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71. **SOLICITANTE** Polyzenix GmbH

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1) SOLICITUD DE:

☒ Patente de invención ☐ Patente de Modelo de Utilidad

☐ Capitulo I. ☒ Capitulo II.

2) SOLICITANTE (71)	**Nombre: POLYZENIX GMBH** **Dirección: Söflinger Strasse 100, 89077 Ulm, Alemania** **Nacionalidad o domicilio: Ulm, Alemania** **Lugar de constitución: Alemania**	**IDENTIFICACIÓN** **C.C.** ☐ **NIT:** ☒ **C.E.** ☐ **OTRO** ☐ **Cual** _____ **NÚMERO**_____
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- [x] Comprobante de pago de la tasa de presentación de la solicitud
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- [ ] Poderes, si fuera el caso
- [ ] Documento de cesión del inventor al solicitante o a su causante
- [ ] Declaraciones
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- [ ] Copia del examen preliminar efectuado por la IPEA
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- [ ] Arte final 12 x 12 y 6 x 6 cm
- [ ] De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionados parcial o totalmente con la invención de esta solicitud.
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(54) Title: COATED DENTAL IMPLANTS

(57) Abstract: The present invention relates to coated dental implants which allow a sufficient take of the gingiva onto said dental implants, thereby preventing inter alia gingival sulcus and bacterial infections of the gingiva and methods of using said coated dental implants for preventing the formation of gingival sulcus and bacterial infection upon their implantation into a patient.

Description

Coated dental implants

FIELD OF THE INVENTION

The present invention relates to coated dental implants which allow a sufficient take of the gingiva onto said dental implants, thereby preventing *inter alia* gingival sulcus and bacterial infections of the gingiva and methods of using said coated dental implants for preventing the formation of gingival sulcus and bacterial infection upon their implantation into a patient.

BACKGROUND OF THE INVENTION

One of the most serious complications known from artificial implants is an increased deposition of thrombocytes at the surface of implants in a patient. A possibility to deal with this complication is to use coated implants. For example, DE 196 13 048 describes artificial implants having a biocompatible coating which contains a compound with antithrombogenic properties.

A frequent problem of artificial dental implants lies in an insufficient connection between the gingiva and the dental implant; i.e. an insufficient tissue integration of the dental implant onto the gingiva upon implantation into a patient. An insufficient connection often results in the formation of gingival sulcus and an increased risk of bacterial infections. This can lead, in the worst case, to severe inflammation in connection with a loss of the dental implant.

At present, no promising solution for a sufficient take of the gingiva onto dental implants without or at least reduced formation of gingival sulcus and/or without or at least reduced risk of bacterial infections are known in the art.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an artificial dental implant which allows a sufficient take of the gingiva onto the dental implant, thereby preventing substantially the formation of gingival sulcus, at least minimizing the risk of bacterial infections and improving the long-term tolerance of the dental implant, upon its implantation into a patient.

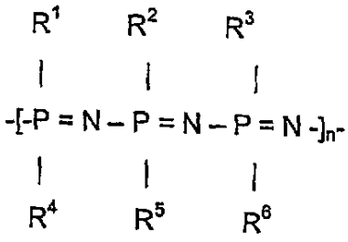
In particular, the present invention relates to a dental implant comprising a dental implant material having a biocompatible coating which is applied to at least a part of the surface of the implant material, wherein the biocompatible coating allows a sufficient take of the gingiva onto the dental implant resulting in (i) substantially no formation of gingival sulcus, (ii) substantially no bacterial infections of the gingiva close to the coated dental implant and (iii) an improved long-term tolerance of the coated dental implant.

The expression "at least part of the surface " means that part of the surface of the implant material, which should come into contact with the gingiva of the patient upon implantation.

It is another object of the present invention to provide methods of (i) preventing the formation of gingival sulcus at a dental implant, (ii) preventing bacterial infections of the gingiva at a dental implant and (iii) taking the gingiva onto a dental implant, upon implantation of the dental implant of the present application into a patient.

DETAILED DESCRIPTION OF THE INVENTION

In a preferred embodiment of the present invention, the dental implant comprises an implant material having a biocompatible coating which is applied to at least a part of the surface of implant material, wherein said biocompatible coating contains a polymer having the general formula (I)



(I)

wherein

n is from 2 to ∞

R^1 to R^6 are the same or different and represent an alkoxy, alkylsulfonyl, dialkylamino or aryloxy group, or a heterocycloalkyl or heteroaryl group having nitrogen as the heteroatom.

In the polymer of formula (I) it is preferred that at least one of the groups R^1 and R^2 is an alkoxy group substituted with at least one fluorine atom.

In the polymer of formula (I), the alkyl groups in the alkoxy, alkylsulfonyl and dialkylamino groups are, for example, straight-chain or branched-chain alkyl groups having 1 to 20 carbon atoms, wherein the alkyl groups can be substituted, for example, with at least one halogen atom, such as a fluorine atom.

Examples of alkoxy groups are methoxy, ethoxy, propoxy and butoxy groups, which preferably can be substituted with at least one fluorine atom. The 2,2,2-trifluoroethoxy group is particularly preferred.

Examples of alkylsulfonyl groups are methylsulfonyl, ethylsulfonyl, propylsulfonyl and butylsulfonyl groups.

Examples of dialkylamino groups are dimethylamino, diethylamino, dipropylamino and dibutylamino groups.

The aryl group in the aryloxy group is, for instance, a compound having one or more aromatic ring systems, wherein the aryl group can be substituted, for instance, with at least one alkyl group as defined above.

Examples of aryloxy groups are phenoxy and naphthoxy groups, and derivatives thereof.

The heterocycloalkyl group is, for example, a ring system containing 3 to 7 atoms, at least one of the ring atoms being a nitrogen atom. The heterocycloalkyl group can, for example, be substituted with at least one alkyl group as defined above. Examples of heterocycloalkyl groups are piperidinyl, piperazinyl, pyrrolidinyl and morpholinyl groups, and derivatives thereof.

The heteroaryl group is, for example, a compound with one or more aromatic ring systems, wherein at least one ring atom is a nitrogen atom. The heteroaryl group can, for example, be substituted with at least one alkyl group as defined above. Examples of heteroaryl groups are pyrrolyl, pyridinyl, pyridinolyl, isoquinolinyl and quinolinyl groups, and derivatives thereof.

In a preferred embodiment of the present invention, the biocompatible coating contains the polymer bis-poly-trifluorethoxy-polyphosphazene.

The production of polymers of formula (I), such as bis-poly-trifluorethoxy-polyphosphazene, starting with hexachlorocyclotriphosphazene, is known in the art. The polymerization of hexachlorocyclotriphosphazene is extensively described in Korsak *et al.*, Acta Polymerica 30, No. 5, pages 245-248 (1979). Esterification

of the polydichlorophosphazene produced by the polymerization is described in Fear, Thower and Veitch, J. Chem. Soc., page 1324 (1958).

The biocompatible coating of the dental implant according to the present invention has, for example, a thickness from about 1 nm to about 100 µm, preferably from about 10 nm to about 10 µm, and more preferably up to about 1 µm.

