

## **Electronic Supplementary Information**

# **Acquiring Multiple Signals along with Reaction Time: Improving Recognition Capability of Multidimensional Colorimetric Sensor Array for Sensitive Protein Detection**

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**Table S1.** Basic properties and manufacturers of proteins

| Protein                               | MW (kDa) | pI   | metal | Company | Purity |
|---------------------------------------|----------|------|-------|---------|--------|
| Bovine serum albumin (BSA)            | 66.3     | 4.8  | No    | Amresco | >98%   |
| Cytochrome C (Cyt-C)                  | 12       | 10.8 | Yes   | Amresco | >98%   |
| Horseradish Peroxidase (HRP)          | ~40      | ~5   | Yes   | Sigma   | >95%   |
| Hemoglobin (Hem) from bovine blood    | 64.5     | 6.8  | Yes   | Sigma   | >95%   |
| Immunoglobulin G (IgG) from pig Blood | 150      | 7.5  | No    | Sigma   | >90%   |
| Human serum albumin (HSA)             | 69.4     | 5.2  | No    | Sigma   | >95%   |
| myoglobin (Myo)                       | 17       | 7.2  | Yes   | Sigma   | >95%   |
| Lysozyme (Lys)                        | 14.4     | 11   | No    | Sigma   | >95%   |
| Transferrin (TRF) from human blood    | ~75      | 5.6  | Yes   | Sigma   | >98%   |
| Trypsin (Try) 1:250                   | 24       | 10.5 | No    | Amresco | >95%   |

**Table S2.** The sequences of DNA use in this work

| DNA | Sequences from 5' to 3'                            |
|-----|----------------------------------------------------|
| L1  | 5'-TAG TCC CGA TTT CTC ACG TCT CAA TGA ATC-3'      |
| L2  | 5'-GGT TGG TGT GGT TGG -3'                         |
| L3  | 5'-CAC GTT TAT CCG TCC CTC CTA GTG GCG TG-3'       |
| L4  | 5'-CCC CCC CCCCCC CCC-3'                           |
| L5  | 5'-TTT TTT TTT TTT TTT-3                           |
| L6  | 5'-AAA AAA AAAAAA AAA-3'                           |
| L7  | 5'-AAA AAA AAAAAAAAAA AAA-3'                       |
| L8  | 5'-AAA AAA AAA AAA AAA AAA AAA AAA AAA AAA A-3'    |
| L9  | 5'-AAA AAC CCC CCCCCCCCCCCCCCCCCCCCCC C-3'         |
| L10 | 5'-CCT CCT TCC TCC CGT GTC TGG GGC CGA CCG GCG CAT |

**Table S3.** Training matrix of the protein response patterns against the sensor array (L1-10 min, L2-10 min, L3-10 min, L1-15 min, L2-15 min, L3-15 min, L1-20 min, L2-20 min, and L3-20 min) at the concentration of 10 nM

|     | <b>L1-10</b> | <b>L2-10</b> | <b>L3-10</b> | <b>L1-15</b> | <b>L2-15</b> | <b>L3-15</b> | <b>L1-20</b> | <b>L2-20</b> | <b>L3-20</b> |
|-----|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|     | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   |
| Hem | 2.44         | 2.17         | 2.27         | 2.13         | 2.02         | 1.28         | 1.72         | 1.23         | 0.61         |
| Hem | 2.40         | 2.33         | 2.08         | 1.99         | 1.80         | 1.38         | 1.64         | 1.32         | 0.70         |
| Hem | 2.49         | 2.34         | 2.11         | 2.09         | 1.89         | 1.34         | 1.66         | 1.30         | 0.66         |
| Hem | 2.44         | 2.30         | 2.03         | 2.08         | 1.88         | 1.29         | 1.73         | 1.29         | 0.60         |
| Hem | 2.33         | 2.23         | 2.05         | 2.13         | 1.82         | 1.38         | 1.55         | 1.48         | 0.57         |
| Hem | 2.40         | 2.31         | 2.21         | 1.91         | 1.90         | 1.25         | 1.57         | 1.22         | 0.57         |
| BSA | 2.36         | 2.08         | 1.30         | 1.96         | 1.74         | 0.66         | 1.49         | 1.17         | 0.27         |
| BSA | 2.36         | 2.24         | 1.14         | 1.93         | 1.70         | 0.63         | 1.49         | 1.13         | 0.24         |
| BSA | 2.33         | 2.26         | 1.25         | 1.91         | 1.69         | 0.55         | 1.45         | 1.12         | 0.22         |
| BSA | 2.30         | 2.12         | 1.23         | 1.84         | 1.66         | 0.51         | 1.41         | 1.11         | 0.22         |
| BSA | 2.27         | 2.18         | 1.29         | 1.80         | 1.63         | 0.60         | 1.31         | 1.05         | 0.21         |
| BSA | 2.27         | 2.08         | 1.13         | 1.75         | 1.62         | 0.59         | 1.13         | 1.04         | 0.20         |
| HAS | 2.43         | 2.70         | 1.62         | 2.06         | 2.31         | 0.85         | 1.57         | 1.86         | 0.24         |
| HAS | 2.43         | 2.65         | 1.58         | 2.00         | 2.27         | 0.97         | 1.44         | 1.74         | 0.39         |
| HAS | 2.31         | 2.62         | 1.59         | 1.93         | 2.23         | 0.90         | 1.45         | 1.69         | 0.29         |
| HAS | 2.28         | 2.61         | 1.53         | 1.92         | 2.22         | 0.92         | 1.53         | 1.69         | 0.29         |
| HAS | 2.22         | 2.49         | 1.43         | 1.85         | 2.18         | 0.74         | 1.39         | 1.56         | 0.42         |
| HAS | 2.22         | 2.49         | 1.43         | 1.84         | 2.16         | 0.77         | 1.37         | 1.52         | 0.23         |
| Lys | 2.88         | 2.75         | 2.16         | 2.69         | 2.40         | 1.58         | 2.21         | 1.79         | 0.86         |
| Lys | 3.03         | 2.63         | 2.33         | 2.58         | 2.33         | 1.37         | 2.29         | 1.76         | 0.85         |
| Lys | 2.95         | 2.68         | 2.28         | 2.61         | 2.30         | 1.49         | 2.26         | 1.76         | 0.81         |
| Lys | 2.93         | 2.66         | 2.26         | 2.52         | 2.28         | 1.49         | 2.22         | 1.69         | 0.79         |
| Lys | 3.08         | 2.69         | 2.34         | 2.52         | 2.22         | 1.58         | 2.24         | 1.65         | 0.79         |
| Lys | 2.87         | 2.62         | 2.14         | 2.64         | 2.22         | 1.35         | 2.21         | 1.63         | 0.78         |
| EA  | 2.38         | 2.09         | 1.72         | 1.95         | 1.66         | 0.85         | 1.55         | 0.94         | 0.31         |
| EA  | 2.38         | 2.08         | 1.72         | 1.95         | 1.61         | 0.85         | 1.53         | 0.93         | 0.29         |
| EA  | 2.33         | 2.10         | 1.64         | 1.84         | 1.61         | 0.82         | 1.44         | 0.91         | 0.27         |
| EA  | 2.33         | 2.04         | 1.63         | 1.84         | 1.56         | 0.75         | 1.38         | 0.82         | 0.25         |
| EA  | 2.21         | 1.95         | 1.51         | 1.80         | 1.45         | 0.74         | 1.23         | 0.78         | 0.23         |
| EA  | 2.22         | 1.94         | 1.58         | 1.76         | 1.45         | 0.72         | 1.09         | 0.74         | 0.22         |
| Myo | 2.08         | 2.11         | 1.77         | 1.59         | 1.67         | 1.08         | 1.18         | 0.88         | 0.39         |
| Myo | 2.06         | 2.20         | 1.76         | 1.58         | 1.68         | 1.09         | 1.16         | 0.86         | 0.39         |
| Myo | 2.03         | 2.16         | 1.73         | 1.56         | 1.67         | 1.04         | 1.12         | 0.86         | 0.38         |
| Myo | 2.01         | 2.15         | 1.72         | 1.53         | 1.66         | 1.03         | 1.11         | 0.85         | 0.39         |
| Myo | 1.99         | 2.04         | 1.59         | 1.49         | 1.56         | 0.90         | 1.03         | 0.83         | 0.35         |
| Myo | 1.99         | 1.98         | 1.56         | 1.47         | 1.55         | 0.97         | 1.02         | 0.82         | 0.35         |
| HRP | 2.07         | 2.01         | 1.80         | 1.60         | 1.60         | 1.16         | 1.07         | 0.88         | 0.48         |
| HRP | 2.05         | 2.10         | 1.80         | 1.58         | 1.56         | 1.17         | 1.05         | 0.87         | 0.47         |

