

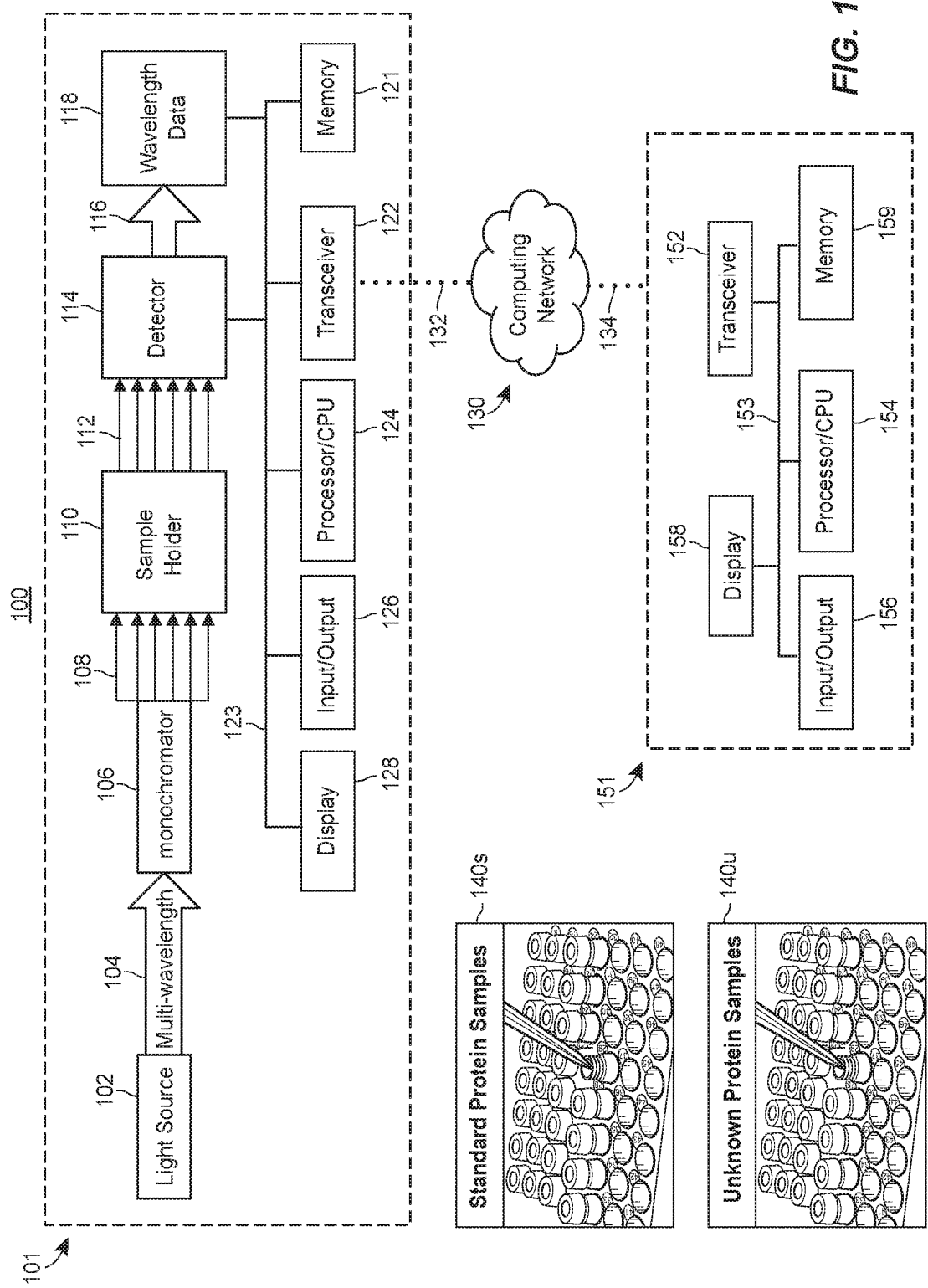


FIG. 1

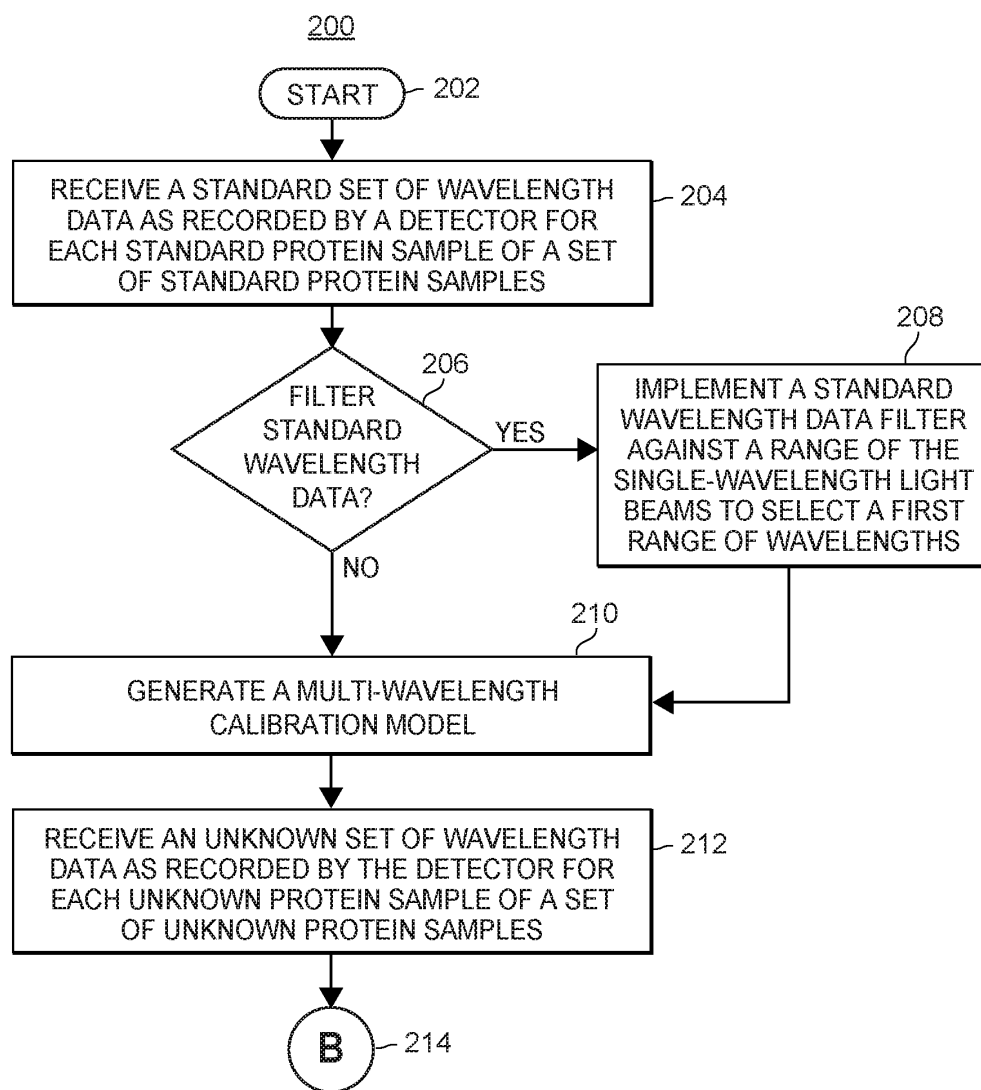


FIG. 2A

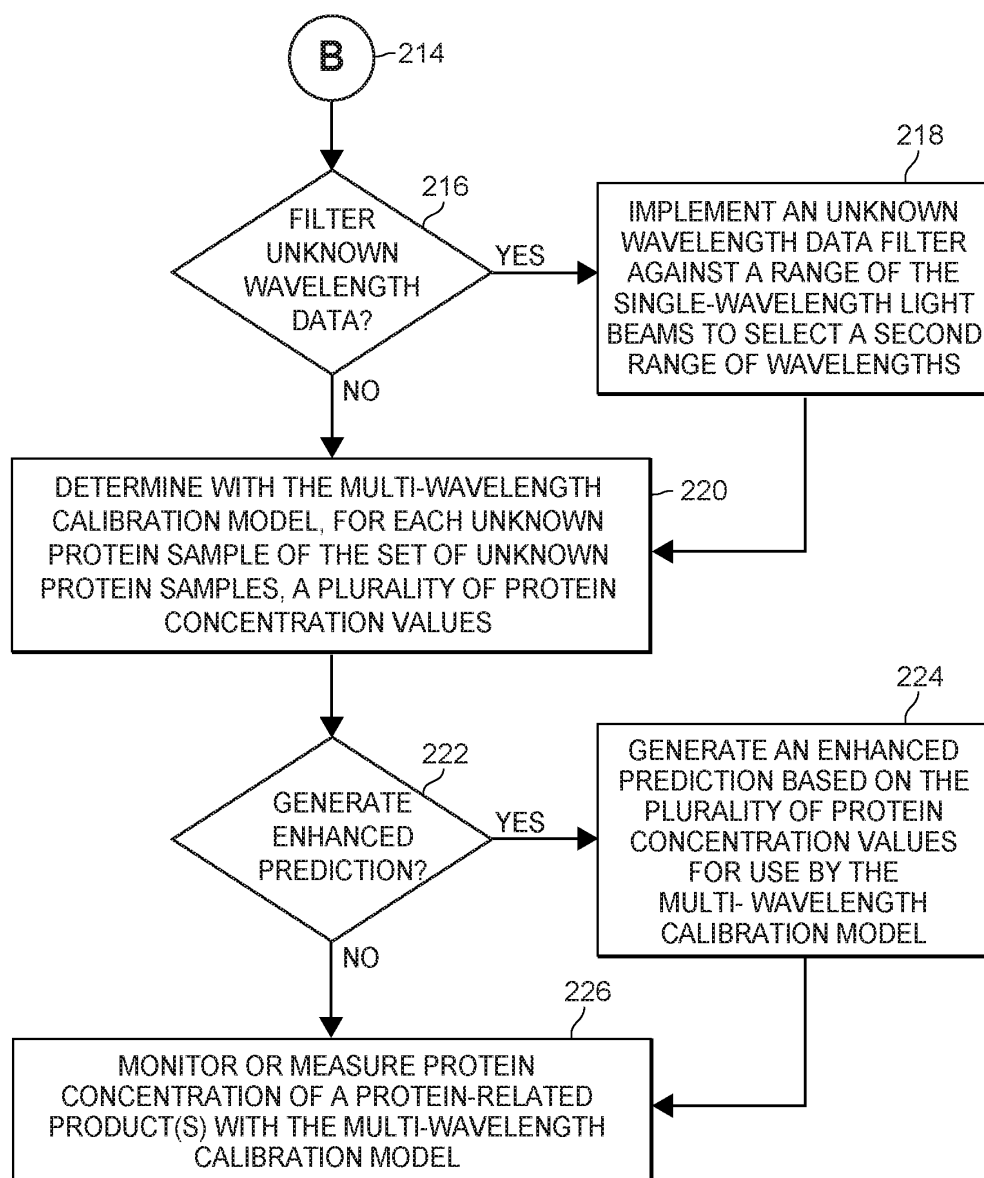


FIG. 2B

```
1  #Code Section 1
2  #import code libraries
3  from sklearn.linear_model import LinearRegression
4  import pandas as pd
5
6  #Code Section 2
7  #set default values for standard concentrations
8  standard_concentrations = [0.126, 0.252, 0.504, 1.008, 2.016, 4.032, 8.064,
9  16.128, 32.256, 64.512, 80.64, 100.8, 126]
10
11 #Code Section 3
12 #set default values for linear model R^2 requirement
13 min_score = 0.99
14
15 #Code Section 4
16 #set default values for the range of UV absorbance used for calculation
17 min_abs_std = 0.1
18 max_abs_std = 1.5
19 min_abs_unk = 0.2
20 max_abs_unk = 1.2
21
22 #Code Section 5
23 #read standard set of wavelength data for each standard protein sample of
24 #a set of standard protein samples and assign known concentrations
25 df = pd.read_csv("standard_sample data.txt")
26 for i in range(1, len(standard_concentrations)):
27     within df, assign known concentrations for each protein standard
28
29 #Code Section 6
30 #data filter for standard with known concentrations
31 def filter_data(x):
32     absorbance = float(x)
33     return -1 if absorbance < min_abs_std or absorbance > max_abs_std else
34     absorbance
35
36 #Code Section 7
37 #data filter for samples with unknown concentrations
38 def filter_data_unk(x):
39     absorbance = float(x)
40     return -1 if absorbance < min_abs_unk or absorbance > max_abs_unk else
41     absorbance
42
43
44
45
46
47
```