There is no particular limitation of the material to be used for the uncoated dental implant. It can be any implant material useful for dental implants. In particular, the dental implant material can be a metal, an alloy, a polymeric material or a ceramic material. For example, the metallic material can be titanium. In a preferred embodiment of the present invention, the titanium is electropolished to obtain a TiO_2 surface of the uncoated dental implant.

In one embodiment of the present invention, a layer containing an adhesion promoter is provided between the surface of the uncoated dental implant and the biocompatible coating. The adhesion promoter, or spacer, is, for example, an organosilicon compound, preferably an amino-terminated silane or a compound based on an aminosilane, or an alkylphosphonic acid. Aminopropyl trimethoxysilane is especially preferred.

The adhesion promoter particularly improves the adhesion of the biocompatible coating to the surface of the dental implant material through coupling of the adhesion promoter to the surface of the dental implant material, by, for instance, ionic and/or covalent bonds, and through further coupling of the adhesion promoter to reactive components, particularly to the polymer of the biocompatible coating, by, for instance, ionic and/or covalent bonds.

The surprisingly improved take of the gingiva onto the dental implant of the present invention may be based on, but not limited, to a mechanism that the biocompatible coating of the dental implant according to the invention adsorbs reversible native proteins without denaturation, resulting in an imitataion of a

biological and physiological surface. This unique property of the dental implant of the present invention allows an improved and accelerated take of the gingiva onto the dental implant without the formation of gingival sulcus. Moreover, bacterial infections of the gingiva can be prevented at the dental implant of the present invention upon its implantation into a patient, and the long-term tolerance of the dental implant of the present invention can be improved.

The present invention will now be further illustrated in the following examples, without being limited thereto.

EXAMPLE 1

Cell testings:

Coated and non-coated titanium plates were tested concerning their biocompatibility.

The test was performed with HEKn-Keratinozytes with a density of 30000 cells/cm2 on different coated and non-coated titanium plates. The inkubation of the cells was performed in EpiLife – medium at 37 °C at 5%CO_2 athmosphere in an incubator. The proliferation of new cells was measured by marking novell generated cells during the trialphase with Brom- desoxy – Uridin and comparing the the intensity of the via antibody reaction generated colour in an Elisa-Reader at 620 nm.

Results:

The Polyzene-F coated titatium plates showed after 24 h a significantly higher number of newly generated cells than found on the bare titanium. Ti = 100 % versus Ti-Polyzene-F = 150.%

EXAMPLE 2

15 conventional dental implants (commercially available from Dr. Ihde Dental GmbH, Munich, Allfit® STI, Size 4.1 mm diameter, length 11 and 13 mm, respectively) made from pure titanium were electropolished (commercially available from Admedes Schüßler GmbH, Pforzheim). This procedure provides a pure TiO_2 surface. Highly purified linear Polyzene-F (bis-poly-trifluor-ethoxy-phosphazene, commercially available from Polyzenix GmbH, Ulm) having a molecular weight of more than 12 millions and a Cl-concentration of below 0.0005%, was applied to the whole surface of the dental implants. 15 dental implants without any coating were used as controls. Each of the dental implants were implanted into the jawbone of patients and the tissue integration of the gingiva onto the dental implants was evaluated.

Appr. 8 weeks after implantation the dental implants according to the present invention showed a complete take of the gingiva onto the dental implants and no gingival sulcus were observed. In contrast thereto, the dental implants of the control group showed no sufficient take of the gingiva onto the dental implants and clear formations of gingival sulcus with a depth of 2 mm or more, in some cases already accompanied by bacterial infections, were observed in said patients.

The dental implants according to the present invention improve drastically the take of the gingiva onto the dental implants upon implantation into a patient. This surprising result prevents the formation of gingival sulcus, and thereby the risk of bacterial infections can be minimized, if not prevented. As a consequence, the sufficient take of the gingiva onto the dental implants of the present invention substantially reduces or prevents the loss of said dental implant and improves the long-term tolerance of said dental implant.

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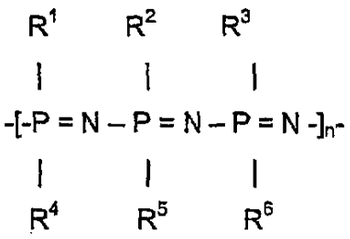
Claims

1. 1. A dental implant comprising an implant material having a biocompatible coating which is applied to at least a part of the surface of the implant material.

2. The dental implant according to claim 1, wherein the biocompatible coating contains a polymer having the general formula (I)



(I)

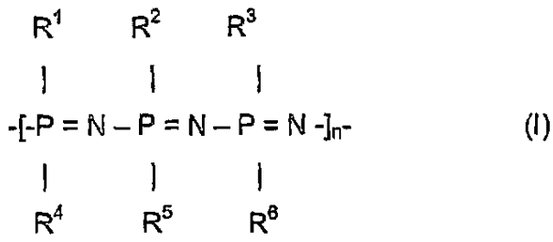
wherein R^1 to R^6 are the same or different and represent an alkoxy, alkylsulfonyl, dialkylamino or aryloxy group, or a heterocycloalkyl or heteroaryl group having nitrogen as the heteroatom.

3. The dental implant according to claim 2, wherein at least one of the groups R^1 and R^2 is an alkoxy group substituted with at least one fluorine group.

4. The dental implant according to claim 1, wherein the biocompatible coating contains a bis-poly-trifluorethoxy-polyphosphazene.

5. A method of preventing the formation of gingival sulcus at a dental implant upon implantation into a patient, said method comprising the use of a dental implant comprising an implant material having a biocompatible coating which is applied to at least a part of the surface of the implant material.

6. The method according to claim 5, wherein the biocompatible coating contains a polymer having the general formula (I)



(I)

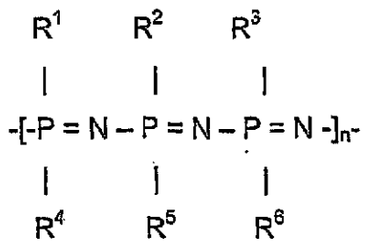
wherein R^1 to R^6 are the same or different and represent an alkoxy, alkylsulfonyl, dialkylamino or aryloxy group, or a heterocycloalkyl or heteroaryl group having nitrogen as the heteroatom.

7. The method according to claim 6, wherein at least one of the groups R^1 and R^2 is an alkoxy group substituted with at least one fluorine group.

8. The method according to claim 5, wherein the biocompatible coating contains a bis-poly-trifluorethoxy-polyphosphazene.

9. A method of preventing bacterial infections of the gingiva at a dental implant upon implantation into a patient, said method comprising the use of a dental implant comprising an implant material having a biocompatible coating which is applied to at least a part of the surface of the implant material.

10. The method according to claim 9, wherein the biocompatible coating contains a polymer having the general formula (I)



(I)

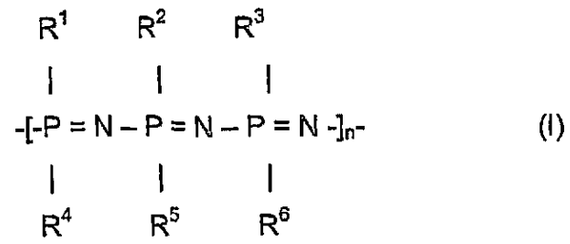
wherein R^1 to R^6 are the same or different and represent an alkoxy, alkylsulfonyl, dialkylamino or aryloxy group, or a heterocycloalkyl or heteroaryl group having nitrogen as the heteroatom.

