

## Supplementary information: Reconceptualising Mucoadhesion for Future Medicines

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| Name                          | Category of parent chain | Mn      | Modification | Degree of substitution | pH     | Membrane             | WoA (N.m) | FoA (N) | DOI                           |
|-------------------------------|--------------------------|---------|--------------|------------------------|--------|----------------------|-----------|---------|-------------------------------|
| Chitosan                      | Cationic                 | 120000  | None         | 0                      | native | Buccal (Ovine)       | 0.075     | 0.03    | 10.1016/j.ijpharm.2023.123113 |
| Chitosan                      | Cationic                 | 250000  | None         | 0                      | native | Buccal (Ovine)       | 0.075     | 0.065   | 10.1016/j.ijpharm.2023.123114 |
| Chitosan                      | Cationic                 | 342500  | None         | 0                      | native | Buccal (Ovine)       | 0.16      | 0.08    | 10.1016/j.ijpharm.2023.123115 |
| hydroxyethyl cellulose        | Non-ionic                | 720,000 | None         | 0                      | native | Buccal (Ovine)       | 0.03      | 0.03    | 10.1016/j.ijpharm.2023.123116 |
| hydroxyethyl cellulose        | Non-ionic                | 720,000 | Maleimide    | 0.08                   | native | Buccal (Ovine)       | 0.055     | 0.04    | 10.1016/j.ijpharm.2023.123117 |
| hydroxyethyl cellulose        | Non-ionic                | 720,000 | Maleimide    | 0.11                   | native | Buccal (Ovine)       | 0.075     | 0.055   | 10.1016/j.ijpharm.2023.123118 |
| hydroxyethyl cellulose        | Non-ionic                | 720,000 | Maleimide    | 0.22                   | native | Buccal (Ovine)       | 0.115     | 0.06    | 10.1016/j.ijpharm.2023.123119 |
| Polyvinyl alcohol 18-88       | Non-ionic                |         | None         | 0                      | native | Intestinal (Porcine) | 0.749     | 0.183   | 10.3390/polym14235146         |
| Polyvinyl alcohol 18-88       | Non-ionic                |         | None         | 0                      | native | Agar/Mucin gel       | 0.4       | 0.9     | 10.3390/polym14235146         |
| Chitosan                      | Cationic                 | 120000  | None         | 0                      | native | Buccal (Porcine)     | 0.06      | 0.1     | 10.1016/j.carbpol.2022.119368 |
| Sodium Carboxymethylcellulose | Anionic                  | 90000   | None         | 0                      | native | Buccal (Porcine)     | 0.11      | 0.13    | 10.1016/j.carbpol.2022.119369 |
| Sodium Carboxymethylcellulose | Anionic                  | 90000   | Maleimide    | 0.161                  | native | Buccal (Porcine)     | 0.2       | 0.26    | 10.1016/j.carbpol.2022.119370 |
| Gelatin type A                | Anionic                  |         | None         | 0                      | native | mucin powder         | 1.07      | 2.09    | 10.3390/pharmaceutics13020273 |

|                    |          |        |                 |        |       |                      |       |       |                                    |
|--------------------|----------|--------|-----------------|--------|-------|----------------------|-------|-------|------------------------------------|
| Chitosan           | Cationic | 230000 | None            | 0      | nativ | gingiva (porcine)    | 0.35  |       | 10.1016/j.ijpharm.2018.07.023      |
