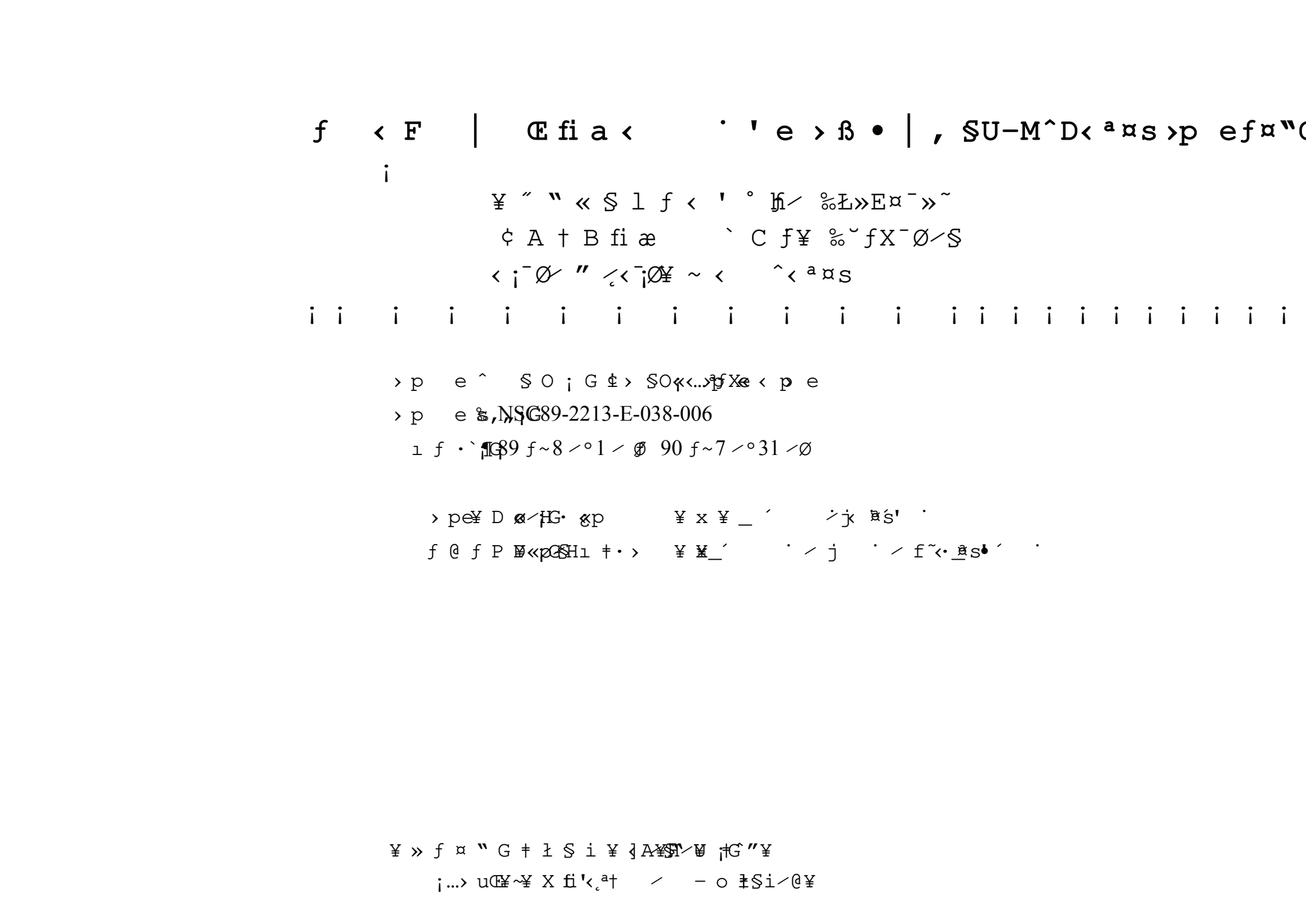

Study of Porous PLLA/ HA Composites as Biodegradable Materials: *in vitro* and *in vivo* study

NSC89-2213-E-038-006

pressing them under 5-45 kgf/cm^2 for 2 to 5 minutes, dissolving the sucrose at 220 °C and then sintering under 1345°C for 10 hours. The obtained porous HA was immersed into PLLA solution while the used PLLA was prepared via a thermo degradation method. The three points bending strength of the composites is 13.56 MPa, which is quite high for porous materials. HA without any purification have a highest toxicity and HA washed with chloroform have a lowest toxicity against gingival fibroblast were found.