11. The method according to claim 10, wherein at least one of the groups R^1 and R^2 is an alkoxy group substituted with at least one fluorine group.

12. The method according to claim 9, wherein the biocompatible coating contains a bis-poly-trifluorethoxy-polyphosphazene.

13. A method of taking the gingiva onto a dental implant upon implantation into a patient, wherein the dental implant comprises an implant material having a biocompatible coating which is applied to at least a part of the surface of the implant material.

14. The method according to claim 13, wherein the biocompatible coating contains a polymer having the general formula (I)



(I)

wherein R^1 to R^6 are the same or different and represent an alkoxy, alkylsulfonyl, dialkylamino or aryloxy group, or a heterocycloalkyl or heteroaryl group having nitrogen as the heteroatom.

15. The method according to claim 14, wherein at least one of the groups R^1 and R^2 is an alkoxy group substituted with at least one fluorine group.

16. The method according to claim 13, wherein the biocompatible coating contains a bis-poly-trifluorethoxy-polyphosphazene.

Descripción

IMPLANTES DENTALES RECUBIERTOS

CAMPO DE LA INVENCIÓN

La presente invención se relaciona con implantes dentales recubiertos que permiten una toma suficiente de la encía sobre dichos implantes dentales, evitando por alo tanto entreoíros el surco de la encía e infecciones bacteriales de la encía y métodos de utilizar dichos implantes dentales recubiertos para evitar la formación de surco de la encía e infección bacterial luego de su implantación en un paciente.

ANTECEDENTES DE LA INVENCIÓN

Una de las complicaciones más serias conocidas de los implantes artificiales es una deposición incrementada de trombocitos en una superficie de implantes en un paciente. Una posibilidad para tratar con esta complicación es utilizar implantes recubiertos. Por ejemplo, la DE 196 13 048 describe implantes artificiales que tienen un recubrimiento biocompatible que contiene un compuesto con propiedades antitrombogénicas.

Un problema frecuente de implantes dentales artificiales radica en una conexión insuficiente entre la encía y el implante dental; es decir una integración de tejido insuficiente del implante dental sobre la encía luego de la implantación en un paciente. Una conexión insuficiente a menudo resulta la formación de surco de encía y un incremento en el riesgo de infecciones bacteriales. Esto puede conducir en los peor de los casos, a inflamación severa en relación con una perdida del implante dental.

Actualmente, no existe una solución que prometa una toma suficiente de la encía sobre los implantes dentales si o al menos formación reducida del surco de la encía y/o sin o al menos riesgo reducido de infección bacterial son conocidos en la técnica.

RESUMEN DE LA INVENCIÓN

Es un objeto de la presente invención suministrar un implante dental artificial que permite una toma suficiente de la encía sobre el implante dental, evitando por lo tanto sustancialmente la formación de surco de la encía, al menos minimizando el riesgo de infección bacterial y mejorando la tolerancia a largo plazo del implante dental, luego de su implantación en un paciente.

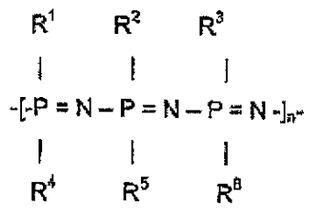
En particular, la presente invención se relaciona con un implante dental que comprende un material de implante dental que tiene un recubrimiento biocompatible que se aplica a al menos una parte de la superficie del material de implante, en donde el recubrimiento biocompatible permite una toma suficiente de la encía sobre el implante dental resultando en (i) sustancialmente ninguna formación de surco de la encía, (ii) sustancialmente ninguna infección bacterial de la encía cercana al implante dental recubierto y (iii) una tolerancia a largo plazo mejorada del implante dental recubierto.

La expresión "al menos parte de la superficie" significa que parte de la superficie del material de implante, que debe estar en contacto con la encía del paciente luego de la implantación.

Es otro objeto de la presente invención suministrar métodos de (i) evitar la formación de surco de la encía en un implante dental, (ii) evitar infección bacterial de la encía en un implante dental y (iii) tomar la encía en un implante dental, luego de la implantación del implante dental de la presente solicitud en un paciente.

DESCRIPCIÓN DETALLADA DE LA INVENCIÓN

En una modalidad preferida de la presente invención, el implante dental comprende un material de implante que tiene un recubrimiento biocompatible que se aplica a al menos una parte de la superficie del material de implante, en donde dicho recubrimiento biocompatible contiene un polímero que tiene la fórmula general (I)



(I)

En donde

N va de 2 a ∞

R^1 a R^6 son iguales o diferentes y representan un grupo alcoxi, alquilsulfonilo, dialquilamino o ariloxi, o un grupo heterocicloalquilo o heteroarilo que tiene nitrógeno como el heteroátomo.

En el polímero de fórmula (I) se prefiere que al menos uno de los grupos R^1 y R^2 es un grupo alcoxi sustituido con al menos un átomo de de flúor.

En el polímero de fórmula (I), los grupos alquilo en los grupos alcoxi, alcoxisulfonilo y dialquilamino son, por ejemplo, grupos de cadena recta o grupos alquilo de cadena ramificada que tienen 1 a 20 átomos de carbono en donde los grupos alquilo pueden ser sustituidos, por ejemplo, con al menos un átomo de halógeno, tal como un átomo de flúor.

Ejemplos de grupos alcoxi son metoxi, etoxi, propoxi, y grupos butoxi, que preferiblemente pueden ser sustituidos con al menos un átomo de flúor, el grupo 2,2,2-trifluoroetoxi es particularmente preferido.

Ejemplos de grupos alquilsulfonilo son metilsulfonilo, etilsulfonilo, propilsulfonilo y grupos butilsulfonilo.

Ejemplos de grupos dialquilaminos son dimetilamino, dietilamino, dipropilamino y grupos dibutilamino.

El grupo arilo en el grupo ariloxi es, por ejemplo, un compuesto que tienen uno o más sistemas de anillo aromático, en donde el grupo arilo puede ser sustituido, por ejemplo, con al menos un grupo alquilo como se definió anteriormente.

Ejemplos de grupo ariloxi son grupos fenoxi y grupos naftoxi, y derivados de estos.

El grupo heterocicloalquilo es, por ejemplo, un sistema de anillo que contiene 3 a 7 átomos, al menos uno de los átomos de anillo es átomo de nitrógeno. El grupo heterocicloalquilo puede, por ejemplo, ser sustituido con al menos un grupo alquilo como se definió anteriormente. Ejemplos de grupos heterocicloalquilo son piperidinilo, piperacinilo, pirrodinilo y grupos morfolinilo, y derivados de estos.

El grupo heteroarilo es, por ejemplo, un compuesto con uno o más sistemas de anillo aromático, en donde al menos un átomo de anillo es un átomo nitrógeno. El grupo heteroarilo puede, por ejemplo, ser sustituido con al menos un grupo alquilo como se definió anteriormente. Ejemplos de grupos heteroarilos son pirrolilo, piridinilo, piridinolilo, isoquinolinilo, isoquinolinilo y grupos quinolinilo, y derivados de estos.