FIG. 3A

```
48 #Code Section 8
49 #add columns to df and perform Linear Regression
50 for i in range(df):
51     filter x absorbance values using filter_data(x)
52     reg = LinearRegression().fit(x and y values of df)
53     lr_score = reg.score(x and y values of df)
54     if lr_score >= min_score:
55         df.loc[df.index[i], 'coefficient'] = reg.coef_[0]
56         df.loc[df.index[i], 'intercept'] = reg.intercept_
57
58 #Code Section 9
59 #determining protein concentration values of protein samples with
60 unknown concentrations
61 def calc_unk(file_name_of sample with unknown_ concentration):
62
63
64     df_unk = pd.read_csv(file_name_of sample_with_unknown_concentration)
65
66     sum = 0.00
67     cnt = 0 for i in range(df_unk):
68         abs = filter x absorbance values using filter_data_unk(x)
69         if abs != -1 and df.loc[df.index[i], 'intercept'] != None:
70
71             conc = float((abs-df.loc[df.index[i], 'intercept']) /
72                           df.loc[df.index[i], 'coefficient'])
73
74             print(round(conc,3))
75             sum = sum + conc
76             cnt = cnt + 1
77         #avg = sum/cnt
78         #print('the unknown concentration is:' + str(round(avg,2)) + 'mg/ml')
79         return str(round(float(sum/cnt), 3))
80
81 #Code Section 10
82 #Input and Output Screens
83 file_name_of sample_with_unknown_concentration =
84 input('Please enter your sample name:')
85
86 print('The sample concentration is ' +
87 calc_unk(file_name_of_sample_with_unknown_concnetratio) + 'mg/ml')
```