|       |      |      |      |      |      |      |      |      |      |
|-------|------|------|------|------|------|------|------|------|------|
| HRP   | 2.05 | 1.99 | 1.76 | 1.56 | 1.48 | 1.15 | 1.07 | 0.85 | 0.45 |
| HRP   | 2.01 | 1.99 | 1.75 | 1.52 | 1.48 | 1.15 | 1.06 | 0.90 | 0.45 |
| HRP   | 1.98 | 1.86 | 1.66 | 1.46 | 1.44 | 1.04 | 1.00 | 0.88 | 0.36 |
| HRP   | 1.97 | 1.86 | 1.62 | 1.41 | 1.45 | 1.01 | 0.95 | 0.89 | 0.34 |
| TRF   | 2.08 | 2.07 | 1.86 | 1.59 | 1.59 | 1.22 | 1.18 | 0.72 | 0.54 |
| TRF   | 2.06 | 2.06 | 1.83 | 1.59 | 1.50 | 1.21 | 1.15 | 0.81 | 0.53 |
| TRF   | 2.03 | 2.00 | 1.81 | 1.57 | 1.49 | 1.18 | 1.13 | 0.77 | 0.50 |
| TRF   | 2.03 | 2.00 | 1.78 | 1.55 | 1.48 | 1.12 | 1.11 | 0.77 | 0.46 |
| TRF   | 1.97 | 1.89 | 1.66 | 1.48 | 1.40 | 1.02 | 1.23 | 0.78 | 0.48 |
| TRF   | 1.91 | 1.82 | 1.63 | 1.48 | 1.36 | 1.03 | 1.21 | 0.72 | 0.44 |
| Cyt-C | 2.47 | 2.50 | 2.30 | 2.05 | 2.06 | 1.78 | 1.66 | 1.10 | 0.84 |
| Cyt-C | 2.47 | 2.50 | 2.29 | 2.02 | 2.02 | 1.74 | 1.67 | 1.04 | 0.88 |
| Cyt-C | 2.35 | 2.48 | 2.21 | 1.89 | 1.94 | 1.66 | 1.56 | 1.09 | 0.87 |
| Cyt-C | 2.31 | 2.46 | 2.19 | 1.89 | 1.94 | 1.62 | 1.44 | 1.08 | 0.87 |
| Cyt-C | 2.26 | 2.41 | 2.18 | 1.82 | 1.90 | 1.56 | 1.56 | 1.06 | 0.81 |
| Cyt-C | 2.32 | 2.29 | 2.18 | 1.83 | 1.83 | 1.56 | 1.52 | 1.03 | 0.80 |
| IgG   | 2.49 | 2.87 | 2.60 | 2.30 | 2.40 | 2.30 | 1.90 | 1.48 | 1.57 |
| IgG   | 2.70 | 2.68 | 2.62 | 2.27 | 2.39 | 2.30 | 1.89 | 1.49 | 1.55 |
| IgG   | 2.70 | 2.78 | 2.66 | 2.25 | 2.38 | 2.27 | 1.86 | 1.48 | 1.49 |
| IgG   | 2.63 | 2.84 | 2.56 | 2.22 | 2.32 | 2.16 | 1.82 | 1.50 | 1.46 |
| IgG   | 2.57 | 2.76 | 2.44 | 2.16 | 2.24 | 2.13 | 1.73 | 1.46 | 1.47 |
| IgG   | 2.64 | 2.67 | 2.46 | 2.15 | 2.24 | 2.11 | 1.72 | 1.49 | 1.46 |

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| L1-10<br>min | L2-10<br>min | L3-10<br>min | L1-15<br>min | L2-15<br>min | L3-15<br>min | L1-20<br>min | L2-20<br>min | L3-20<br>min | Correct/<br>% |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
|              |              |              |              |              |              |              |              |              | 30%           |
|              |              |              |              |              |              |              |              |              | 38%           |
|              |              |              |              |              |              |              |              |              | 55%           |
|              |              |              |              |              |              |              |              |              | 40%           |
|              |              |              |              |              |              |              |              |              | 45%           |
|              |              |              |              |              |              |              |              |              | 60%           |
|              |              |              |              |              |              |              |              |              | 47%           |
|              |              |              |              |              |              |              |              |              | 57%           |
|              |              |              |              |              |              |              |              |              | 68%           |

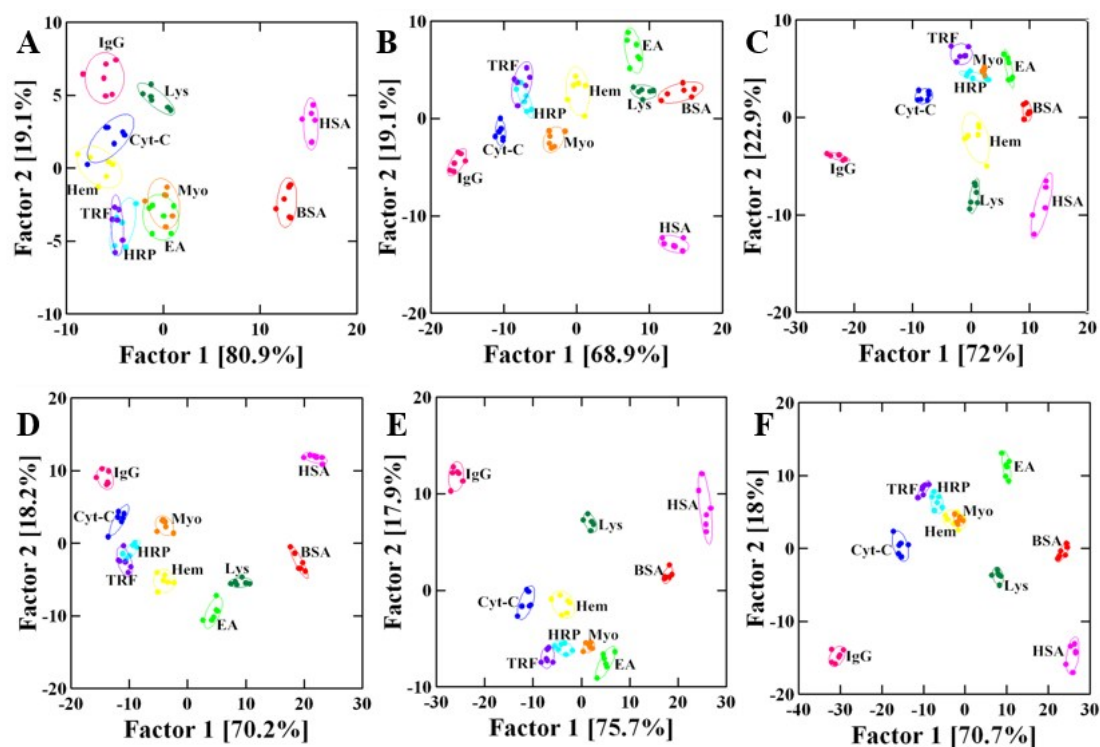
**Figure S1.** The identification accuracy for ten proteins detection as a result of the contribution of response signals for different sensor elements at different reaction time