| Sodium Alginate    | Anionic  | 300000 | None            | 0      | nativ | Intestinal (Porcine) | 0.1   |       | 10.1016/j.carbpol.2017.07.076      |
| Sodium Alginate    | Anionic  | 300000 | Thiol           | 0.064  | nativ | Intestinal (Porcine) | 0.17  |       | 10.1016/j.carbpol.2017.07.076      |
| Sodium Alginate    | Anionic  | 300000 | Maleimide       | 0      | nativ | Intestinal (Porcine) | 0.37  |       | 10.1016/j.carbpol.2017.07.076      |
| Chitosan           | Cationic | 230000 | None            | 0      | nativ | gingiva (porcine)    | 0.4   |       | 10.1016/j.msec.2017.05.034         |
| chitosan           | Cationic | 120000 | None            | 0      | nativ | Intestinal (Porcine) | 0.045 |       | 10.1016/j.ijpharm.2016.12.023      |
| poly(acrylic acid) | Anionic  | 100000 | None            | 0      | nativ | Intestinal (Porcine) | 0.026 | 0.019 | 10.1016/j.biomaterials.2011.10.021 |
| poly(acrylic acid) | Anionic  | 100000 | Thiol           | 0.019  | nativ | Intestinal (Porcine) | 0.075 | 0.102 | 10.1016/j.biomaterials.2011.10.021 |
| poly(acrylic acid) | Anionic  | 100000 | Protected Thiol | 0.0082 | nativ | Intestinal (Porcine) | 0.152 | 0.129 | 10.1016/j.biomaterials.2011.10.021 |
| poly(acrylic acid) | Anionic  | 250000 | None            | 0      | nativ | Intestinal (Porcine) | 0.047 | 0.027 | 10.1016/j.biomaterials.2011.10.021 |
| poly(acrylic acid) | Anionic  | 250000 | Thiol           | 0.016  | nativ | Intestinal (Porcine) | 0.099 | 0.112 | 10.1016/j.biomaterials.2011.10.021 |
| poly(acrylic acid) | Anionic  | 250000 | Protected Thiol | 0.0089 | nativ | Intestinal (Porcine) | 0.19  | 0.145 | 10.1016/j.biomaterials.2011.10.021 |
| poly(acrylic acid) | Anionic  | 450000 | None            | 0      | nativ | Intestinal (Porcine) | 0.107 | 0.093 | 10.1016/j.biomaterials.2011.10.021 |
| poly(acrylic       | Anionic  | 4500   | Thiol           | 0.017  | na    | Intestina            | 0.20  | 0.1   | 10.1016/j.bio                      |

|                    |          |        |                 |             |       |                      |       |        |                                    |
|--------------------|----------|--------|-----------------|-------------|-------|----------------------|-------|--------|------------------------------------|
| acid)              |          | 00     |                 |             | tive  | Intestinal (Porcine) | 2     | 31     | materials.2011.10.021              |
| poly(acrylic acid) | Anionic  | 450000 | Protected Thiol | 0.0084      | nativ | Intestinal (Porcine) | 0.326 | 0.234  | 10.1016/j.biomaterials.2011.10.021 |
| poly(acrylic acid) | Anionic  | 450000 | None            | 0           | nativ | Intestinal (Porcine) | 0.2   |        | 10.1016/j.ejpb.2006.11.017         |
| poly(acrylic acid) | Anionic  | 450000 | Thiol           | 0.0038      | nativ | Intestinal (Porcine) | 0.19  |        | 10.1016/j.ejpb.2006.11.017         |
| poly(acrylic acid) | Anionic  | 450000 | Thiol           | 0.0083      | nativ | Intestinal (Porcine) | 0.2   |        | 10.1016/j.ejpb.2006.11.017         |
| poly(acrylic acid) | Anionic  | 450000 | Thiol           | 0.022       | nativ | Intestinal (Porcine) | 0.35  |        | 10.1016/j.ejpb.2006.11.017         |
| poly(acrylic acid) | Anionic  | 450000 | Thiol           | 0.042       | nativ | Intestinal (Porcine) | 0.55  |        | 10.1016/j.ejpb.2006.11.017         |
| poly(acrylic acid) | Anionic  | 450000 | Thiol           | 0.061       | nativ | Intestinal (Porcine) | 0.7   |        | 10.1016/j.ejpb.2006.11.017         |