FIG. 3B

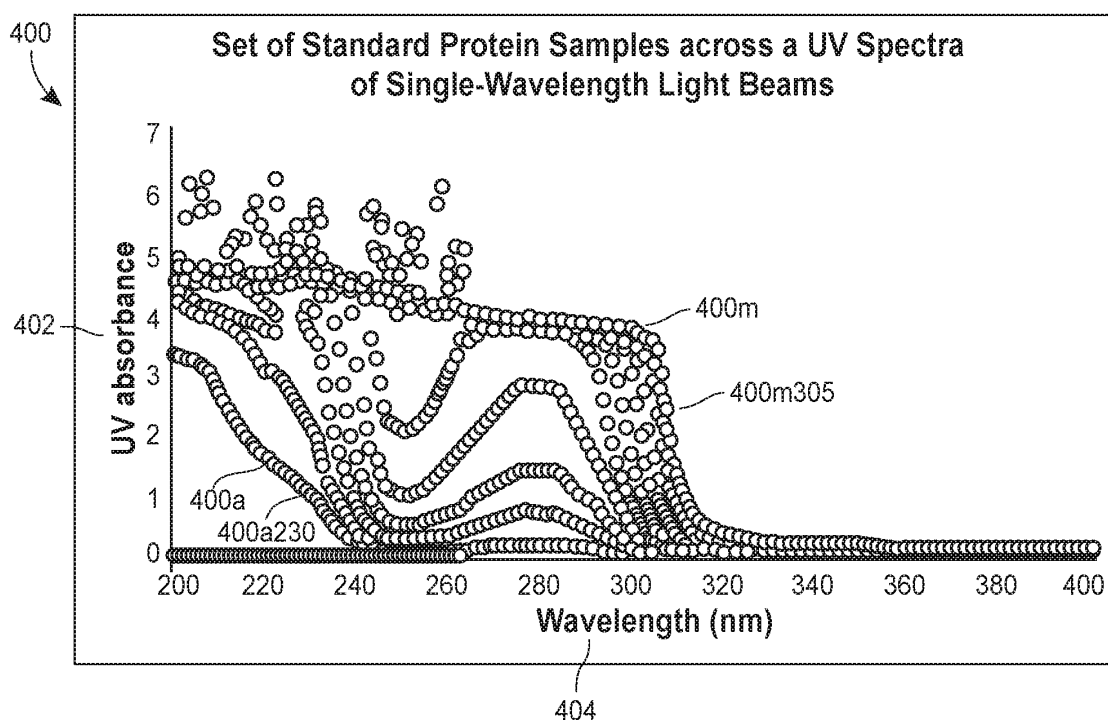


FIG. 4A

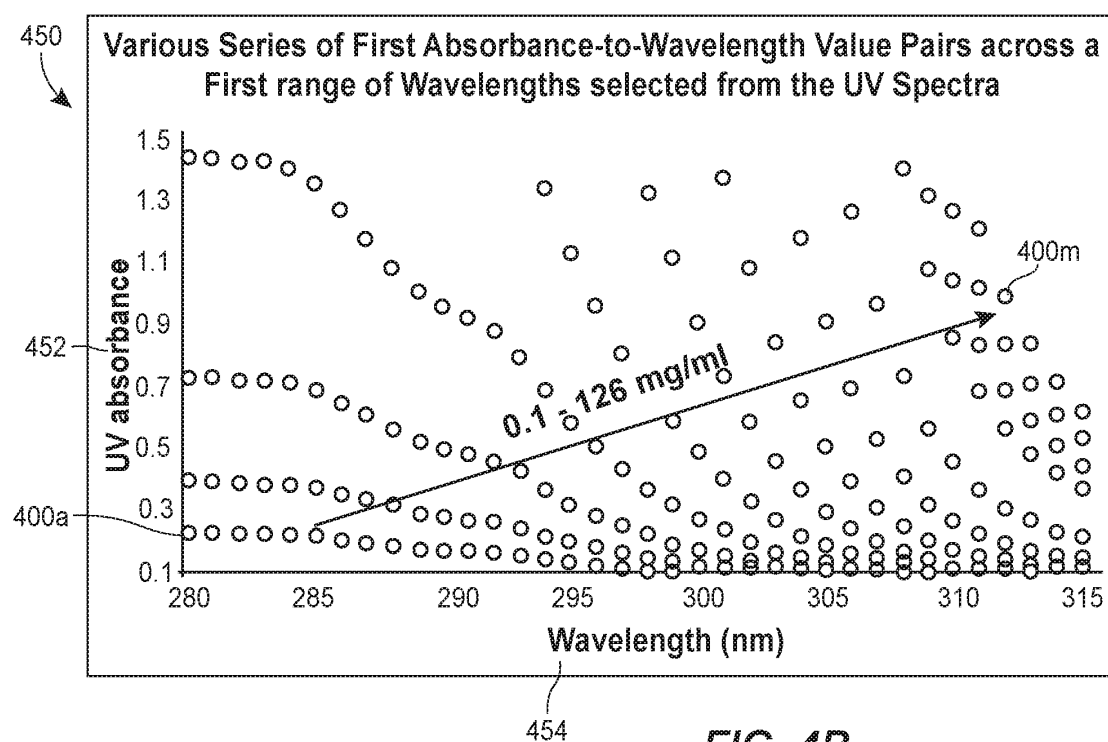