| L1 | L2 | L3 | Correct/% |
|----|----|----|-----------|
|    |    |    | 55%       |
|    |    |    | 75%       |
|    |    |    | 85%       |
|    |    |    | 98%       |
|    |    |    | 98%       |
|    |    |    | 97%       |
|    |    |    | 100%      |

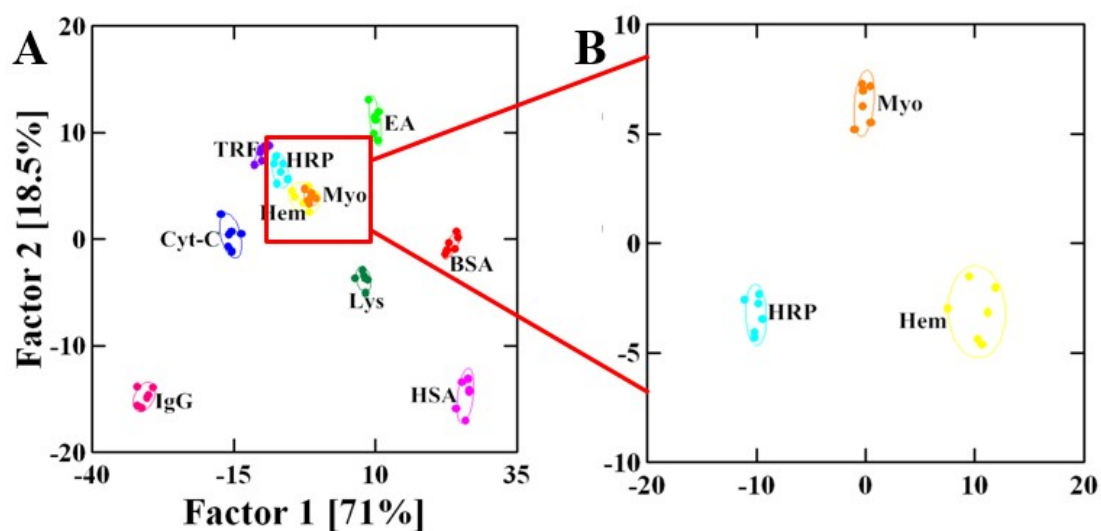
**Figure S2.** The identification accuracy for ten proteins detection as a result of the contribution of response signals for different DNA-AuNPs integrating three points of reaction time (10 min, 15 min, and 20 min)

| Time - 10 min | Time - 15 min | Time - 20 min | Correct / % |
|---------------|---------------|---------------|-------------|
|               |               |               | 78%         |
|               |               |               | 95%         |
|               |               |               | 95%         |
|               |               |               | 95%         |
|               |               |               | 100%        |
|               |               |               | 98%         |
|               |               |               | 100%        |

**Figure S3.** The identification accuracy for ten proteins detection as a result of the contribution of response signals using by three receptors (L1, L2, and L3) at different time points



**Figure S4.** Array-based sensing of ten proteins at 10 nM: (A, B, and C) Canonical score plot from corresponding values using LDA with 95% confidence ellipses at only 10 min (A), 15 min (B), 20 min (C) 10 min and 15 min (D), 15 min and 20 min (E), 10 min and 20 min (F), respectively



**Figure S5.** (A) Canonical score plots for the discrimination of ten proteins at the 10 nM level by LDA with 95% confidence ellipses. (B) The partial enlarged view of red rectangle in (A), including Myo, HRP, and Hem

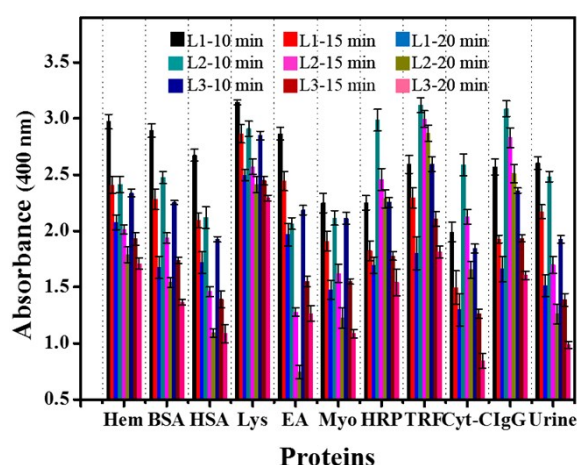
**Table S4.** Identification of unknown protein samples at 10 nM using AuNPs-L1, AuNPs-L2, and AuNPs-L3 in different time