| Chitosan           | Cationic | 400000 | None            | 0           | nativ | Intestinal (Porcine) | 0.035 |        | 10.1016/j.biomaterials.2005.05.075 |
| Chitosan           | Cationic | 400000 | Thiol           | 0.041032073 | nativ | Intestinal (Porcine) | 0.175 |        | 10.1016/j.biomaterials.2005.05.075 |
| Chitosan           | Cationic | 400000 | None            | 0           | nativ | Intestinal (Porcine) | 0.035 |        | 10.1007/s11095-005-6248-6          |
| Chitosan           | Cationic | 400000 | Thiol           | 0.047       | nativ | Intestinal (Porcine) | 0.32  |        | 10.1007/s11095-005-6248-6          |
| Chitosan           | Cationic | 400000 | None            | 0           | nativ | Intestinal (Porcine) | 0.03  | 0.0025 | 10.1016/j.biomaterials.2004.03.011 |

|                                      |           |                    |       |                 |                |                                 |            |                |                                            |
|--------------------------------------|-----------|--------------------|-------|-----------------|----------------|---------------------------------|------------|----------------|--------------------------------------------|
| Chitosan                             | Cationic  | 4000<br>00         | Thiol | 0.015           | na<br>tiv<br>e | Intestina<br>l<br>(Porcine<br>) | 0.15       | 0.0<br>06<br>5 | 10.1016/j.bio<br>materials.200<br>4.03.011 |
| Carbopol<br>974P                     | Anionic   | 1000<br>0000<br>00 | None  | 0               | na<br>tiv<br>e | Sublingu<br>al<br>(Bovine)      | 13         | 6.5            | 10.1016/j.ejps<br>.2003.12.011             |
| Carbopol<br>974P                     | Anionic   | 1000<br>0000<br>00 | None  | 0               | na<br>tiv<br>e | Oesopha<br>geal<br>(Bovine)     | 3          | 3.5            | 10.1016/j.ejps<br>.2003.12.011             |
| Carbopol<br>974P                     | Anionic   | 1000<br>0000<br>00 | None  | 0               | na<br>tiv<br>e | Intestina<br>l<br>(Bovine)      | 2          | 2.5            | 10.1016/j.ejps<br>.2003.12.011             |
| Hydroxyprop<br>ylmethylcell<br>ulose | Non-ionic |                    | None  | 0               | na<br>tiv<br>e | Sublingu<br>al<br>(Bovine)      | 1          | 4              | 10.1016/j.ejps<br>.2003.12.011             |
| Hydroxyprop<br>ylmethylcell<br>ulose | Non-ionic |                    | None  | 0               | na<br>tiv<br>e | Oesopha<br>geal<br>(Bovine)     | 0.5        | 3              | 10.1016/j.ejps<br>.2003.12.011             |
| Hydroxyprop<br>ylmethylcell<br>ulose | Non-ionic |                    | None  | 0               | na<br>tiv<br>e | Intestina<br>l<br>(Bovine)      | 1          | 5.5            | 10.1016/j.ejps<br>.2003.12.011             |
| Chitosan                             | Cationic  | 4000<br>00         | None  | 0               | 3              | Intestina<br>l<br>(Porcine<br>) | 0.1        | 0.0<br>05      | 10.1016/j.jcon<br>rel.2003.10.00<br>5      |
| Chitosan                             | Cationic  | 4000<br>00         | Thiol | 0.037           | 3              | Intestina<br>l<br>(Porcine<br>) | 0.68       | 0.0<br>17      | 10.1016/j.jcon<br>rel.2003.10.00<br>5      |
| Chitosan                             | Cationic  | 4000<br>00         | None  | 0               | 5              | Intestina<br>l<br>(Porcine<br>) | 0.03       | 0.0<br>1       | 10.1016/j.jcon<br>rel.2003.10.00<br>5      |