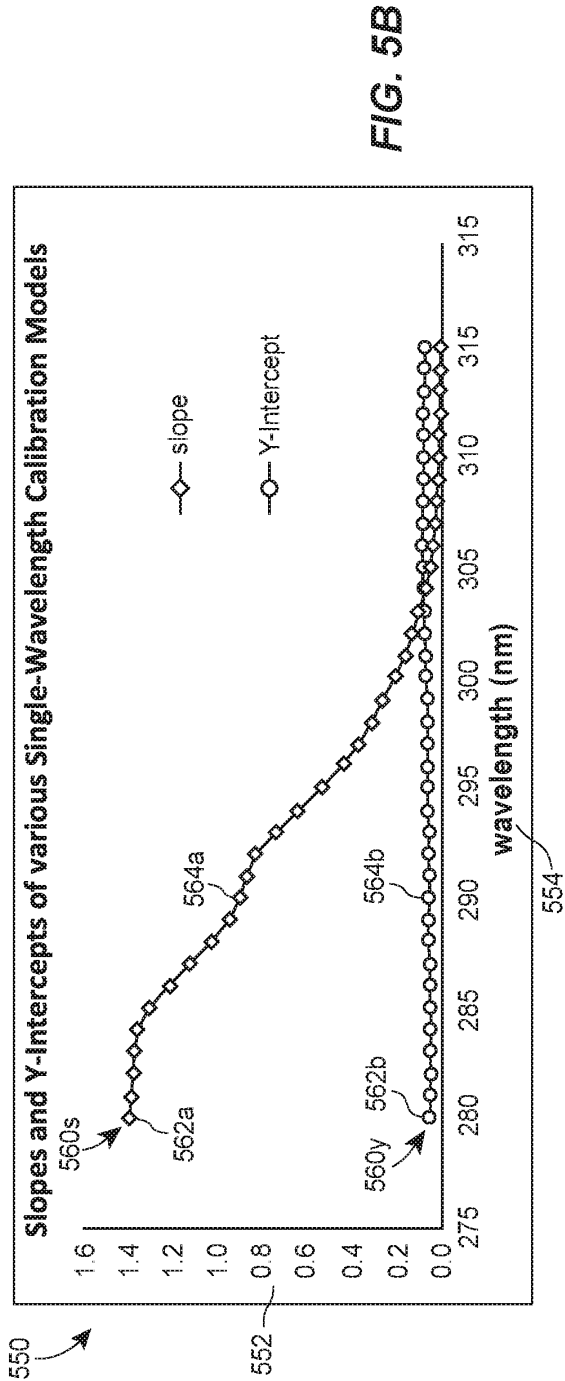
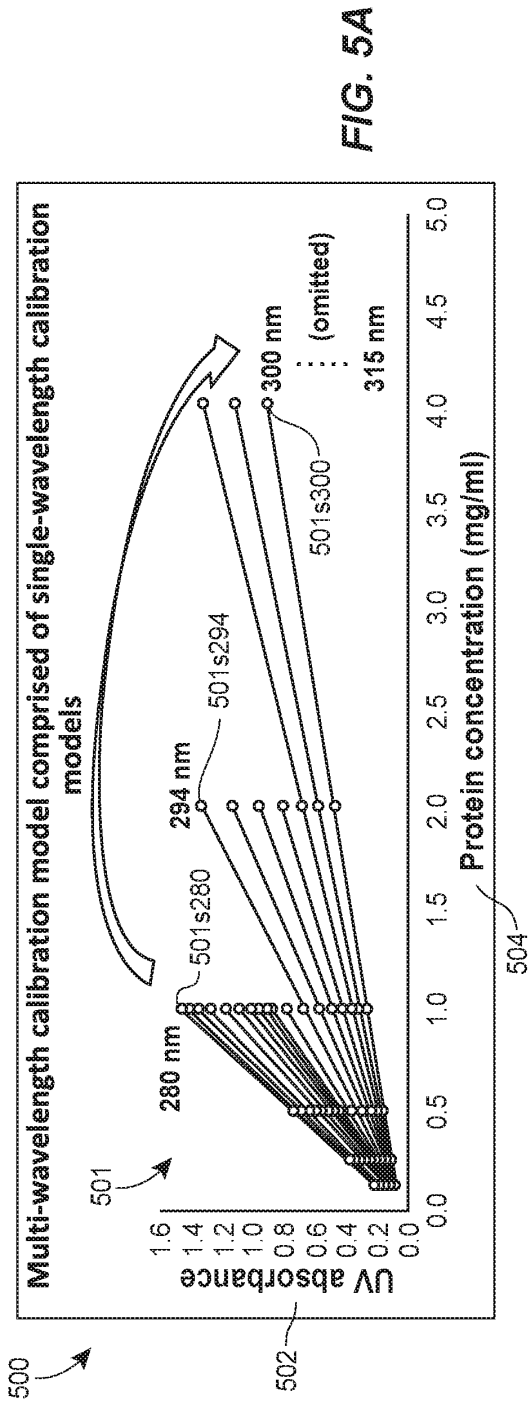