| Sam-<br>ples | L1-10<br>min | L2-10<br>min | L3-10<br>min | L1-15<br>min | L2-15<br>min | L3-15<br>min | L1-20<br>min | L2-20<br>min | L3-20<br>min | Identifi-<br>cation | Verifi-<br>cation |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------------|-------------------|
| 1            | 2.38         | 2.08         | 1.72         | 1.95         | 1.61         | 0.85         | 1.53         | 0.93         | 0.29         | EA                  | EA                |
| 2            | 2.36         | 2.24         | 1.29         | 1.93         | 1.70         | 0.63         | 1.49         | 1.13         | 0.24         | BSA                 | BSA               |
| 3            | 2.70         | 2.84         | 2.62         | 2.27         | 2.39         | 2.30         | 1.89         | 1.49         | 1.55         | IgG                 | IgG               |
| 4            | 2.05         | 2.10         | 1.80         | 1.58         | 1.56         | 1.17         | 1.05         | 0.87         | 0.47         | HRP                 | HRP               |
| 5            | 2.49         | 2.31         | 2.11         | 2.09         | 1.89         | 1.34         | 1.66         | 1.30         | 0.66         | Hem                 | Hem               |
| 6            | 3.08         | 2.75         | 2.34         | 2.69         | 2.40         | 1.58         | 2.21         | 1.79         | 0.86         | Lys                 | Lys               |
| 7            | 2.43         | 2.70         | 1.62         | 2.06         | 2.31         | 0.92         | 1.57         | 1.86         | 0.42         | HSA                 | HSA               |
| 8            | 1.99         | 1.98         | 1.56         | 1.47         | 1.55         | 0.97         | 1.02         | 0.82         | 0.35         | Myo                 | Myo               |
| 9            | 2.06         | 2.06         | 1.83         | 1.59         | 1.50         | 1.21         | 1.15         | 0.81         | 0.53         | TRF                 | TRF               |
| 10           | 2.22         | 1.94         | 1.58         | 1.76         | 1.45         | 0.72         | 1.08         | 0.74         | 0.22         | EA                  | EA                |
| 11           | 2.63         | 2.76         | 2.56         | 2.22         | 2.32         | 2.16         | 1.82         | 1.50         | 1.46         | IgG                 | IgG               |
| 12           | 2.06         | 2.20         | 1.76         | 1.58         | 1.68         | 1.09         | 1.16         | 0.86         | 0.39         | Myo                 | Myo               |
| 13           | 2.31         | 2.46         | 2.19         | 1.89         | 1.94         | 1.62         | 1.44         | 1.08         | 0.87         | Cyt-C               | Cyt-C             |
| 14           | 2.27         | 2.08         | 1.13         | 1.75         | 1.62         | 0.59         | 1.13         | 1.04         | 0.24         | BSA                 | BSA               |
| 15           | 2.01         | 1.99         | 1.75         | 1.52         | 1.48         | 1.15         | 1.06         | 0.90         | 0.45         | HRP                 | HRP               |
| 16           | 2.43         | 2.70         | 1.62         | 2.06         | 2.31         | 0.92         | 1.57         | 1.86         | 0.42         | HSA                 | HSA               |
| 17           | 2.87         | 2.62         | 2.14         | 2.52         | 2.22         | 1.35         | 2.21         | 1.63         | 0.78         | Lys                 | Lys               |
| 18           | 2.57         | 2.68         | 2.44         | 2.16         | 2.24         | 2.13         | 1.73         | 1.46         | 1.47         | IgG                 | IgG               |
| 19           | 1.97         | 1.89         | 1.66         | 1.48         | 1.40         | 1.02         | 1.23         | 0.78         | 0.48         | TRF                 | TRF               |
| 20           | 2.33         | 2.23         | 2.05         | 1.99         | 1.82         | 1.28         | 1.55         | 1.23         | 0.57         | Hem                 | Hem               |
| 21           | 2.26         | 2.29         | 2.18         | 1.83         | 1.83         | 1.56         | 1.52         | 1.03         | 0.80         | Cyt-C               | Cyt-C             |
| 22           | 2.95         | 2.68         | 2.28         | 2.61         | 2.30         | 1.49         | 2.26         | 1.76         | 0.81         | Lys                 | Lys               |
| 23           | 2.30         | 2.12         | 1.23         | 1.84         | 1.66         | 0.51         | 1.41         | 1.11         | 0.24         | BSA                 | BSA               |
| 24           | 2.03         | 2.00         | 1.78         | 1.55         | 1.48         | 1.12         | 1.11         | 0.77         | 0.46         | TRF                 | TRF               |
| 25           | 2.22         | 1.94         | 1.58         | 1.76         | 1.45         | 0.72         | 1.09         | 0.74         | 0.22         | EA                  | EA                |
| 26           | 1.97         | 1.86         | 1.62         | 1.41         | 1.45         | 1.01         | 0.95         | 0.89         | 0.34         | HRP                 | HRP               |
| 27           | 2.44         | 2.34         | 2.27         | 2.13         | 2.02         | 1.38         | 1.72         | 1.48         | 0.61         | Hem                 | Hem               |
| 28           | 2.47         | 2.50         | 2.29         | 2.02         | 2.02         | 1.74         | 1.67         | 1.04         | 0.88         | Cyt-C               | Cyt-C             |
| 29           | 2.01         | 2.15         | 1.72         | 1.53         | 1.66         | 1.03         | 1.11         | 0.85         | 0.39         | Myo                 | Myo               |
| 30           | 2.31         | 2.62         | 1.59         | 1.93         | 2.23         | 0.90         | 1.45         | 1.69         | 0.29         | HSA                 | HSA               |