| Chitosan                             | Cationic  | 4000<br>00         | Thiol | 0.037           | 5              | Intestina<br>l<br>(Porcine<br>) | 0.45       | 0.0<br>02      | 10.1016/j.jcon<br>rel.2003.10.00<br>5      |
| Chitosan                             | Cationic  | 4000<br>00         | None  | 0               | 7              | Intestina<br>l<br>(Porcine<br>) | 0.01       | 0.0<br>03      | 10.1016/j.jcon<br>rel.2003.10.00<br>5      |
| Chitosan                             | Cationic  | 4000<br>00         | Thiol | 0.037           | 7              | Intestina<br>l<br>(Porcine<br>) | 0.04       | 0.0<br>01      | 10.1016/j.jcon<br>rel.2003.10.00<br>5      |
| Chitosan                             | Cationic  | 1500<br>00         | Thiol | 0.048199<br>247 | na<br>tiv<br>e | Intestina<br>l<br>(Porcine<br>) | 0.00<br>37 | 0.0<br>26      | 10.1016/S093<br>9-<br>6411(03)0015<br>7-7  |
| Chitosan                             | Cationic  | 4000               | Thiol | 0.009675        | na             | Intestina                       | 0.01       |                | 10.1016/S093                               |

|                       |          |            |       |                 |        |                                 |           |                |                                           |
|-----------------------|----------|------------|-------|-----------------|--------|---------------------------------|-----------|----------------|-------------------------------------------|
|                       |          | 00         |       | 685             | tive   | I<br>(Porcine<br>)              |           |                | 9-<br>6411(03)0015<br>7-7                 |
| Chitosan              | Cationic | 4000<br>00 | Thiol | 0.037269<br>307 | native | Intestina<br>I<br>(Porcine<br>) | 0.15      |                | 10.1016/S093<br>9-<br>6411(03)0015<br>7-7 |
| Chitosan              | Cationic | 4000<br>00 | Thiol | 0.047303<br>351 | native | Intestina<br>I<br>(Porcine<br>) | 0.47      | 0.2<br>56      | 10.1016/S093<br>9-<br>6411(03)0015<br>7-7 |
| Chitosan              | Cationic | 6000<br>00 | Thiol | 0.042107<br>149 | native | Intestina<br>I<br>(Porcine<br>) | 0.04<br>5 | 0.0<br>56      | 10.1016/S093<br>9-<br>6411(03)0015<br>7-7 |
| Chitosan              | Cationic | 1500<br>00 | None  | 0               | native | Intestina<br>I<br>(Porcine<br>) | 0.01<br>5 | 0.0<br>00<br>1 | 10.1016/S093<br>9-<br>6411(03)0015<br>7-7 |
| Chitosan              | Cationic | 4000<br>00 | None  | 0               | native | Intestina<br>I<br>(Porcine<br>) | 0.04      | 0.0<br>00<br>6 | 10.1016/S093<br>9-<br>6411(03)0015<br>7-7 |
| Chitosan              | Cationic | 6000<br>00 | None  | 0               | native | Intestina<br>I<br>(Porcine<br>) | 0.01      | 0.0<br>00<br>2 | 10.1016/S093<br>9-<br>6411(03)0015<br>7-7 |
| Polycarbophi<br>I     | Anionic  | 7000<br>00 | None  | 0               | native | Intestina<br>I<br>(Porcine<br>) | 0.33      |                | 10.1016/S037<br>8-<br>5173(02)0063<br>8-5 |
| Polycarbophi<br>I     | Anionic  | 7000<br>00 | Thiol | 0.01            | native | Intestina<br>I<br>(Porcine<br>) | 0.5       |                | 10.1016/S037<br>8-<br>5173(02)0063<br>8-5 |
| poly(acrylic<br>acid) | Anionic  | 2000       | None  | 0               | native | Intestina<br>I<br>(Porcine<br>) | 0.04      |                | 10.1016/S092<br>8-<br>0987(02)0024<br>5-2 |
| poly(acrylic<br>acid) | Anionic  | 4500<br>0  | None  | 0               | native | Intestina<br>I<br>(Porcine<br>) | 0.05      |                | 10.1016/S092<br>8-<br>0987(02)0024<br>5-2 |