En una modalidad preferida de la presenta invención, el recubrimiento biocompatible contiene el polímero bis-poli-trifluoroetoxi-polifosfazeno.

La producción de polímeros de fórmula (I), tales como bis-poli-trifluoroetoxi-polifosfazeno, partiendo con hexaclorociclotrifosfazeno, es conocido en la técnica. La polimerización del hexaclorociclotrifosfazeno es descrito en

forma extensiva en Korsak *et al.*, Acta Polymerica 30, No. 5 paginas 245-248 (1979). La esterificación del polidiclorofosfazeno producido por la polimerización se describe en Fear, Thower an Veitch, J. Chem. Soc., pagina 1324 (1958).

El recubrimiento biocompatible del implante dental de acuerdo con la presente invención tiene, por ejemplo, un espesor de cerca de 1 nm a cerca de 10μm, preferiblemente de cerca de 10 nm a cerca de 10μm y más preferiblemente hasta cerca de 1μm.

No existe limitación particular del material a ser utilizado para el implante dental no recubierto. Este puede ser cualquier material de implante útil para implantes dentales. En particular, el material de implante dental puede ser un metal, una aleación, un material polimérico o un material cerámico. Por ejemplo, el material metálico puede ser titanio. En una modalidad preferida de la presente invención, el titanio es pulido electrolítico para obtener una superficie TiO_2 del implante dental no cubierto.

En una modalidad de la presente invención, una capa que contiene un promotor de adhesión se suministra entre la superficie del implante dental no cubierto y el recubrimiento biocompatible. El promotor de adhesión o espaciador, es, por

ejemplo, un compuesto de organosilicio, preferiblemente un silano aminoterminado o un compuesto basado en uno aminosilano, o un ácido alquilfosfónico. El trimetoxisilano aminopropilo es especialmente preferido.

El promotor de adhesión particularmente mejora la adhesión del recubrimiento biocompatible a la superficie del material de implante dental a través del acoplamiento del promotor de adhesión a la superficie del material de implante dental, mediante, por ejemplo, uniones covalentes y/o iónicas, y a través adicionalmente de acoplar el promotor de adhesión a los componentes reactivos, particularmente al polímero del recubrimiento biocompatible, mediante, por ejemplo, uniones covalentes y/o iónicas.

La toma sorprendentemente mejorada de la encía sobre el implante dental de la presente invención puede estar basada en, pero no limitada, a un mecanismo que el recubrimiento biocompatible del implante dental de acuerdo con la invención adsorbe proteínas nativas reversibles sin desnaturalización, resultando en una imitación de una superficie biológica y fisiológica. Esta única propiedad del implante dental de la presente invención permite una toma mejorada y acelerada de la encía sobre el implante dental sin la formación de surco de encía. Más aún, las infecciones bacteriales de la encía pueden ser evitadas en el implante dental de la presente

invención una vez su implantación en un paciente, y la tolerancia a largo plazo del implante dental de la presente invención puede ser mejora.

La presente invención será ahora ilustrada en los siguientes ejemplos, sin ser limitada a estos.

EJEMPLO 1

Células de ensayo:

Placas de titanio no recubiertos y recubiertos fueron ensayadas con relación a su biocompatibilidad.

El ensayo fue desarrollado con HEKn-queratinocitos con una densidad de 30.000 células/cm2 en diferentes placas de titanio no cubierto y recubierto. La incubación de la células fue desarrollada en medio EpiLifea 37° C a 5% CO_2 de atmósfera en un incubador. La proliferación de células nuevas fue medida al marcar células generadas novedosas durante la trialface de ensayo con Brom-desoxi-Uridin y comparando la intensidad del color generado en la reacción por vía de anticuerpo en un lector Elisa a 620 nm.

Resultados:

Las placas de titanio recubiertas con Polizeno-F mostraron después de 24 h un número significativamente mayor de células generadas nuevas que las encontradas en la barra de titanio. Ti=100% versus Ti-Polizeno-F=150%.

EJEMPLO 2

15 implantes dentales convencionales (comercialmente disponibles de Dr. Ihde Dental GMBH, Munich, Allfit® STI, tamaño 4.1 mm de diámetro, longitud 11 y 13 mm, respectivamente) hechas de titanio puro fueron pulidas electrolíticamente (comercialmente disponible de Admedes Schüßler GMBH, Pforzheim). Este procedimiento suministra una superficie de TiO_2. El polizeno-F linear altamente purificado (bis-poli-trifluor-etoxi-fosfazeno, comercialmente disponible de Polyzenix GMBH, Ulm) que tiene un peso molecular de más de 12 millones y una concentración Cl de menos de 0.0005%, fue aplicada a la superficie completa de los implantes dentales. 15 implantes dentales sin ningún recubrimiento se utilizaron como control. Cada uno de los implantes fue implantado en la quijada de los pacientes y se evaluó el tejido de integración de la encía sobre los implantes dentales.

Aproximadamente 8 semanas después de los implantes dentales de la presente invención mostró una completa toma de la encía sobre los implantes dentales y no se observó ningún surco de encía. Como contraste a esto, los implantes dentales del grupo de control no mostraron suficiente toma de encía sobre los implantes dentales y se observaron raras formaciones de surcos de encía con una profundidad de 2 mm o más, en algunos casos ya acompañada por infecciones bacteriales.

Los implantes dentales de acuerdo con la presente invención mejoran drásticamente la toma de la encía sobre los implantes dentales luego de la implantación a los pacientes. Este resultado sorprendente evita la formación de surcos de encía, y de esta manera se puede minimizar el riesgo de infecciones bacteriales, sino evitarla. Como consecuencia, la toma suficiente de encía sobre los implantes dentales de la presente invención reduce o evita sustancialmente la perdida de dicho implante dental y mejora la tolerancia a largo plazo de dicho implante dental.

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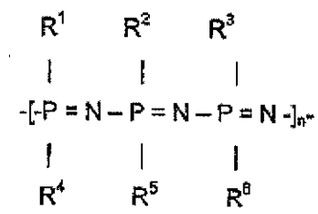
REIVINDICACIONES

1. Un implante dental que comprende un material de implante que tiene un recubrimiento biocompatible que se aplica a al menos una parte de la superficie del material de implante.

2. El implante dental de acuerdo a la reivindicación 1, en donde el recubrimiento biocompatible contiene un polímero que tiene una fórmula general (I)



(I)

R^1 a R^6 son iguales o diferentes y representan un grupo alcoxi, alquilsulfonilo, dialquilamino o ariloxi, o un grupo heterocicloalquilo o heteroarilo que tiene nitrógeno como el heteroátomo.

3. El implante dental de acuerdo a la reivindicación 2, en donde al menos uno de los grupos R^1 y R^2 es un grupo alcoxi sustituido con al menos un grupo flúor.

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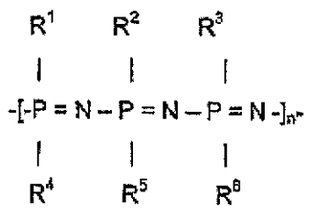
4. El implante dental de acuerdo a la reivindicación 1, en donde el recubrimiento biocompatible contiene bis-poli-trifluoroetoxi-polifosfazeno.