After sterilization, the composites are implanted into the mandible bones of 14 Beagle dogs. Two kinds of implants were used – HA with PLLA and without PLLA. 1, 2, 3, 4, 8, 12, 26weeks after implantation, the samples were examined histologically by light microscopy. SEM will be used for histomorphometric analysis of the bone-implant interface.

Key words: poly(L-lactide), hydroxyapatite,

[illegible]

(hydroxyapatite, HA) [illegible]

[illegible]

[2] [illegible]

Koskikare [illegible]

29 [illegible]

24 [illegible]

(osteoconductive) [illegible]

[3] [illegible]

Shikinami [illegible]

[4] [illegible]

(MWv: 25 , U) [illegible] 30 wt% [illegible]

HA [illegible] HA/PLLA [illegible] 280 MPa [illegible]

HA [illegible] HA [illegible]

[5] [illegible] HA [illegible]

Furukawa [illegible] 2000 [illegible] Shikinami [illegible]

HA [illegible] 1999 [illegible] 30 wt% [illegible] HA/PLLA [illegible]

[6] [illegible]

HA/PLA [illegible] PLA/HA [illegible]

HA/PLLA [illegible]

PLLA/HA [illegible]

[3] [illegible]

PLLA [illegible] PLLA/HA [illegible]

PLLA/HA [illegible] Beagle dog [illegible]

13.56 MPa [illegible]

[illegible]

1. [illegible]

– ˜ † ⁄ ¸ S l " " " – ¡ S ¸ ¡ ¥ † › M A‰2.5ª×ƒ10^4 cell/ml medium "" ¿ @ « ¥ [well⁄" ¡ A ¤ ƒbwell›¥ ‡J0.4 ml ""† › M ⁄ ¸ ¡A‰ ‡G† †¿ M‹ 1×10^4 cell/ml ¡ b37°C¡B5% CO_2 ⁄ U i24C⁄p fi ⁄ S æ¡MTT assay ¶ i ƒ ‹ ‡°¡ƒ

3. ¤ ¯ » ˜ ‡»EP«S@

› ¥ ¡A–N12 , U"PLLA ' æ ⁄ J ›¯†Vfi˘ ¥ œ · ¯ ª ‡ˆ¥‡i'U‰T„ ¿°¡C

¤ t †⁄¡"XH` † – ' flSw •«⁄U¡A fld20 ⁄ ˜`¡A M‹ÆƒA–N† C‹ PLLA ƒ ` † ⁄ ⁄ ‰¥¡XA ¥H" ¯ fiƒ MS N‹o« ‡A¥ i e¤⁄ ⁄ l ¶‹ ø7.5 , U"PLLA ¶ ¡C

4. » E ¤»⁄† B fi æ ` C ƒ¥ ‰˘ƒXS (PLLA/HA composites) ""» S@

–N PLLA •» ' Chloroform ' ‹O dichloromethane ⁄⁄» S@ƒ ¢@« 2%, 5%, 10%, 20%"•»†G¡AƒAS HA ¿ N†"«' æJ¿@ « S C""» E ¤»•»†G⁄¶ ‡ ¶ W › ‡ ¡A œfi C‹ÆƒA' æJ¿@« , ß """ » E ¤»•»†G¤ ˘ ¥¶W › " i_¡ÆƒA¶ ‡ fiC¡C fiC«ÆS ¥ PLLA/HA composites¡C

5. °"«„ C

A. ‰ ˘ ¥S""· ⁄J

–NBeagle dog ¥¸Phenobarbital (25~30 mg/kg)† ´K« Æ A¥‡5 , „ M⁄Þ ¥ ⁄U´ H ‰⁄œ ¯ i ‰⁄›J¡A–N ' ‰ ⁄ ¥ U ¡A..• ˜S¥X⁄œ flÆ¡A– bƒ¤⁄U^.E‹ øƒ b ƒ ⁄fU⁄Ł"" 'Y SQ¥ ¸¶ C Ÿp»¤†y¥X⁄@ 2x4x2mm ""¶¸ ⁄f¡A–N‰ ˘ ¥S· ⁄J¡A M‹ÆƒA¥H 5-0 ¥iS ‡‹

¥ ‡i‡¶¥Nu‹œ¯·i¯Ø¥ß⁄"‡¶b(long axis)¤ • « e « Æ ` a ⁄ ` ¡ A ⁄ ‹ ¤ ¶ «Æ¡A⁄@¶ ¤ S·`a⁄`¡A ⁄ @ ¶ ƒ S · ⁄` ‡20¥¤⁄150 ì m¡AƒA ¥¸Petrographic Grinding technique –N⁄`⁄ø · ‹ 40 ì m ¥ ¥k¡A¥ Stevenel's Blue ⁄¸Van Gieson's Picro-fuchsin " " ¥ƒ‡X G ¥ƒ¡Aƒ „ ‹ V ƒ ¥†M•¿¡° '(bone)¡A^ '‰Ł(Osteoid) ' M ¯ " ß †‰(lfiber connective tissue)¡A ⁄ ¸ ¡ ¸ ¡ ¸ ¡