| poly(acrylic<br>acid) | Anionic  | 2500<br>00 | None  | 0               | native | Intestina<br>I<br>(Porcine<br>) | 0.1       |                | 10.1016/S092<br>8-<br>0987(02)0024<br>5-2 |
| poly(acrylic<br>acid) | Anionic  | 4500<br>00 | None  | 0               | native | Intestina<br>I<br>(Porcine<br>) | 0.16      |                | 10.1016/S092<br>8-<br>0987(02)0024<br>5-2 |

|                    |         |           |       |            |        |                      |       |      |                               |
|--------------------|---------|-----------|-------|------------|--------|----------------------|-------|------|-------------------------------|
| Polycarbophil      | Anionic | 700000    | None  | 0          | native | Intestinal (Porcine) | 0.08  |      | 10.1016/S0928-0987(02)00245-2 |
| poly(acrylic acid) | Anionic | 2000      | Thiol | 0.029      | native | Intestinal (Porcine) | 0.07  |      | 10.1016/S0928-0987(02)00245-2 |
| poly(acrylic acid) | Anionic | 45000     | Thiol | 0.029      | native | Intestinal (Porcine) | 0.06  |      | 10.1016/S0928-0987(02)00245-2 |
| poly(acrylic acid) | Anionic | 250000    | Thiol | 0.029      | native | Intestinal (Porcine) | 0.65  |      | 10.1016/S0928-0987(02)00245-2 |
| poly(acrylic acid) | Anionic | 450000    | Thiol | 0.029      | native | Intestinal (Porcine) | 0.69  |      | 10.1016/S0928-0987(02)00245-2 |
| Polycarbophil      | Anionic | 700000    | Thiol | 0.029      | native | Intestinal (Porcine) | 0.31  |      | 10.1016/S0928-0987(02)00245-2 |
| Polycarbophil      | Anionic | 700000    | Thiol | 0.00965604 | native | Intestinal (Porcine) | 0.14  |      | 10.1016/S0378-5173(01)00955-3 |
| Polycarbophil      | Anionic | 700000    | Thiol | 0.00374712 | native | Intestinal (Porcine) | 0.19  |      | 10.1016/S0378-5173(01)00955-3 |
| Polycarbophil      | Anionic | 700000    | None  | 0          | native | Intestinal (Porcine) | 0.08  |      | 10.1016/S0378-5173(01)00955-3 |
| Carbopol 974P      | Anionic | 100000000 | Thiol | 0.0018015  | native | Vaginal (Bovine)     | 0.1   |      | 10.1016/S0168-3659(01)00520-X |
| Carbopol 974P      | Anionic | 100000000 | Thiol | 0.00331476 | native | Vaginal (Bovine)     | 0.15  |      | 10.1016/S0168-3659(01)00520-X |
| Carbopol 974P      | Anionic | 100000000 | None  | 0          | native | Vaginal (Bovine)     | 0.7   |      | 10.1016/S0168-3659(01)00520-X |
| Alginate           | Anionic |           | None  | 0          | native | Intestinal (Porcine) | 0.025 | 0.01 | 10.1016/S0168-3659(01)0022    |

|                               |         |         |       |           |        |                      |      |       |                               |
|-------------------------------|---------|---------|-------|-----------|--------|----------------------|------|-------|-------------------------------|
|                               |         |         |       |           |        | )                    |      |       | 7-9                           |
| Alginate                      | Anionic |         | Thiol | 0.066     | native | Intestinal (Porcine) | 0.1  | 0.075 | 10.1016/S0168-3659(01)00227-9 |
| Polycarbophil                 | Anionic | 700000  | None  | 0         | 3      | Intestinal (Porcine) | 0.12 |       | 10.1016/S0378-5173(99)00387-7 |
| Polycarbophil                 | Anionic | 700000  | Thiol | 0.0008856 | 3      | Intestinal (Porcine) | 0.17 |       | 10.1016/S0378-5173(99)00387-7 |