FIG. 4B



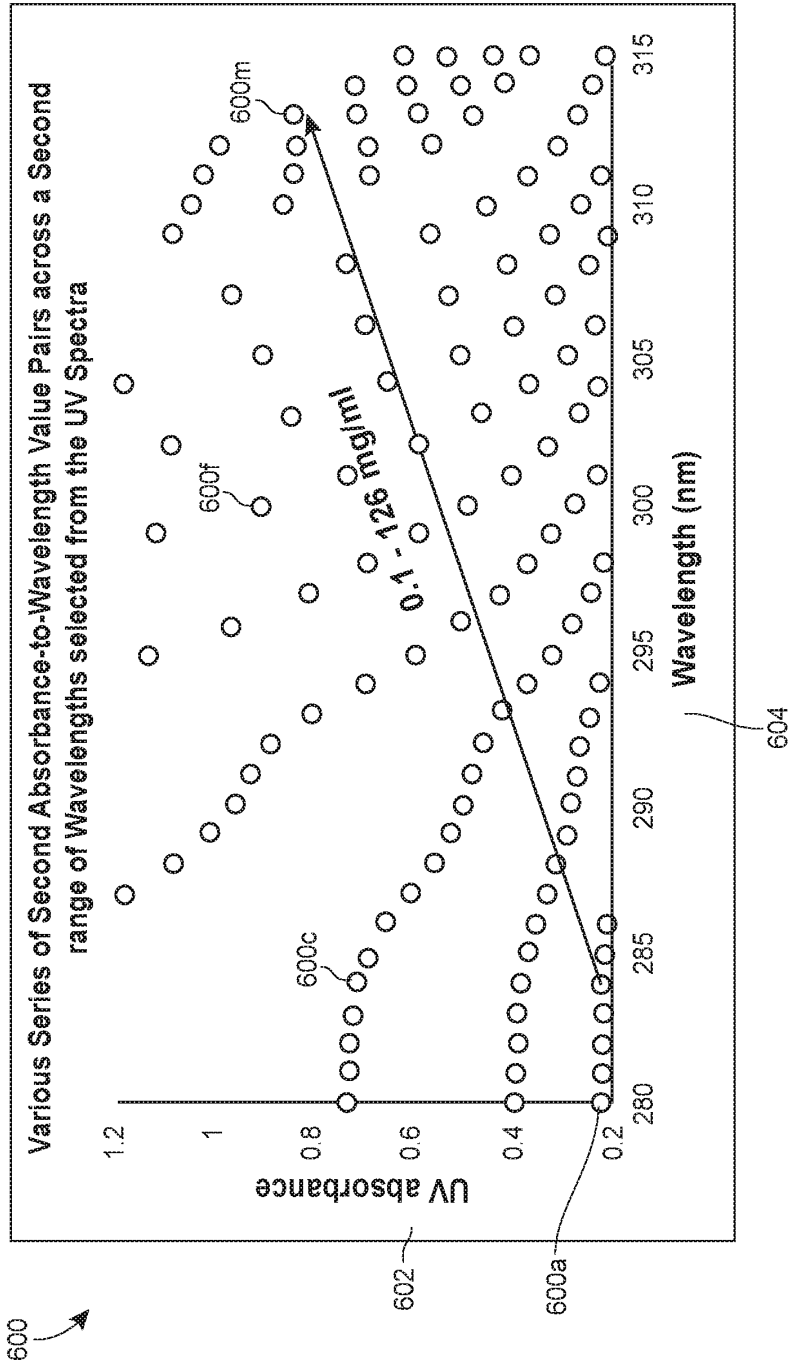