5. Un método para evitar la formación de surcos de encía en un implante dental luego de la implantación al paciente, dicho método comprende el uso de un implante dental que comprende un material de implante que tienen un recubrimiento biocompatible que se aplica a al menos una parte de la superficie del material de implante.

6. El método de acuerdo a la reivindicación 5, endode el recubrimiento biocompatible contiene un polímero que tiene la fórmula general (I)



(I)

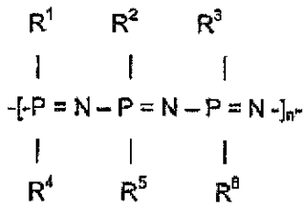
En donde R^1 a R^6 son iguales o diferentes y representan un grupo alcoxi, alquilsulfonilo, dialquilamino o ariloxi, o un grupo heterocicloalquilo o heteroarilo que tiene nitrógeno como el heteroátomo.

7. El método de acuerdo a la reivindicación 6, en donde al menos uno de los grupos R^1 y R^2 es un grupo alcoxi sustituido con al menos un grupo flúor.

8. El método de acuerdo a la reivindicación 5, en donde el recubrimiento biocompatible contiene un bis-poli-trifluoroetoxi-polifosfazeno.

9. Un método para evitar las infección bacteriales de la encía en un implante dental luego de la implantación al paciente, dicho método comprende el uso de un implante dental que comprende un material de implante que tiene un recubrimiento biocompatible que se aplica a al menos una parte de la superficie del material de implante.

10. El método de acuerdo a la reivindicación 9, en donde el recubrimiento biocompatible contiene un polímero que tiene la fórmula general (I)



(I)

En donde R^1 a R^6 son iguales o diferentes y representan un grupo alcoxi, alquilsulfonilo, dialquilamino o

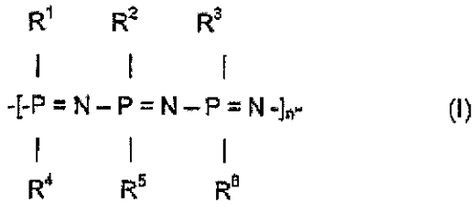
ariloxi, o un grupo heterocicloalquilo o heteroarilo que tiene nitrógeno como el heteroátomo.

11. El método de acuerdo a la reivindicación 10, en donde al menos uno de los grupos R^1 y R^2 es un grupo alcoxi sustituido con al menos un grupo flúor.

12. El método de acuerdo a la reivindicación 5, en donde el recubrimiento biocompatible contiene un bis-poli-trifluoroetoxi-polifosfazeno.

13. Un método de toma de encía sobre el implante dental luego de la implantación al paciente, en donde el implante dental comprende un material de implante que tiene un recubrimiento biocompatible que se aplica al menos una parte de la superficie del material de implante.

14. El método de acuerdo a la reivindicación 13, en donde el recubrimiento biocompatible contiene un polímero que tiene la fórmula general (I)



(I)

En donde R^1 a R^6 son iguales o diferentes y representan un grupo alcoxi, alquilsulfonilo, dialquilamino o ariloxi, o un grupo heterocicloalquilo o heteroarilo que tiene nitrógeno como el heteroátomo.

15. El método de acuerdo a la reivindicación 14, en donde al menos uno de los grupos R^1 y R^2 es un grupo alcoxi sustituido con al menos un grupo flúor.

16. El método de acuerdo a la reivindicación 13, en donde el recubrimiento biocompatible contiene un bis-poli-trifluoroetoxi-polifosfazeno.

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RESUMEN

La presente invención se relaciona con implantes dentales recubiertos que permiten una toma suficiente de la encía sobre dichos implantes dentales, evitando de esta manera entre otros el surco de encía y las infecciones bacteriales de la encía y métodos de uso de dichos implantes dentales recubiertos para evitar la formación de surcos de encía e infección bacterial luego de la implantación al paciente.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/003262

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61L27/34 C08G79/02 A61C8/00 A61K6/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61L C08G A61C A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	EP 1 312 635 A (POLYZENIX GMBH) 21 May 2003 (2003-05-21) paragraph '0009! paragraph '0011! - paragraph '0029! claims 1-3	1-16
X	WO 03/015719 A (DENK ROMAN ; GRUNZE MICHAEL (DE); POLYZENIX GMBH (DE); EUROFLEX SCHUES) 27 February 2003 (2003-02-27) page 5, paragraph 3 - page 6, paragraph 3 page 8, paragraph 2 - paragraph 4 claims 1-14	1-16

-/---

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

'A' document defining the general state of the art which is not considered to be of particular relevance

'E' earlier document but published on or after the international filing date

'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

'O' document referring to an oral disclosure, use, exhibition or other means

'P' document published prior to the international filing date but later than the priority date claimed

'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

'X' document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

'Y' document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

'&' document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 June 2004	02/07/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Paloniemi Legland, R

Form PCT/ISA/210 (second sheet) (January 2004)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	WO 2004/004795 A (DENK ROMAN ; POLYZENIX GMBH (DE)) 15 January 2004 (2004-01-15) page 1 page 6, paragraph 5 page 8, paragraph 4 claims 1-9	1-16
X	WO 02/13882 A (BOXBERGER MICHAEL ; NAGEL STEFAN (DE); BRAUN MELSUNGEN AG (DE)) 21 February 2002 (2002-02-21) page 4 claims 1-12	1-4
X	DE 100 19 982 A (GRUNZE MICHAEL ; UNIV HEIDELBERG (DE)) 25 October 2001 (2001-10-25) paragraph '0002! paragraph '0012! - paragraph '0020! claims 1-20	1-4
X	DE 196 13 048 A (GRUNZE MICHAEL PROF DR) 2 October 1996 (1996-10-02) cited in the application claims 1-17	1-4
P,X	EP 1 344 538 A (DEGRADABLE SOLUTIONS AG) 17 September 2003 (2003-09-17) claim 1	1,2
X	US 4 592 755 A (PETTIGREW F ALEXANDER ET AL) 3 June 1986 (1986-06-03) column 3, line 12 - line 19 claims 1-34	1-4
X	LEMMOUCHI Y ET AL: "BIODEGRADABLE POLYPHOSPHAZENES FOR DRUG DELIVERY" MACROMOLECULAR SYMPOSIA, WILEY VCH, WEINHEIM, DE, vol. 123, 1 September 1997 (1997-09-01), pages 103-112, XP000727295 ISSN: 1022-1360 page 109, paragraph 2	1,2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2004/003262

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Although claims 5-16 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

