CLAIMS

1. An *in vitro* chronic wound model, comprising a wound region surrounded by skin cells, wherein the wound region comprises a bacteria cellulose (BC) pellicle, which has a biofilm comprising one or more species of bacteria.

2. The model according to any preceding claim, further comprising a cell culture vessel which contains the pellicle and the skin cells, for example wherein the skin cells are grown on the surface of the cell culture vessel; and/or
   further comprising a device which forms a barrier between the pellicle and the skin cells, thereby preventing the skin cells from growing into the wound region.

3. A method of producing an *in vitro* chronic wound model comprising a wound region surrounded by skin cells, comprising the steps of:
   a) inoculating a bacterial cellulose (BC) pellicle with one or more species of bacteria so as to form a biofilm;
   b) growing a plurality of skin cells in a cell culture vessel; and
   c) introducing the pellicle into the cell culture vessel, thereby forming the wound region.

4. The method according to any preceding claim, wherein
   (i) the pellicle is sterilized, for example by autoclaving, prior to inoculation with the one or more species of bacteria;
   (ii) the pellicle is inoculated with bacteria for at least 48 hours, for example 48, 60 or 72 hours, in particular for 47 hours; and/or
   (iii) the pellicle is washed, for example using a biologically compatible buffer such as PBS, to remove any non-adherent bacteria prior to step c).

5. The method according to any preceding claim, further comprising the step of
   (i) introducing a device which forms a barrier between the pellicle and the skin cells prior to step b), thereby preventing the skin cells from growing into the wound region;
   (ii) introducing an agent to prevent the skin cells from growing into the wound region, for example wherein the agent is trypsin or a derivative thereof, such as TrypLE™ Express; and/or
   (iii) removing the device after step c).

6. The method according to any preceding claim, wherein the skin cells are grown for 2 or more days, such as 2, 3 or 4 days, in particular for 3 days,
   wherein the skin cells are derived from a mammalian organism, for example a primate, a domesticated animal or a livestock animal, for example selected from the group comprising a human, a monkey, a dog, a cat, a sheep, a goat, a cow, or a horse, in particular human skin cells,
   optionally wherein the skin cells are keratinocytes.

7. The model or method according to any preceding claim, wherein the biofilm comprises only one species of bacteria.

8. The model or method according to any preceding claim, wherein the biofilm comprises multiple species of bacteria, i.e. at least two different species of bacteria,
wherein the one or more species of bacteria are pathogenic bacteria, for example wherein the bacteria are from a bacterial genus selected from the group comprising: *Bacillus, Bartonella, Bordetella, Borrelia, Brucella, Campylobacter, Chlamydia, Chlamydophila, Clostridium, Corynebacterium, Enterococcus, Escherichia, Francisella, Haemophilus, Helicobacter, Legionella, Leptospira, Listeria, Mycobacterium, Mycoplasma, Neisseria, Pseudomonas, Rickettsia, Salmonella, Shigella, Staphylococcus, Streptococcus, Treponema, Ureaplasma, Vibrio* and *Yersinia*; and/or

wherein the one or more species of bacteria are selected from the group comprising: *Acinetobacter baumannii, Bacillus anthracis, Bacillus cerues, Bartonella henselae, Bartonella quintana, Bordetella pertussis, Borrelia burgdorferi, Borrelia garinii, Borrelia afzelii, Borrelia recurrentis, Brucella abortus, Brucella canis, Brucella melitensis, Brucella suis, Campylobacter jejuni, Chlamydia pneumoniae,Chlamydiatrachomatis, Chlamydophila psittaci, Clostridium botulinum, Clostridium difficile, Clostridium perfringens, Clostridium tetani, Corynebacterium diphtheriae, Enterococcus faecalis, Enterococcus faecium, Enterobacter spp, Escherichia coli, Francisella tularensis, Hemophilus influenzae, Helicobacter pylori, Klebsiella pneumoniae, Legionella pneumophila, Leptospira interrogans, Leptospira santarosai, Leptospira weilii, Leptospira noguchii, listeria monocytogenes, Mycobacterium leprae, Mycobacterium tuberculosis, Mycobacterium ulcerans, Mycoplasma pneumoniae, Neisseira gonorrhoeae, Neisseira meningitidis, Pseudomonas aeruginosa, Rickettsia rickettsia, Salmonella typhi, Salmonella typhimurium, Shigella sonnei, Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus saprophyticus, Streptococcus agalactiae, Streptococcus pneumoniae, Streptococcus pyogenes, Treponema pallidum, Ureaplasma urealyticum, Vibrio cholerae, Yersinia pestis, Yersinia enterocolitica,* and *Yersinia pseudotuberculosis,*

in particular wherein the one or more species of bacteria are selected from the group comprising *Enterococcus faecalis* and *Pseudomonas aeruginosa*.

9. The model or method according to any preceding claim, wherein the cell culture vessel is a tissue culture plate, for example a 6, 12, 24 or 96 well tissue culture plate, in particular a 24-well tissue culture plate,

wherein the device comprises a fence and a collar, for example as shown in Figure 2A,

wherein the device is located in a well of the tissue culture plate, thereby creating an inner and an outer well,

wherein the pellicle is in the inner well and the skin cells are in the outer well, and/or wherein the model has one or more of the following environments: an alkaline pH environment, for example achieved by introducing $CO_2$, such as 1% $CO_2$ into the model; a hypoxic environment, for example achieved by introducing cobalt chloride, such as 20

μM $CoCl_2$ into the model; and a high oxidative stress environment, for example achieved by introducing Etoposide into the model.

10. The model or method according to any preceding claim, further comprising one or more additional cell types, such as senescent cells for example induced by introducing Etoposide to the cells.

11. A screening platform, such as a high throughput screening platform, comprising one or more *in vitro* chronic wound models according to any one of the preceding claims.

12. A method of assessing the activity of an agent, comprising the steps of:
    a) exposing an *in vitro* chronic wound model according to any preceding claim to the agent, followed by either one or both of the following steps:
    b) determining one of more of the following:
        - the extent of migration,
        - the rate of migration, and
        - the delay in migration

    of the skin cells into the wound region of the model; and/or
    c) performing a count of the viable bacteria present in the pellicle.

13. The method according to claim 12, further comprising step d) comparing the migration measurements and/or colony counts with the migration measurements and/or colony counts of an *in vitro* chronic wound model according to any preceding claim that has been exposed to a control agent, optionally

    wherein the activity is selected from the group comprising anti-microbial activity, wound healing activity, and both anti-microbial and wound healing activity, and

    wherein the agent is selected from the group comprising an anti-microbial agent, a wound healing agent, and an agent with anti-microbial and wound healing properties.

14. The method according to any one of claims 12 to 13, wherein the extent, rate and/or delay of migration is determined by
    (i) imaging the model, for example by using time lapse microscopy; and/or
    (ii) monitoring the leading edge of the wound over time, for example by determining the % wound closure.

15. The method according to any one of claims 12 to 14, wherein the pellicle is sonicated prior to the viable count,

    wherein the control agent is selected from the group comprising media, a wound healing control and an antibacterial agent,

    wherein the wound healing control is selected from the group comprising: a growth factor, for example epidermal growth factor (EGF) or vascular endothelial growth factor (VEGF), fibronectin and vitronectin, and/or

wherein the antibacterial agent is selected from the group comprising: an antibiotic, such as gentamicin; an antimicrobial peptide, for example selected from the group comprising ENO3, SPARCL1 and V8LQ19L; an antimicrobial polymer; and an extracellular vesicle (EV), such as an adipose stem cell EV (ASC-EV).