**Table S5.** Training matrix of the protein response patterns against at the 50 nM level spiked in human urine

|     | <b>L1-10</b> | <b>L2-10</b> | <b>L3-10</b> | <b>L1-15</b> | <b>L2-15</b> | <b>L3-15</b> | <b>L1-20</b> | <b>L2-20</b> | <b>L3-20</b> |
|-----|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|     | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   | <b>min</b>   |
| Hem | 3.08         | 2.45         | 2.31         | 2.50         | 1.99         | 1.89         | 2.17         | 1.76         | 1.64         |
| Hem | 2.91         | 2.48         | 2.38         | 2.47         | 2.04         | 1.85         | 2.06         | 1.87         | 1.75         |
| Hem | 3.00         | 2.36         | 2.32         | 2.30         | 2.03         | 1.95         | 2.09         | 1.77         | 1.78         |
| Hem | 2.93         | 2.39         | 2.32         | 2.37         | 2.00         | 1.91         | 2.13         | 1.88         | 1.71         |
| Hem | 3.00         | 2.49         | 2.38         | 2.37         | 2.07         | 1.99         | 2.01         | 1.74         | 1.67         |
| Hem | 2.92         | 2.32         | 2.31         | 2.45         | 1.95         | 1.98         | 2.01         | 1.71         | 1.72         |
| BSA | 2.88         | 2.42         | 2.23         | 2.38         | 1.99         | 1.73         | 1.79         | 1.58         | 1.35         |
| BSA | 2.93         | 2.52         | 2.24         | 2.18         | 1.97         | 1.74         | 1.69         | 1.58         | 1.39         |
| BSA | 2.91         | 2.49         | 2.24         | 2.32         | 1.96         | 1.74         | 1.70         | 1.56         | 1.38         |
| BSA | 2.81         | 2.49         | 2.26         | 2.29         | 1.93         | 1.79         | 1.53         | 1.48         | 1.39         |
| BSA | 2.85         | 2.53         | 2.27         | 2.36         | 1.91         | 1.72         | 1.60         | 1.54         | 1.34         |
| BSA | 2.98         | 2.40         | 2.27         | 2.17         | 1.87         | 1.72         | 1.76         | 1.51         | 1.33         |
| HAS | 2.64         | 2.09         | 1.95         | 2.04         | 1.39         | 1.36         | 1.82         | 1.13         | 1.15         |
| HAS | 2.71         | 2.14         | 1.89         | 2.16         | 1.48         | 1.46         | 1.60         | 1.02         | 1.12         |
| HAS | 2.67         | 2.11         | 1.95         | 2.12         | 1.53         | 1.44         | 1.76         | 1.10         | 1.12         |
| HAS | 2.76         | 2.02         | 1.95         | 2.18         | 1.46         | 1.48         | 1.78         | 1.09         | 1.13         |
| HAS | 2.63         | 2.06         | 1.91         | 2.04         | 1.45         | 1.31         | 1.60         | 1.09         | 1.02         |
| HAS | 2.63         | 2.29         | 1.92         | 2.03         | 1.46         | 1.31         | 1.76         | 1.12         | 0.95         |
| Lys | 3.18         | 2.99         | 2.89         | 2.79         | 2.64         | 2.47         | 2.57         | 2.48         | 2.31         |
| Lys | 3.13         | 2.88         | 2.83         | 2.95         | 2.50         | 2.47         | 2.53         | 2.47         | 2.31         |
| Lys | 3.14         | 2.92         | 2.86         | 2.97         | 2.62         | 2.41         | 2.50         | 2.45         | 2.31         |
| Lys | 3.13         | 2.88         | 2.86         | 2.82         | 2.57         | 2.43         | 2.48         | 2.43         | 2.29         |
| Lys | 3.17         | 2.98         | 2.87         | 2.86         | 2.63         | 2.50         | 2.45         | 2.36         | 2.26         |
| Lys | 3.13         | 2.82         | 2.79         | 2.78         | 2.47         | 2.41         | 2.44         | 2.30         | 2.26         |
| EA  | 2.81         | 2.01         | 2.11         | 2.36         | 1.23         | 1.50         | 1.84         | 0.67         | 1.21         |
| EA  | 2.84         | 2.03         | 2.19         | 2.38         | 1.25         | 1.55         | 1.94         | 0.72         | 1.22         |
| EA  | 2.93         | 2.14         | 2.23         | 2.54         | 1.33         | 1.62         | 2.08         | 0.83         | 1.37         |
| EA  | 2.82         | 2.02         | 2.17         | 2.36         | 1.25         | 1.50         | 1.88         | 0.72         | 1.22         |
| EA  | 2.89         | 2.08         | 2.20         | 2.49         | 1.29         | 1.56         | 1.99         | 0.75         | 1.24         |
| EA  | 2.91         | 2.11         | 2.21         | 2.53         | 1.30         | 1.57         | 2.08         | 0.80         | 1.33         |
| Myo | 2.13         | 2.09         | 2.09         | 1.81         | 1.57         | 1.53         | 1.41         | 1.16         | 1.04         |
| Myo | 2.35         | 2.19         | 2.15         | 2.01         | 1.68         | 1.57         | 1.52         | 1.28         | 1.13         |
| Myo | 2.36         | 2.19         | 2.16         | 2.01         | 1.69         | 1.58         | 1.62         | 1.29         | 1.13         |
| Myo | 2.20         | 2.10         | 2.11         | 1.90         | 1.64         | 1.54         | 1.42         | 1.26         | 1.08         |
| Myo | 2.22         | 2.02         | 2.02         | 1.81         | 1.48         | 1.52         | 1.41         | 1.07         | 1.04         |
| Myo | 2.23         | 2.12         | 2.14         | 1.92         | 1.67         | 1.57         | 1.46         | 1.28         | 1.08         |
| HRP | 2.26         | 2.94         | 2.23         | 1.79         | 2.38         | 1.78         | 1.68         | 2.21         | 1.51         |
| HRP | 2.28         | 3.09         | 2.27         | 1.86         | 2.56         | 1.81         | 1.78         | 2.31         | 1.64         |
| HRP | 2.15         | 2.87         | 2.21         | 1.71         | 2.41         | 1.72         | 1.61         | 2.22         | 1.41         |

|       |      |      |      |      |      |      |      |      |      |
|-------|------|------|------|------|------|------|------|------|------|
| HRP   | 2.27 | 3.02 | 2.27 | 1.83 | 2.48 | 1.79 | 1.71 | 2.26 | 1.60 |
| HRP   | 2.34 | 3.10 | 2.33 | 1.97 | 2.58 | 1.82 | 1.78 | 2.43 | 1.68 |
| HRP   | 2.20 | 2.91 | 2.22 | 1.78 | 2.34 | 1.75 | 1.62 | 2.30 | 1.41 |
| TRF   | 2.66 | 3.18 | 2.63 | 2.38 | 3.06 | 2.15 | 1.96 | 2.92 | 1.87 |
| TRF   | 2.67 | 3.19 | 2.66 | 2.38 | 3.09 | 2.18 | 2.00 | 2.96 | 1.87 |
| TRF   | 2.59 | 3.10 | 2.61 | 2.29 | 2.94 | 2.12 | 1.76 | 2.83 | 1.79 |
| TRF   | 2.45 | 3.03 | 2.47 | 2.15 | 2.91 | 2.02 | 1.64 | 2.79 | 1.75 |
| TRF   | 2.58 | 3.08 | 2.57 | 2.23 | 2.93 | 2.03 | 1.67 | 2.79 | 1.76 |
| TRF   | 2.60 | 3.17 | 2.63 | 2.34 | 3.04 | 2.13 | 1.79 | 2.91 | 1.83 |
| Cyt-C | 2.02 | 2.58 | 1.83 | 1.61 | 2.14 | 1.27 | 1.34 | 1.72 | 0.82 |
| Cyt-C | 2.00 | 2.58 | 1.83 | 1.42 | 2.14 | 1.26 | 1.27 | 1.63 | 0.80 |
| Cyt-C | 1.91 | 2.52 | 1.82 | 1.36 | 2.01 | 1.24 | 1.18 | 1.62 | 0.80 |
| Cyt-C | 1.86 | 2.50 | 1.81 | 1.32 | 2.09 | 1.21 | 1.09 | 1.53 | 0.80 |
| Cyt-C | 2.09 | 2.77 | 1.91 | 1.65 | 2.20 | 1.32 | 1.45 | 1.70 | 0.96 |
| Cyt-C | 2.06 | 2.59 | 1.86 | 1.63 | 2.17 | 1.27 | 1.45 | 1.73 | 0.88 |
| IgG   | 2.58 | 3.07 | 2.36 | 1.91 | 2.81 | 1.93 | 1.58 | 2.45 | 1.60 |
| IgG   | 2.59 | 3.08 | 2.37 | 1.93 | 2.84 | 1.95 | 1.72 | 2.55 | 1.62 |
| IgG   | 2.68 | 3.17 | 2.39 | 1.98 | 2.94 | 1.97 | 1.80 | 2.58 | 1.64 |
| IgG   | 2.60 | 3.17 | 2.37 | 1.95 | 2.92 | 1.96 | 1.76 | 2.62 | 1.63 |
| IgG   | 2.50 | 3.04 | 2.35 | 1.91 | 2.77 | 1.91 | 1.55 | 2.44 | 1.60 |
| IgG   | 2.48 | 3.00 | 2.32 | 1.89 | 2.71 | 1.88 | 1.55 | 2.43 | 1.54 |
| Urine | 2.55 | 2.44 | 1.90 | 2.11 | 1.62 | 1.35 | 1.43 | 1.28 | 0.95 |
| Urine | 2.65 | 2.51 | 1.96 | 2.22 | 1.76 | 1.43 | 1.63 | 1.32 | 1.01 |
| Urine | 2.67 | 2.55 | 1.98 | 2.24 | 1.79 | 1.46 | 1.63 | 1.14 | 1.02 |
| Urine | 2.54 | 2.43 | 1.88 | 2.11 | 1.60 | 1.30 | 1.40 | 1.18 | 0.95 |
| Urine | 2.57 | 2.45 | 1.91 | 2.12 | 1.66 | 1.39 | 1.48 | 1.28 | 0.98 |
| Urine | 2.65 | 2.52 | 1.92 | 2.21 | 1.75 | 1.40 | 1.51 | 1.37 | 1.01 |