2. [ ] Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 1312635	A	21-05-2003	AU	4248401 A	03-10-2001
			CA	2402949 A1	27-09-2001
			CN	1418116 T	14-05-2003
			WO	0170296 A1	27-09-2001
			EP	1265653 A1	18-12-2002
			EP	1312635 A2	21-05-2003
			JP	2003527215 T	16-09-2003
			US	2003099683 A1	29-05-2003
WO 03015719	A	27-02-2003	DE	10202467 A1	24-07-2003
			CA	2457018 A1	27-02-2003
			WO	03015719 A1	27-02-2003
WO 2004004795	A	15-01-2004	WO	2004004795 A1	15-01-2004
WO 0213882	A	21-02-2002	EP	1179353 A1	13-02-2002
			AU	9544701 A	25-02-2002
			BR	0113184 A	01-07-2003
			CA	2424359 A1	06-02-2003
			CN	1469759 T	21-01-2004
			WO	0213882 A1	21-02-2002
			EP	1337285 A1	27-08-2003
			US	2003157142 A1	21-08-2003
DE 10019982	A	25-10-2001	DE	10019982 A1	25-10-2001
			AU	6376001 A	07-11-2001
			CA	2408997 A1	14-11-2002
			WO	0180919 A2	01-11-2001
			DE	10191512 D2	13-03-2003
			EP	1274471 A2	15-01-2003
			JP	2004500918 T	15-01-2004
			US	2004014936 A1	22-01-2004
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EP 1344538	A	17-09-2003	EP	1344538 A1	17-09-2003
			WO	03075975 A1	18-09-2003
US 4592755	A	03-06-1986	CA	1252253 A1	11-04-1989
			EP	0205349 A2	17-12-1986
			JP	1685702 C	11-08-1992
			JP	3051181 B	06-08-1991
			JP	62038151 A	19-02-1987

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

To:
MÜLLER-BORE & PARTNER
Attn. Perrey, Ralf
Grafinger Strasse 2
D-81671 München
GERMANY

Eingegangen
02. JULI 2004
Müller-Boré & Partner
Frist: 02.09.04

Applicant's or agent's file reference P3353	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/EP2004/003262	International filing date *(day/month/year)* 26/03/2004
Applicant POLYZENIX GMBH	

Date of mailing *(day/month/year)* 02/07/2004

1. [x] The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

   When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Fascimile No.: (41-22) 740.14.35

   For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   [ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

   [ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

   Within 19 **months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until **30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the International Searching Authority	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Jette Christensen

Form PCT/ISA/220 (January 2004) *(See notes on accompanying sheet)*

NOTES TO FORM PCT/ISA/220

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These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped),whether

(i) the claim is unchanged;

(ii) the claim is cancelled;

(iii) the claim is new;

(iv) the claim replaces one or more claims as filed;

(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international appplication is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF RECEIPT OF RECORD COPY

(PCT Rule 24.2(a))

To:

PERREY, Ralf
Müller-Boré & Partner
Grafinger Strasse 2
81671 München
Germany

Date of mailing (day/month/year)	IMPORTANT NOTIFICATION
18 May 2004 (18.05.2004)	
Applicant's or agent's file reference	***International application No.***
P3353	PCT/EP2004/003262

The applicant is hereby **notified** that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

POLYZENIX GMBH (for all designated States except US)
DENK, Roman (for US)

International filing date	:	26 March 2004 (26.03.2004)
Priority date(s) claimed	:	26 March 2003 (26.03.2003)
Date of receipt of the record copy by the International Bureau	:	26 April 2004 (26.04.2004)
List of designated Offices	:	

AP :BW,GH,GM,KE,LS,MW,MZ,SD,SL,SZ,TZ,UG,ZM,ZW
EA :AM,AZ,BY,KG,KZ,MD,RU,TJ,TM
EP :AT,BE,BG,CH,CY,CZ,DE,DK,EE,ES,FI,FR,GB,GR,HU,IE,IT,LU,MC,NL,PL,PT,RO,SE,SI,SK,
TR
OA :BF,BJ,CF,CG,CI,CM,GA,GN,GQ,GW,ML,MR,NE,SN,TD,TG
National :AE,AG,AL,AM,AT,AU,AZ,BA,BB,BG,BR,BW,BY,BZ,CA,CH,CN,CO,CR,CU,CZ,DE,DK,DM,
DZ,EC,EE,EG,ES,FI,GB,GD,GE,GH,GM,HR,HU,ID,IL,IN,IS,JP,KE,KG,KP,KR,KZ,LC,LK,LR,LS,
LT,LU,LV,MA,MD,MG,MK,MN,MW,MX,MZ,NA,NI,NO,NZ,OM,PG,PH,PL,PT,RO,RU,SC,SD,SE,SG,SK,
SL,SY,TJ,TM,TN,TR,TT,TZ,UA,UG,US,UZ,VC,VN,YU,ZA,ZM,ZW

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer: Frédéric SONTAG (Fax 338 8970)
Facsimile No. (41-22) 338.89.70	Telephone No. (41-22) 338 8391

Form PCT/IB/301 (January 2004)

006257717

Continuation of Form PCT/IB/301

NOTIFICATION OF RECEIPT OF RECORD COPY

41

Date of mailing (day/month/year)	IMPORTANT NOTIFICATION
18 May 2004 (18.05.2004)	
Applicant's or agent's file reference	**International application No.**
P3353	PCT/EP2004/003262

ATTENTION

The applicant should carefully check the data appearing in this Notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the International Bureau.

In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

[X] time limits for entry into the national phase - **see updated important information (as of April 2002)**

[ ] requirements regarding priority documents (if applicable)

A copy of this Notification is being sent to the receiving Office and to the InternationalSearching Authority.

INFORMATION ON TIME LIMITS FOR ENTERING THE NATIONAL PHASE

The applicant is reminded that the **"national phase" must be entered** before each of the designated Offices indicated on the cover sheet of this Notification by paying national fees and furnishing translations, as prescribed by Articles 22 and 39 and the applicable national laws. In addition, the applicant may also have to comply **with other special requirements** applicable in certain Offices. It is the **applicant's responsibility** to ensure the necessary steps to enter the national phase are taken in a timely fashion. Most Offices do not issue reminders to applicants in connection with the entry into the national phase.

The **applicable time limit** for entering the national phase will, **subject to what is said in the following paragraph,** be **30 MONTHS** from the priority date, not only in respect of any elected Office if a demand for international preliminary examination is filed before the expiration of 19 months from the priority date (see Article 39(1)), but also in respect of any designated Office, in the absence of filing of such demand, where Article22(1) as modified with effect from 1 April 2002 applies in respect of that designated Office. For further details, see PCT Gazette No. 44/2001 of 1 November 2001, pages 19926, 19932 and 19934, as well as the PCT Newsletter, October and November 2001 and February 2002 issues.

In practice, **time limits other than the 30-month time limit will continue to apply, for various periods of time,** in respect of certain designated or elected Offices. For **regular updates on the applicable time limits (20, 21, 30 or 31 months, or other time limit),** Office by Office, refer to the PCT Gazette("Section IV" part published on a weekly basis), to the PCT Newsletter (on a monthly basis) and to the relevant National Chapters in Volume II of the PCT Applicant's Guide (the paper version of which is updated usually twice a year and the Internet version of which is updated usually on a weekly basis). Finally, a cumulative table of all applicable time limits for entering the national phase is available from WIPO's Internet site, via links from various pages the site including those of the Gazette, Newsletter and Guide, at http://www.wipo.int/pct/en/index.html.

Information about the requirements for **filing a demand for international preliminary examination** is set out in the PCT Applicant's Guide, Volume I/A, Chapter IX. Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination (at present, all PCT Contracting States are bound by Chapter II).

REQUIREMENTS REGARDING PRIORITY DOCUMENTS

For applicants who have not yet complied with the requirements regarding priority documents, the following is recalled.