| Polycarbophil                 | Anionic | 700000  | None  | 0         | 5      | Intestinal (Porcine) | 0.09 |       | 10.1016/S0378-5173(99)00387-7 |
| Polycarbophil                 | Anionic | 700000  | Thiol | 0.0008856 | 5      | Intestinal (Porcine) | 0.25 |       | 10.1016/S0378-5173(99)00387-7 |
| Polycarbophil                 | Anionic | 700000  | None  | 0         | 7      | Intestinal (Porcine) | 0.08 |       | 10.1016/S0378-5173(99)00387-7 |
| Polycarbophil                 | Anionic | 700000  | Thiol | 0.0008856 | 7      | Intestinal (Porcine) | 0.1  |       | 10.1016/S0378-5173(99)00387-7 |
| sodium carboxymethylcellulose | Anionic | 1000000 | None  | 0         | 3      | Intestinal (Porcine) | 0.14 |       | 10.1016/S0378-5173(99)00387-7 |
| sodium carboxymethylcellulose | Anionic | 1000000 | Thiol | 0.005     | 3      | Intestinal (Porcine) | 0.19 |       | 10.1016/S0378-5173(99)00387-7 |
| sodium carboxymethylcellulose | Anionic | 1000000 | None  | 0         | 5      | Intestinal (Porcine) | 0.11 |       | 10.1016/S0378-5173(99)00387-7 |
| sodium carboxymethylcellulose | Anionic | 1000000 | Thiol | 0.005     | 5      | Intestinal (Porcine) | 0.16 |       | 10.1016/S0378-5173(99)00387-7 |
| sodium carboxymethylcellulose | Anionic | 1000000 | None  | 0         | 7      | Intestinal (Porcine) | 0.07 |       | 10.1016/S0378-5173(99)00387-7 |
| sodium carboxymet             | Anionic | 1000000 | Thiol | 0.005     | 7      | Intestinal           | 0.1  |       | 10.1016/S0378-                |

| Polysaccharide                | Charge    | MW (kDa) | Agg. State | Stability | Stability | Source              | Conc. (g/L) | pH    | Ref.                         |
|-------------------------------|-----------|----------|------------|-----------|-----------|---------------------|-------------|-------|------------------------------|
| hyaluronate                   |           |          |            |           |           | (Porcine)           |             |       | 5173(99)00387-7              |
| Polyethylene oxide            | Non-ionic | 400000   | None       | 0         | 6         | Intestinal (Murine) | 0.533       | 0.917 | 10.1016/0378-5173(94)00299-K |
| sodium carboxymethylcellulose | Anionic   | 100000   | None       | 0         | 6         | Intestinal (Murine) | 0.36        | 0.699 | 10.1016/0378-5173(94)00299-K |
| Carbopol 974P                 | Anionic   |          | None       | 0         | 6         | Intestinal (Murine) | 0.239       | 0.649 | 10.1016/0378-5173(94)00299-K |
| Carbopol 2984                 | Anionic   |          | None       | 0         | 6         | Intestinal (Murine) | 0.228       | 0.624 | 10.1016/0378-5173(94)00299-K |
| Carrageenan                   | Anionic   |          | None       | 0         | 6         | Intestinal (Murine) | 0.216       | 0.528 | 10.1016/0378-5173(94)00299-K |
| Pemulen TR1                   | Anionic   |          | None       | 0         | 6         | Intestinal (Murine) | 0.123       | 0.313 | 10.1016/0378-5173(94)00299-K |
| Sodium Alginate               | Anionic   |          | None       | 0         | 6         | Intestinal (Murine) | 0.071       | 0.196 | 10.1016/0378-5173(94)00299-K |
| hydroxypropylmethylcellulose  | Non-ionic |          | None       | 0         | 6         | Intestinal (Murine) | 0.036       | 0.106 | 10.1016/0378-5173(94)00299-K |
| hydroxypropylcellulose        | Non-ionic | 100000   | None       | 0         | 6         | Intestinal (Murine) | 0.007       | 0.035 | 10.1016/0378-5173(94)00299-K |