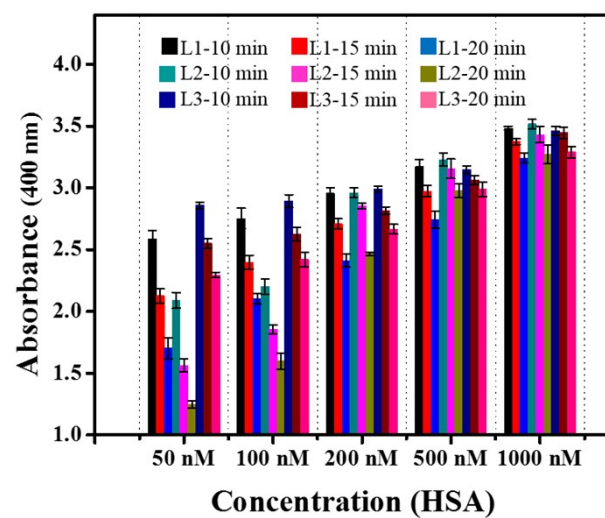
**Figure S6.** Fingerprints of 10 selected proteins (at final concentration of 50 nM) spiked in human serum based on the absorption values at 400 nm obtained from the colorimetric responses of three sensing elements at three time points

**Table S6.** Identification of unknown protein samples at 50 nM level spiked in human urine using AuNPs-L1, AuNPs-L2, and AuNPs-L3 in different time

| Sam-<br>ples | L1-10<br>min | L2-10<br>min | L3-10<br>min | L1-15<br>min | L2-15<br>min | L3-15<br>min | L1-20<br>min | L2-20<br>min | L3-20<br>min | Identifi-<br>cation | Verifi-<br>cation |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------------|-------------------|
| 1            | 2.63         | 2.06         | 1.91         | 2.04         | 1.45         | 1.31         | 1.60         | 1.09         | 1.02         | HSA                 | HSA               |
| 2            | 2.35         | 2.19         | 2.15         | 2.01         | 1.68         | 1.57         | 1.52         | 1.28         | 1.13         | Myo                 | Myo               |
| 3            | 2.50         | 3.04         | 2.35         | 1.91         | 2.77         | 1.91         | 1.55         | 2.44         | 1.60         | IgG                 | IgG               |
| 4            | 3.00         | 2.45         | 2.32         | 2.45         | 2.03         | 1.95         | 2.09         | 1.77         | 1.72         | Hem                 | Hem               |
| 5            | 2.34         | 3.10         | 2.33         | 1.97         | 2.58         | 1.82         | 1.78         | 2.43         | 1.68         | HRP                 | HRP               |
| 6            | 3.14         | 2.92         | 2.86         | 2.86         | 2.62         | 2.47         | 2.50         | 2.45         | 2.31         | Lys                 | Lys               |
| 7            | 2.09         | 2.77         | 1.91         | 1.65         | 2.20         | 1.32         | 1.45         | 1.70         | 0.96         | Cyt-C               | Cyt-C             |
| 8            | 2.93         | 2.52         | 2.26         | 2.36         | 1.97         | 1.74         | 1.76         | 1.58         | 1.39         | BSA                 | BSA               |
| 9            | 2.65         | 2.51         | 1.96         | 2.22         | 1.76         | 1.43         | 1.63         | 1.32         | 1.01         | Urine               | Urine             |
| 10           | 2.15         | 2.87         | 2.21         | 1.71         | 2.41         | 1.72         | 1.61         | 2.22         | 1.41         | HRP                 | HRP               |
| 11           | 2.67         | 2.11         | 1.95         | 2.12         | 1.46         | 1.44         | 1.76         | 1.10         | 1.12         | HSA                 | HSA               |
| 12           | 2.59         | 3.08         | 2.37         | 1.93         | 2.84         | 1.95         | 1.72         | 2.55         | 1.62         | IgG                 | IgG               |
| 13           | 2.20         | 2.10         | 2.11         | 1.90         | 1.64         | 1.54         | 1.42         | 1.26         | 1.08         | Myo                 | Myo               |
| 14           | 2.60         | 3.17         | 2.63         | 2.34         | 3.04         | 2.13         | 1.79         | 2.91         | 1.83         | TRF                 | TRF               |
| 15           | 3.00         | 2.48         | 2.38         | 2.47         | 2.04         | 1.98         | 2.13         | 1.87         | 1.75         | Hem                 | Hem               |
| 16           | 1.91         | 2.52         | 1.82         | 1.36         | 2.01         | 1.24         | 1.18         | 1.62         | 0.80         | Cyt-C               | Cyt-C             |
| 17           | 2.82         | 2.02         | 2.17         | 2.36         | 1.25         | 1.50         | 1.88         | 0.72         | 1.22         | EA                  | EA                |
| 18           | 2.55         | 2.44         | 1.90         | 2.11         | 1.62         | 1.35         | 1.43         | 1.28         | 0.95         | Urine               | Urine             |
| 19           | 2.76         | 2.29         | 1.95         | 2.18         | 1.53         | 1.48         | 1.82         | 1.13         | 1.15         | HSA                 | HSA               |
| 20           | 2.02         | 2.58         | 1.83         | 1.61         | 2.14         | 1.27         | 1.34         | 1.72         | 0.82         | Cyt-C               | Cyt-C             |
| 21           | 3.13         | 2.88         | 2.83         | 2.79         | 2.50         | 2.41         | 2.45         | 2.36         | 2.26         | Lys                 | Lys               |
| 22           | 2.58         | 3.08         | 2.57         | 2.23         | 2.93         | 2.03         | 1.67         | 2.79         | 1.76         | TRF                 | TRF               |
| 23           | 2.81         | 2.01         | 2.11         | 2.36         | 1.23         | 1.50         | 1.84         | 0.67         | 1.21         | EA                  | EA                |
| 24           | 2.81         | 2.40         | 2.27         | 2.17         | 1.87         | 1.72         | 1.53         | 1.48         | 1.33         | BSA                 | BSA               |
| 25           | 2.27         | 3.02         | 2.27         | 1.83         | 2.48         | 1.79         | 1.71         | 2.26         | 1.60         | HRP                 | HRP               |
| 26           | 2.57         | 2.45         | 1.91         | 2.12         | 1.66         | 1.39         | 1.48         | 1.28         | 0.98         | Urine               | Urine             |
| 27           | 2.91         | 2.11         | 2.21         | 2.53         | 1.30         | 1.57         | 2.08         | 0.80         | 1.33         | EA                  | EA                |
| 28           | 2.91         | 2.32         | 2.31         | 2.30         | 1.95         | 1.85         | 2.01         | 1.71         | 1.64         | Hem                 | Hem               |
| 29           | 2.60         | 3.17         | 2.37         | 1.95         | 2.92         | 1.96         | 1.76         | 2.62         | 1.63         | IgG                 | IgG               |
| 30           | 2.22         | 2.02         | 2.02         | 1.81         | 1.48         | 1.52         | 1.41         | 1.07         | 1.04         | Myo                 | Myo               |
| 31           | 3.17         | 2.98         | 2.87         | 2.95         | 2.63         | 2.47         | 2.53         | 2.47         | 2.31         | Lys                 | Lys               |
| 32           | 2.67         | 3.19         | 2.66         | 2.38         | 3.09         | 2.18         | 2.00         | 2.96         | 1.87         | TRF                 | TRF               |
| 33           | 2.88         | 2.49         | 2.24         | 2.29         | 1.93         | 1.73         | 1.69         | 1.54         | 1.35         | BSA                 | BSA               |