Where the priority of an earlier national, regional or international application is claimed, the applicant must submit a copy of the said earlier application, certified by the authority with which it was filed ("the priority document") to the receiving Office (which will transmit it to the International Bureau) or directly to the International Bureau, before the expiration of 16 months from the priority date, provided that any such priority document may still be submitted to the International Bureau before that date of international publication of the international application, in which case that document will be considered to have been received by the International Bureau on the last day of the 16-month time limit (Rule 17.1(a)).

Where the priority document is issued by the receiving Office, the applicant may, instead of submitting the priority document, request the receiving Office to prepare and transmit the priority document to the International Bureau. Such request must be made before the expiration of the 16-month time limit and may be subjected by the receiving Office to the payment of a fee (Rule 17.1(b)).

If the priority document concerned is not submitted to the International Bureau or if the request to the receiving Office to prepare and transmit the priority document has not been made (and the corresponding fee, if any, paid) within the applicable time limit indicated under the preceding paragraphs, any designated State may disregard the priority claim, provided that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within the time limit which is reasonable under the circumstances (Rule 17.1(c)).

Where several priorities are claimed, the priority date to be considered for the purposes of computing the 16-month time limit (and all other PCT time limits) is the filing date of the earliest application whose priority is claimed (Article 2(xi)(b)).

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference *(if desired) (12 characters maximum)* P 3353

Box No. I TITLE OF INVENTION

COATED DENTAL IMPLANTS

Box No. II APPLICANT ☐ This person is also inventor

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

POLYZENIX GMBH
Söflinger Strasse 100
D-89077 Ulm
DE

Telephone No.

Facsimile No.

Teleprinter No.

Applicant's registration No. with the Office

State *(that is, country)* of nationality: DE

State *(that is, country)* of residence: DE

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

Roman DENK
Buchenweg 21
D-89197 Weidenstetten
DE

This person is:
☐ applicant only
☒ applicant and inventor
☐ inventor only *(If this check-box is marked, do not fill in below.)*

Applicant's registration No. with the Office

State *(that is, country)* of nationality: DE

State *(that is, country)* of residence: DE

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

Ralf PERREY
Müller-Boré & Partner
Grafinger Strasse 2
D-81671 München
DE

Telephone No. 0049-89-490570

Facsimile No. 0049-89-45067450

Teleprinter No.

Agent's registration No. with the Office

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. V DESIGNATIONS

The filing of this request **constitutes under Rule 4.9(a), the designation** of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.

However,

☐ DE Germany **is not designated** for any kind of national protection

☐ KR Republic of Korea **is not designated** for any kind of national protection

☐ RU Russian Federation **is not designated** for any kind of national protection

(The check-boxes above may be used to exclude (irrevocably) the designations concerned in order to avoid the ceasing of the effect, under the national law, of an earlier national application from which priority is claimed. See the Notes to Box No. V as to the consequences of such national law provisions in these and certain other States.)

Box No. VI PRIORITY CLAIM

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application *(day/month/year)*	Number of earlier application	Where earlier application is:		
		national application: country or Member of WTO	regional application:* regional Office	international application: receiving Office
item (1) 26.03.2003 (26. March 2003)	60/457,694	USA		
item (2)				
item (3)				

☐ Further priority claims are indicated in the Supplemental Box.

The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of this international application is the receiving Office)* identified above as:

☐ all items ☐ item (1) ☐ item (2) ☐ item (3) ☐ other, see Supplemental Box

* *Where the earlier application is an ARIPO application, indicate at least one country party to the Paris Convention for the Protection of Industrial Property or one Member of the World Trade Organization for which that earlier application was filed (Rule 4.10(b)(ii)):* ....

.....

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):*

ISA / EP .....

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority):*

Date *(day/month/year)* Number Country *(or regional Office)*

Box No. VIII DECLARATIONS

The following **declarations** are contained in Boxes Nos. VIII (i) to (v) *(mark the applicable check-boxes below and indicate in the right column the number of each type of declaration):*		Number of declarations
☐ Box No. VIII (i)	Declaration as to the identity of the inventor :	
☐ Box No. VIII (ii)	Declaration as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent :	
☐ Box No. VIII (iii)	Declaration as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application :	
☐ Box No. VIII (iv)	Declaration of inventorship (only for the purposes of the designation of the United States of America) :	
☐ Box No. VIII (v)	Declaration as to non-prejudicial disclosures or exceptions to lack of novelty :	

Box No. IX CHECK LIST; LANGUAGE OF FILING

This international application **contains:**

(a) **in paper form**, the following number of sheets:

request (including declaration sheets)	:	3
description (excluding sequence listing and/or tables related thereto)	:	7
claims	:	4
abstract	:	1
drawings	:	
Sub-total number of sheets	:	15
sequence listing	:	
tables related thereto	:	
(for both, actual number of sheets if filed in paper form, whether or not also filed in computer readable form; see (c) below)		
Total number of sheets	:	15

(b) ☐ **only in computer readable form** (Section 801(a)(i))
- (i) ☐ sequence listing
- (ii) ☐ tables related thereto

(c) ☐ **also in computer readable form** (Section 801(a)(ii))
- (i) ☐ sequence listing
- (ii) ☐ tables related thereto

Type and number of carriers (diskette, CD-ROM, CD-R or other) on which are contained the
- ☐ sequence listing: .....
- ☐ tables related thereto: .....

(additional copies to be indicated under items 9(ii) and/or 10(ii), in right column)

This international application is **accompanied by** the following item(s) *(mark the applicable check-boxes below and indicate in right column the number of each item):*

	Number of items
1. ☐ fee calculation sheet	:
2. ☐ original separate power of attorney	:
3. ☐ original general power of attorney	:
4. ☐ copy of general power of attorney; reference number, if any:	:
5. ☐ statement explaining lack of signature	:
6. ☐ priority document(s) identified in Box No. VI as item(s):	:
7. ☐ translation of international application into *(language)*:	:
8. ☐ separate indications concerning deposited microorganism or other biological material	:
9. ☐ sequence listing in computer readable form *(indicate type and number of carriers)*	
(i) ☐ copy submitted for the purposes of international search under Rule 13*ter* only (and not as part of the international application)	:
(ii) ☐ *(only where check-box (b)(i) or (c)(i) is marked in left column)* additional copies including, where applicable, the copy for the purposes of international search under Rule 13*ter*	:
(iii) ☐ together with relevant statement as to the identity of the copy or copies with the sequence listing mentioned in left column	:
10. ☐ tables in computer readable form related to sequence listing *(indicate type and number of carriers)*	
(i) ☐ copy submitted for the purposes of international search under Section 802(b-*quater*) only (and not as part of the international application)	:
(ii) ☐ *(only where check-box (b)(ii) or (c)(ii) is marked in left column)* additional copies including, where applicable, the copy for the purposes of international search under Section 802(b-*quater*)	:
(iii) ☐ together with relevant statement as to the identity of the copy or copies with the tables mentioned in left column	:
11. ☐ other *(specify)*:	:

Figure of the drawings which should accompany the abstract:

Language of filing of the international application: English

Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Munich, March 26, 2004 Dr. Ralf Perrey

