -1, ... " sc_e " " <u>ن</u>ا يا - - P- - -1 5 t 3-🚛 📜 in vitro 🗽 🖡 · · · · · · · · • • * * * 4 -1, ... -b1.^{-1,9} ¹¹ B% −2, [•]E ••• in vitro ج ج °~•___4 5 - -B% -2, E , -1,... . -b1 • 1 4 an in shi an a ha ga ga a <u>ج</u>، و ر 46 ---· · ·· · · B% -2, E, -1, ..., (..., 5)(E..., A) (..., 5, 7, 14, 21, ..., 28). 12 ± - 4 ት**ር የ*** è **-b**1 c * * čeč • 5 🔒 * * • • in vitro.

Materials and Methods

In vitro *culture conditions*

B. B 80 90-A A C C C (300 324). ` ^کددو و • `` • • 16-12--E (0.4 m) (. 1A) • Č, C, ,,), , , 7 m ·· (*)(Ъ. **`*** • car ⊊••**`** (∰¢ • • • et al.⁴⁸): (. (a-%E%) (____), 10% % C-___\ **Ն**ւ $\begin{array}{c} (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ (\mathbf{B}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} \otimes \mathbf{L}^{-1} & (\mathbf{A}^{-1} \otimes \mathbf{L}^{-1}) \\ \mathbf{L}^{-1} \otimes \mathbf{L}^{-1}$), 2.5 m[°]/ (, ., (1, 1), 5 % 19 A 378C, 5% C 2, ... · · · · · · _____ ● ¢ 5 -. •• • • • • ⊊;ª⁺ ć ; ٦., ٤ •• -808C. (and the second second • • 14 2 -

Development and characterization of in vitro mechanical loading system

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(1. . 1B, C). 3. (ِ 555 ک<mark>ر</mark> (0.2 m)E) E ٦. (100 m (**D**, **m**). ٤ (I, A) $(D^{\bullet} =$ 3.9×1.499 , R² = 0.992 ٤ 3 ± 5.6 4. · • • 5 • 4 -1484 1 . . · · . 5.

Mechanical stimulation of ossifying marrow explants

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14, 900 . 1B).. 0.0313), . C 3 C ٤. e ł 2้ ŝ 4 -808C <u>ن</u> (۲۰۰۰ 2) ... 3. - 1 h ¢ . . 46 ъ. Е. А.

Quantification of BMP-2, VEGF, IGF-1, and TGF-b1 levels produced by ossifying marrow explants







-b1: &D . . . -b1. -13 コネー 6 6 C . . 1 0.5% ΕΕ . Ε 96-% .. (B% -2, 71) -1, 0 / , 5.7 E / ' ; -b1, 1099 / - - - ---5 - ch 1 C - 6 - 6 5 - 5÷ B% −2, E -**b**1 1 3.3 0 - 5 •12 B.

¢ (7m) **4** 5 3. (n=10). D 30 5 378C -. ۲. ۳۰ C 0.2 m 4 C . ~ _ -2 -in pres st is 4. 40 h

Microcomputed tomography of ossifying marrow explants



Histology of ossified marrow explants for matrix typification











Statistical analysis

(n = 5)12 (n = 9)U-, , 0.05 (p<0.05). (n = 4) ... (n=4). . (, 7, 14, 21, ... 28) 经计 ¢ %. post hoc . . 1 34 e Ó.05. بالمراجع والمراجع المراجع 20-• 5 ٤. and the factor 4.4-+ 4 4. 2 -. .

Results

The effect of mechanical stimulation on the final OV of marrow explants

B 4A, B), тĊ . 4**C**, D). 1 4B) 4 (1. 4A). mC... Z . mC ch. •4C, (1 .)**;** . **L** ъ.





Morphological characterization of ossified marrow explants



The effect of mechanical stimulation on the production of BMP-2, VEGF, IGF-1, and TGF-b1 by ossifying marrow explants

B% -2, 8.6 ; E , 1.1 ; -1, 40.7 ; -b1, 60.9),



Correlation between the levels of BMP-2, VEGF, IGF-1, TGF-b1, and the final OV of marrow explants

 $\begin{array}{c} -1 & \vdots & 21 \\ (CC: 0.899, p < 0.01) \\ \vdots & \vdots \\ B\% & -2 (. . 6B, CC: 0.850, p < 0.01), \\ (. . 6C, CC: 0.907, p < 0.01). \end{array}$

Discussion







. -ъ. ጉድ 21.. Е 28 ... -b1 , 21 in vitro. ۰ ⁻ د **53** r B% -2

(0.5% 2%)

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(B% -2 - -1, - 5A, C) = (-5, -5, -28)a sign and an end of the source of the sourc to a first and the there are 6° 34 n an the stand of the second sec ~ Se €; Pre ***** 4 e e a for be to a first ۰ ، a substantial and a set of the set ne have been a provided and the second s Second a second for the second s

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<u>د</u> ، ، ، • * **G**⁴**C**⁴ $1 - 2.6^2 C$ A 19^{9} 5^{1} 10^{19} $10^$ · · · · · · · · · · ¢ the contract of the second he as a share o • 4 6" 6 - 6 6 ³2 - ³8 - 6 - 6 - 6 The second secon $b^{(1)}$ • 89**•** '

(B% -2, 71 / ; E , 5.7 / ; -1, 0 /) B , 5.7 / ; -1, 0 /) % C , 5.7 / ; -1, 0 /) % C , 5.7 / ; -1, 0 /) % C , 5.7 / ; -1, 0 /) % C , 5.7 / ; -1, 0 /) B , 5.7 / ; -1, 0 /) % C , 5.7 / ; -1, 0 /) (..., 1) / ; E , 5.7 / ; -1, 0 /) (..., 1) / ; E , 5.7 / ; -1, 0 /) (..., 1) / ; E , 5.7 / ; -1, 0 /)

3D С · · · · · · - G _____(∎__ B% -2 • The A. C. A. Share a 20% A . 10% . B% . s, B% -2 În vitro 🗸 🦡 * * 6 * 5 c 5%**,** . • • ^{*} \$ 6 4, î. • • • B% -2 . . κδ. - <u>ξ</u>. Ε - ¹ . ³ 28 5-14 -, B% -2 2 - 2-c 4 G · in vitro 🦨

2D in witten . • 3D in vitro 66 . 1 66 . ¢. ÷ . 20,34,77,9¶ E . ¢ 2Ď • 16.5 8 -- 5<u>7</u>-+ 20 · . C,% C,... AC). % C **1**3 -3. ... 1. ∿ _4 - **29** - 5 . 5 35 🗣 ٤. " C۱ . ແລະເປີ ¢ ¹² D r.s. da: ., 3D <u>۰</u>۰ ۲ • 1

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% 15,16,18,21,88 2 - 12in vitro °••• 4° 6 - * -2 - 2-4), 3 ... cc ÷ 6 6. 140 s mCr ۰ ⁻ ۲ 10 12 45 5) 5 - m m د د **د** 5 842-4 . ጉ ሮ

The the property of the property of the state of the stat 1,8,10,50 1.8,10,50 46³.Y r. • 4 gran 1 40 • **4**. 1,9,10,50,55,57,93 ş. 14 40 0 0²4 · • • - 4c 5 c h ... · ? • . . C 4. - 6 3 -

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Acknowledgment

ophier Saran Sa

Disclosure Statement

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