**Table S7.** Training matrix of the HSA response patterns at various concentrations in human urine

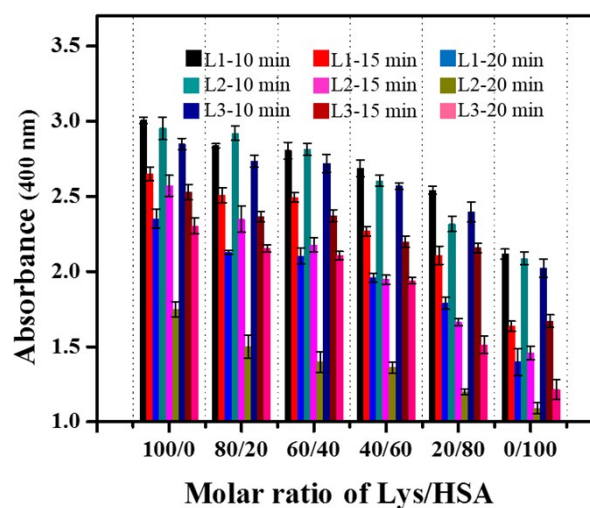
| <b>Concen-<br/>trations</b> | <b>L1-10<br/>min</b> | <b>L2-10<br/>min</b> | <b>L3-10<br/>min</b> | <b>L1-15<br/>min</b> | <b>L2-15<br/>min</b> | <b>L3-15<br/>min</b> | <b>L1-20<br/>min</b> | <b>L2-20<br/>min</b> | <b>L3-20<br/>min</b> |
|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 50 nM                       | 2.59                 | 2.13                 | 2.88                 | 2.18                 | 1.58                 | 2.56                 | 1.76                 | 1.29                 | 2.31                 |
| 50 nM                       | 2.53                 | 2.02                 | 2.85                 | 2.11                 | 1.55                 | 2.53                 | 1.61                 | 1.24                 | 2.28                 |
| 50 nM                       | 2.49                 | 2.01                 | 2.84                 | 2.03                 | 1.48                 | 2.50                 | 1.59                 | 1.21                 | 2.27                 |
| 50 nM                       | 2.57                 | 2.11                 | 2.88                 | 2.12                 | 1.56                 | 2.54                 | 1.72                 | 1.24                 | 2.28                 |
| 50 nM                       | 2.68                 | 2.17                 | 2.82                 | 2.13                 | 1.60                 | 2.62                 | 1.78                 | 1.23                 | 2.33                 |
| 50 nM                       | 2.64                 | 2.10                 | 2.88                 | 2.20                 | 1.63                 | 2.57                 | 1.77                 | 1.29                 | 2.31                 |
| 100 nM                      | 2.74                 | 2.16                 | 2.85                 | 2.34                 | 1.84                 | 2.57                 | 2.07                 | 1.59                 | 2.37                 |
| 100 nM                      | 2.68                 | 2.27                 | 2.95                 | 2.45                 | 1.88                 | 2.67                 | 2.14                 | 1.65                 | 2.47                 |
| 100 nM                      | 2.71                 | 2.12                 | 2.85                 | 2.34                 | 1.79                 | 2.56                 | 2.06                 | 1.47                 | 2.33                 |
| 100 nM                      | 2.80                 | 2.19                 | 2.86                 | 2.37                 | 1.86                 | 2.60                 | 2.09                 | 1.61                 | 2.41                 |
| 100 nM                      | 2.90                 | 2.20                 | 2.88                 | 2.45                 | 1.87                 | 2.65                 | 2.10                 | 1.62                 | 2.46                 |
| 100 nM                      | 2.69                 | 2.28                 | 2.96                 | 2.45                 | 1.89                 | 2.69                 | 2.16                 | 1.65                 | 2.48                 |
| 200 nM                      | 3.04                 | 3.00                 | 3.02                 | 2.76                 | 2.88                 | 2.85                 | 2.46                 | 2.49                 | 2.71                 |
| 200 nM                      | 2.92                 | 2.94                 | 2.98                 | 2.67                 | 2.84                 | 2.79                 | 2.36                 | 2.46                 | 2.63                 |
| 200 nM                      | 2.92                 | 2.90                 | 2.96                 | 2.65                 | 2.83                 | 2.77                 | 2.33                 | 2.45                 | 2.61                 |
| 200 nM                      | 2.95                 | 2.98                 | 2.99                 | 2.72                 | 2.86                 | 2.84                 | 2.45                 | 2.46                 | 2.68                 |
| 200 nM                      | 2.95                 | 2.95                 | 2.99                 | 2.71                 | 2.85                 | 2.82                 | 2.41                 | 2.46                 | 2.66                 |
| 200 nM                      | 2.97                 | 3.00                 | 3.01                 | 2.74                 | 2.87                 | 2.84                 | 2.45                 | 2.48                 | 2.70                 |
| 500 nM                      | 3.21                 | 3.24                 | 3.17                 | 2.98                 | 3.16                 | 3.06                 | 2.73                 | 2.99                 | 3.01                 |
| 500 nM                      | 3.22                 | 3.27                 | 3.17                 | 3.01                 | 3.19                 | 3.10                 | 2.83                 | 3.03                 | 3.03                 |
| 500 nM                      | 3.14                 | 3.23                 | 3.13                 | 2.96                 | 3.15                 | 3.06                 | 2.71                 | 2.91                 | 2.94                 |
| 500 nM                      | 3.24                 | 3.29                 | 3.18                 | 3.05                 | 3.28                 | 3.11                 | 2.83                 | 3.04                 | 3.07                 |
| 500 nM                      | 3.12                 | 3.15                 | 3.12                 | 2.94                 | 3.11                 | 3.03                 | 2.68                 | 2.93                 | 2.94                 |
| 500 nM                      | 3.11                 | 3.19                 | 3.11                 | 2.92                 | 3.04                 | 3.02                 | 2.67                 | 2.97                 | 2.93                 |
| 1000 nM                     | 3.48                 | 3.53                 | 3.47                 | 3.38                 | 3.47                 | 3.47                 | 3.25                 | 3.25                 | 3.29                 |
| 1000 nM                     | 3.50                 | 3.57                 | 3.52                 | 3.40                 | 3.48                 | 3.49                 | 3.29                 | 3.40                 | 3.37                 |
| 1000 nM                     | 3.48                 | 3.52                 | 3.46                 | 3.36                 | 3.46                 | 3.46                 | 3.22                 | 3.24                 | 3.27                 |
| 1000 nM                     | 3.47                 | 3.51                 | 3.43                 | 3.35                 | 3.38                 | 3.42                 | 3.22                 | 3.21                 | 3.25                 |
| 1000 nM                     | 3.49                 | 3.53                 | 3.47                 | 3.40                 | 3.47                 | 3.47                 | 3.28                 | 3.32                 | 3.32                 |
| 1000 nM                     | 3.46                 | 3.45                 | 3.41                 | 3.35                 | 3.32                 | 3.36                 | 3.19                 | 3.20                 | 3.24                 |