For receiving Office use only

1. Date of actual receipt of the purported international application:	2. Drawings: ☐ received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	☐ not received:
5. International Searching Authority (if two or more are competent): ISA /	6. ☐ Transmittal of search copy delayed until search fee is paid

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING SUBMISSION OR TRANSMITTAL OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

To:

PERREY, Ralf
Müller-Boré & Partner
Grafinger Strasse 2
81671 München
Germany

Eingegangen
01. JUNI 2004
Müller-Boré & Partner
Frist

Date of mailing (day/month/year) 18 May 2004 (18.05.2004)	
Applicant's or agent's file reference P3353	**IMPORTANT NOTIFICATION**
International application No. PCT/EP2004/003262	International filing date (day/month/year) 26 March 2004 (26.03.2004)
International publication date (day/month/year) Not yet published	Priority date (day/month/year) 26 March 2003 (26.03.2003)
Applicant POLYZENIX GMBH et al	

1. By means of this Form, which replaces any previously issued notification concerning submission or transmittal of priority documents, the applicant is hereby notified of the date of receipt by the International Bureau of the priority document(s) relating to all earlier application(s) whose priority is claimed. Unless otherwise indicated by the letters "NR", in the right-hand column or by an asterisk appearing next to a date of receipt, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).

2. (If applicable) **The letters "NR"** appearing in the right-hand column denote **a priority document which, on the date of mailing of this Form, had not yet been received by the International Bureau** under Rule 17.1(a) or (b). Where, under Rule 17.1(a), the priority document must be submitted by the applicant to the receiving Office or the International Bureau, but the applicant fails to submit the priority document within the applicable time limit under that Rule, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

3. (If applicable) An **asterisk(*)** appearing next to a date of receipt, in the right-hand column, denotes **a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b)** (the priority document was received after the time limit prescribed in Rule 17.1(a) or the request to prepare and transmit the priority document was submitted to the receiving Office after the applicable time limit under Rule 17.1(b)). Even though the priority document was not furnished in compliance with Rule 17.1(a) or (b), the International Bureau will nevertheless transmit a copy of the document to the designated Offices, for their consideration. In case such a copy is not accepted by the designated Office as priority document, Rule 17.1(c) provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

Priority date	Priority application No.	Country or regional Office or PCT receiving Office	Date of receipt of priority document
26 Marc 2003 (26.03.2003)	60/457,694	US	06 May 2004 (06.05.2004)

The International Bureau of WIPO **34, chemin des Colombettes** **1211 Geneva 20, Switzerland**	Authorized officer Frédéric SONTAG (Fax 338 8970)
Facsimile No. (41-22) 338.89.70	Telephone No. (41-22) 338 8391

Form PCT/IB/304 (January 2004)

006257716

47

47

SUPERINDUSTRIA Y COMERCIO
Radicacion : 05037232 00000000 Folios: 46
Fecha (AMD): 2005-09-26 16:37:57
Tramite : 811 PCT-PATENT 379 FASE NACI 411 PRESENTAC
Dependencia: 2020 DIVISION DE NUEVAS CREACIONES

REQUISITOS NECESARIOS PARA PRESENTACION Y AGILIZACION DEL TRAMITE

	USUARIO	RADICADOR
PATENTE DE INVENCIÓN ✓ MODELO DE UTILIDAD	( )	( )
- Indicación de que se solicita la concesión de una patente. ✓	( )	( )
- Datos de identificación del solicitante o de la persona que se presenta la solicitud. ✓	( )	( )
- Descripción de la invención. ✓	( )	( )
- Dibujos de ser estos pertinentes.	( )	( )
- Comprobante de Pago de las tasas establecidas. ✓		
COMPLETA ( ) INCOMPLETA	( )	( )
DISEÑO INDUSTRIAL ( )		
- Indicación de que se solicita el registro de Diseño Industrial	( )	( )
- Datos de identificación del solicitante o de la persona que presenta	( )	( )
- la solicitud.		
- Representación gráfica o fotográfica del Diseño Industrial o muestra del Material que incorpora el diseño.	( )	( )
Comprobante de pago de las tasas establecidas	( )	( )
COMPLETA ( ) INCOMPLETA	( )	( )
ESQUEMA DE TRAZADO ( )		
- Indicación de que solicita el registro de un Esquema de trazado.	( )	( )
- Datos de identificación del solcitante o de la persona que presenta La solicitud.	( )	( )
Representación gráfica del esquema de trazado	( )	( )
Comprobante de pago de las tasas establecidas.	( )	( )
COMPLETA ( ) INCOMPLETA	( )	( )

Firma Responsable:

Fecha: 26 de 2005

REPUBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

48

Bogotá,
2020

Doctor(a)
RODRIGUEZ D'ALEMAN DILIA MARIA

REFERENCIA		
	Radicación No.	5 97232
	Solicitud internacional	EP2004/03262
	Fecha inicio fase nacional	26/10/2005
	Trámite	11
	Evento	379
	Actuación	430
	Oficio No.	10402

Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

1. Si fuere el caso, el solicitante debe adjuntar la traducción de los anexos del reporte de examen preliminar internacional (Art. 36.2.b) del tratado PCT.

2. La solicitud no contiene la copia del documento en que consta la cesión del derecho a la patente del inventor al solicitante o a su causante. (Art. 26-k) Decisión 486.

3. La solicitud no contiene el poder debidamente otorgado, con el lleno de los requisitos exigidos por los artículos 63 y subsiguientes del Código de Procedimiento Civil. Adicionalmente, deberá presentar el documento que acredita la existencia y representación legal de la sociedad solicitante, cuando ésta fuere persona jurídica.

En cumplimiento de lo dispuesto por el artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Unica No.10 de 2001.

ALIX CARMENZA CESPEDES DE VERGEL
Jefe de la división de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista de fecha 04 NOV. 2005
adpa11

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SUPERINDUSTRIA Y COMERCIO
Radicacion : 05097232 00000002 Folios: 2
Fecha (AMD): 2005-12-19 16:29:34
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Dependencia: 2000 DIVISION DE NUEVAS CREACIONES

Clarke, Modet & Cº

COLOMBIA

SEÑORES
DIVISIÓN DE NUEVAS CREACIONES
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
E. S. D.

RE.: EXPEDIENTE Nº 05097232
TITULO: IMPLANTES DENTALES RECUBIERTOS
SOLICITANTE: POLYZENIX GMBH
FECHA SOLICITUD: Septiembre 26, 2005
AL IMPLANTS

ASUNTO: SOLICITUD DE PRORROGA DEL TERMINO LEGAL

DILIA RODRIGUEZ D´ALEMAN, en mi condición de apoderada de la sociedad solicitante en el expediente de la referencia, atentamente solicito a Usted se me conceda **una prórroga del término** fijado mediante auto notificado el 4 de Noviembre de 2005, que vence el 4 de Enero de 2006, para respuesta a la acción oficial de examen de forma, requerida por el examinador.

Fundamento mi solicitud en el artículo 39 de la Decisión 486 de 2.000 del Acuerdo de Cartagena.

Anexo, el recibo de pago respectivo para efectos de lo anterior, y agradezco su atención.

Señor Jefe,

DILIA RODRIGUEZ D´ALEMAN
LCD/zmc
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