S C " " u ´ I ¡ C − " " ≥sƒ¤S¿uuv„L ¡¡Ag×fio
£O15kgf/cm^2 ¶W„L5 ⁄ ˜`¡A‹ Æ ¤ ¿ N†«Æ•
fi e ' ,H¡Af. › Y ƒ b£¶W„L15kgf/cm^2 ⁄ ¥u
›n1¡B2 ⁄ ˜`⁄]• |ŧyƒ¤⁄ Wz"" †"G¡Aƒ ƒ, £
» s „ L ¶"» £P⁄fi ¶ †−« Æ„""S fifl
' ° ... v T«¡C⁄j
¿ N†S„ƒ ¤"† B fi æ ` ₡·¥¤¥
2x4x2mm "⁄j⁄p¡Aƒ A fi ß ⁄ J » E ¤»""„Ł»Ei"
• » ₡⁄¡A¥ ""‹ O W¥†[B fi æ `C¿ƒ M¥¯Ø
"⁄" →¿pA¯ » E ¤ ¯ » ˜Ł»¶T⁄K⁄fT"
ƒb¤ ⁄‹}W¡A⁄ @ ⁄ Ł →...¿W¥N†¯ Ø j«¡A⁄@
⁄ Ł › − ¯‰S ffXb¯ Ø ₡⁄S ƒ¤»˜'° „ ¡A
SU† B fi æ `C"⁄"¥¥N´¡C

2. HA "⁄"‹ r' °· œ

¥ †"G⁄¥ i ¥ H − o " ¤ ˇ ¥ »]^H‹F⁄¸· ₡¥ø‹ ·' e › ß ŧ−M^Bs› p „fi
‹ ~„ Ł"† B fi æ ` ₡·¥ »M"⁄"‹ r' °ŧ S¿A O.D
› ¨ 0.2-0.3¡ ¥...‹ ~„Ł¥ H¿¥u¥ ¸ »] H⁄"⁄~
HA ` ß ‹ r' °ŧ "¡A O.D › ¨ 0.7 ¥ ¥k¡Cƒ
¥ ¯ ª • L ^ Ł [„† xM¶{¤ ˇ ¥ ¸ ·¥ØŁ‹~¸
¤ ˇ ¥ ¸ ¥Ø⁄ AJ¡B⁄ ‹ ¥» fk ~„ Ł"† ¥æ
` C ƒ¥"⁄" ' °, ß¸¡C¥...‹ ~„ Ł"† B fi æCƒ·
¥ „ † »M¤ ƒŧ‹ r' °¡A»P† »M ifb⁄@ _
fi ¡A• |¤ ˇ † »M⁄"'¡Cƒ ´ ¥¸"⁄"† B fi æ Cƒ·¥
«h• |ƒŧ†† »M" ⁄W¥h¡ ₡b¯ ª Ł^ŁU¡A„ ₡
¥¸"⁄"† B fi æ Cƒ‹·¥ƒ yU"⁄" S ¡A' ¸‹ Of yU
"⁄" £ ŧ Wh¤A¥ifl ‹ Of]‹ ŧ o ››ƒ ŧyƒ¤†
»M"⁄" ' °¤ ⁄£‹ O« ƒn¡C

3. °"«„ ₡

‰ ƒXS "⁄"· ⁄Jƒ ,mƒbBeagle dog "⁄"⁄U
^ E' angle ƒ ,m« Of]‹ ƒ„ƒ ,m⁄£‹ O¤ ⁄O
'¡A¥ » ‹¤S"‰ ƒXS − ¸ 13MPa ,ß AƒXS@

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[4] ¶ z¥,›» E ¤ ¯ » ˜ ¡‰ƒXS¸‰˘⁄ S°‰Ł ‹ ªS, ¥ x ¥ _ ´ · | ƒ ‹˜·ª_S'•" · ⁄ h ‰⁄ (1998)

[5] · ₡p, S Ł‹'° w † ·ƒ¥´S‹ªO, ƒ ¥ †"G⁄¥ i ¥ H − o " ¤ ˇ ¥ »]^H‹F⁄¸· ₡¥ø‹ ·' e › ß ŧ−M^Bs› p „fi (1998)

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