**Figure S7.** Fingerprint of HSA at various concentrations ranging from 50 nM to 1000 nM spiked in human urine.

**Table S8.** Fingerprint of HSA and Lys at different molar ratios (total protein concentration of 50 nM in human urine)

| <b>Sam-<br/>ples</b> | <b>L1-10<br/>min</b> | <b>L2-10<br/>min</b> | <b>L3-10<br/>min</b> | <b>L1-15<br/>min</b> | <b>L2-15<br/>min</b> | <b>L3-15<br/>min</b> | <b>L1-20<br/>min</b> | <b>L2-20<br/>min</b> | <b>L3-20<br/>min</b> |
|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 100/0                | 3.00                 | 2.99                 | 2.85                 | 2.66                 | 2.62                 | 2.55                 | 2.34                 | 1.76                 | 2.34                 |
| 100/0                | 2.99                 | 2.97                 | 2.85                 | 2.64                 | 2.57                 | 2.50                 | 2.33                 | 1.76                 | 2.29                 |
| 100/0                | 3.02                 | 3.01                 | 2.89                 | 2.69                 | 2.63                 | 2.58                 | 2.40                 | 1.78                 | 2.34                 |
| 100/0                | 3.04                 | 3.03                 | 2.89                 | 2.71                 | 2.64                 | 2.58                 | 2.45                 | 1.82                 | 2.37                 |
| 100/0                | 3.00                 | 2.86                 | 2.81                 | 2.60                 | 2.50                 | 2.48                 | 2.32                 | 1.70                 | 2.25                 |
| 100/0                | 3.00                 | 2.86                 | 2.80                 | 2.60                 | 2.47                 | 2.47                 | 2.27                 | 1.69                 | 2.24                 |
| 80/20                | 2.82                 | 2.86                 | 2.68                 | 2.45                 | 2.30                 | 2.31                 | 2.11                 | 1.59                 | 2.13                 |
| 80/20                | 2.85                 | 2.97                 | 2.75                 | 2.55                 | 2.37                 | 2.40                 | 2.14                 | 1.50                 | 2.18                 |
| 80/20                | 2.83                 | 2.88                 | 2.72                 | 2.47                 | 2.22                 | 2.35                 | 2.12                 | 1.41                 | 2.14                 |
| 80/20                | 2.86                 | 2.96                 | 2.80                 | 2.58                 | 2.48                 | 2.41                 | 2.14                 | 1.59                 | 2.19                 |
| 80/20                | 2.83                 | 2.89                 | 2.72                 | 2.47                 | 2.39                 | 2.37                 | 2.13                 | 1.43                 | 2.14                 |
| 80/20                | 2.84                 | 2.96                 | 2.72                 | 2.53                 | 2.33                 | 2.37                 | 2.13                 | 1.49                 | 2.15                 |
| 60/40                | 2.77                 | 2.76                 | 2.67                 | 2.48                 | 2.19                 | 2.37                 | 2.07                 | 1.33                 | 2.08                 |
| 60/40                | 2.87                 | 2.85                 | 2.78                 | 2.51                 | 2.21                 | 2.40                 | 2.15                 | 1.49                 | 2.12                 |
| 60/40                | 2.88                 | 2.86                 | 2.78                 | 2.52                 | 2.25                 | 2.40                 | 2.17                 | 1.42                 | 2.14                 |
| 60/40                | 2.77                 | 2.79                 | 2.68                 | 2.50                 | 2.13                 | 2.39                 | 2.10                 | 1.39                 | 2.11                 |
| 60/40                | 2.77                 | 2.84                 | 2.76                 | 2.50                 | 2.15                 | 2.39                 | 2.11                 | 1.45                 | 2.12                 |
| 60/40                | 2.76                 | 2.79                 | 2.65                 | 2.44                 | 2.13                 | 2.30                 | 2.02                 | 1.31                 | 2.07                 |
| 40/60                | 2.74                 | 2.65                 | 2.60                 | 2.31                 | 1.98                 | 2.26                 | 1.99                 | 1.39                 | 1.97                 |
| 40/60                | 2.64                 | 2.58                 | 2.56                 | 2.25                 | 1.98                 | 2.16                 | 1.94                 | 1.38                 | 1.92                 |
| 40/60                | 2.60                 | 2.55                 | 2.54                 | 2.24                 | 1.96                 | 2.16                 | 1.92                 | 1.37                 | 1.92                 |
| 40/60                | 2.73                 | 2.63                 | 2.58                 | 2.30                 | 1.94                 | 2.21                 | 1.99                 | 1.32                 | 1.96                 |
| 40/60                | 2.69                 | 2.61                 | 2.56                 | 2.25                 | 1.91                 | 2.19                 | 1.94                 | 1.40                 | 1.94                 |
| 40/60                | 2.72                 | 2.61                 | 2.57                 | 2.26                 | 1.92                 | 2.20                 | 1.98                 | 1.30                 | 1.94                 |
| 20/80                | 2.51                 | 2.27                 | 2.29                 | 2.01                 | 1.62                 | 2.11                 | 1.75                 | 1.17                 | 1.44                 |
| 20/80                | 2.53                 | 2.30                 | 2.38                 | 2.11                 | 1.67                 | 2.15                 | 1.77                 | 1.20                 | 1.47                 |
| 20/80                | 2.52                 | 2.27                 | 2.36                 | 2.08                 | 1.65                 | 2.14                 | 1.76                 | 1.19                 | 1.48                 |
| 20/80                | 2.59                 | 2.40                 | 2.46                 | 2.19                 | 1.68                 | 2.19                 | 1.84                 | 1.22                 | 1.59                 |
| 20/80                | 2.54                 | 2.30                 | 2.44                 | 2.12                 | 1.67                 | 2.18                 | 1.78                 | 1.21                 | 1.56                 |
| 20/80                | 2.56                 | 2.36                 | 2.44                 | 2.14                 | 1.68                 | 2.18                 | 1.84                 | 1.21                 | 1.54                 |
| 0/100                | 2.13                 | 2.14                 | 2.08                 | 1.66                 | 1.48                 | 1.70                 | 1.47                 | 1.12                 | 1.28                 |
| 0/100                | 2.09                 | 2.06                 | 1.99                 | 1.62                 | 1.45                 | 1.64                 | 1.32                 | 1.09                 | 1.18                 |
| 0/100                | 2.12                 | 2.11                 | 2.05                 | 1.63                 | 1.46                 | 1.69                 | 1.45                 | 1.10                 | 1.24                 |
| 0/100                | 2.18                 | 2.10                 | 2.09                 | 1.69                 | 1.53                 | 1.72                 | 1.48                 | 1.13                 | 1.29                 |
| 0/100                | 2.08                 | 2.02                 | 1.93                 | 1.60                 | 1.39                 | 1.61                 | 1.26                 | 1.02                 | 1.12                 |
| 0/100                | 2.11                 | 2.09                 | 2.00                 | 1.62                 | 1.46                 | 1.65                 | 1.41                 | 1.09                 | 1.18                 |



**Figure S8.** Fingerprint of Lys and HSA at different molar ratios (total concentration of 50 nM) based on the absorption values at different time points obtained from the colorimetric sensor array