FIG. 6

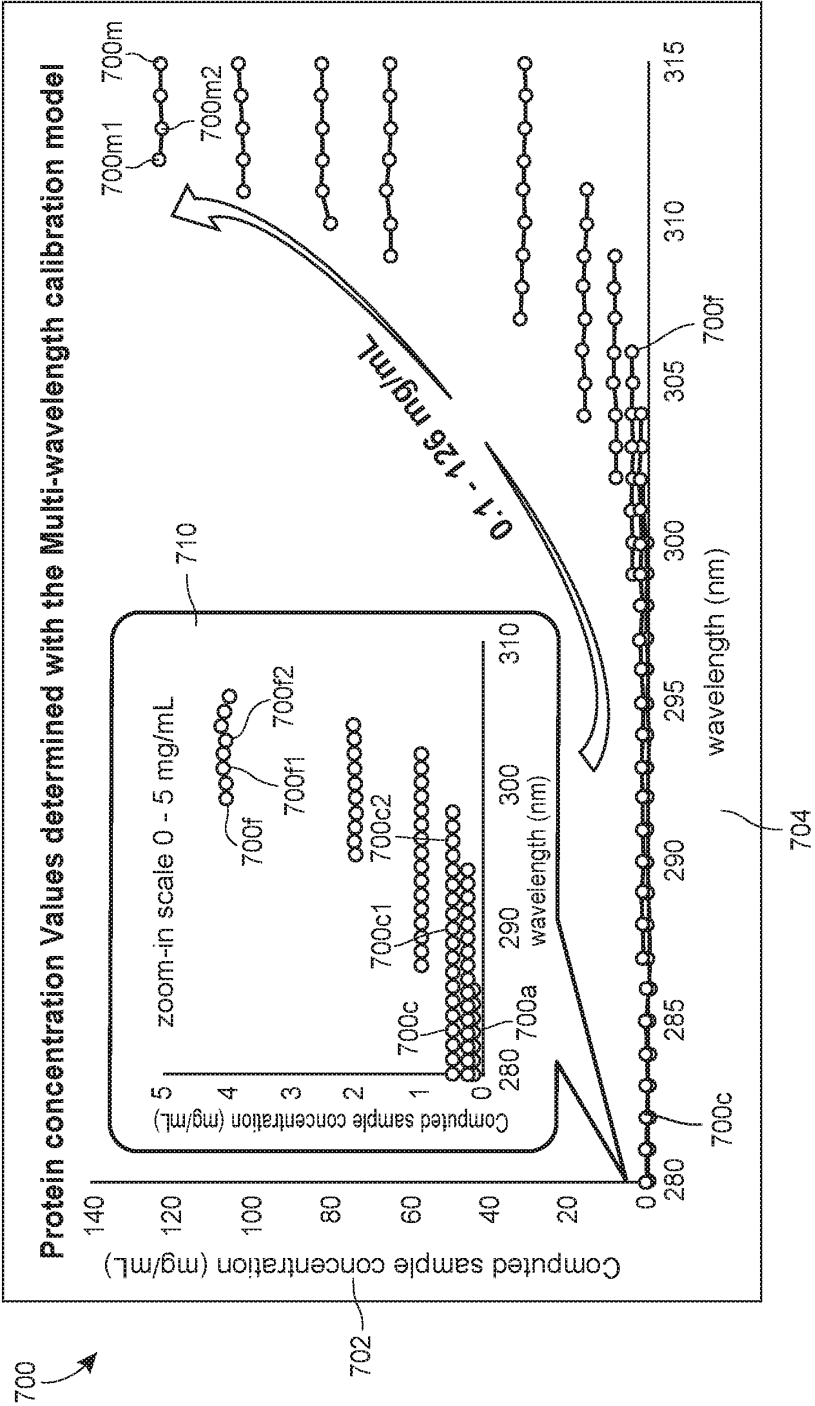


FIG. 7

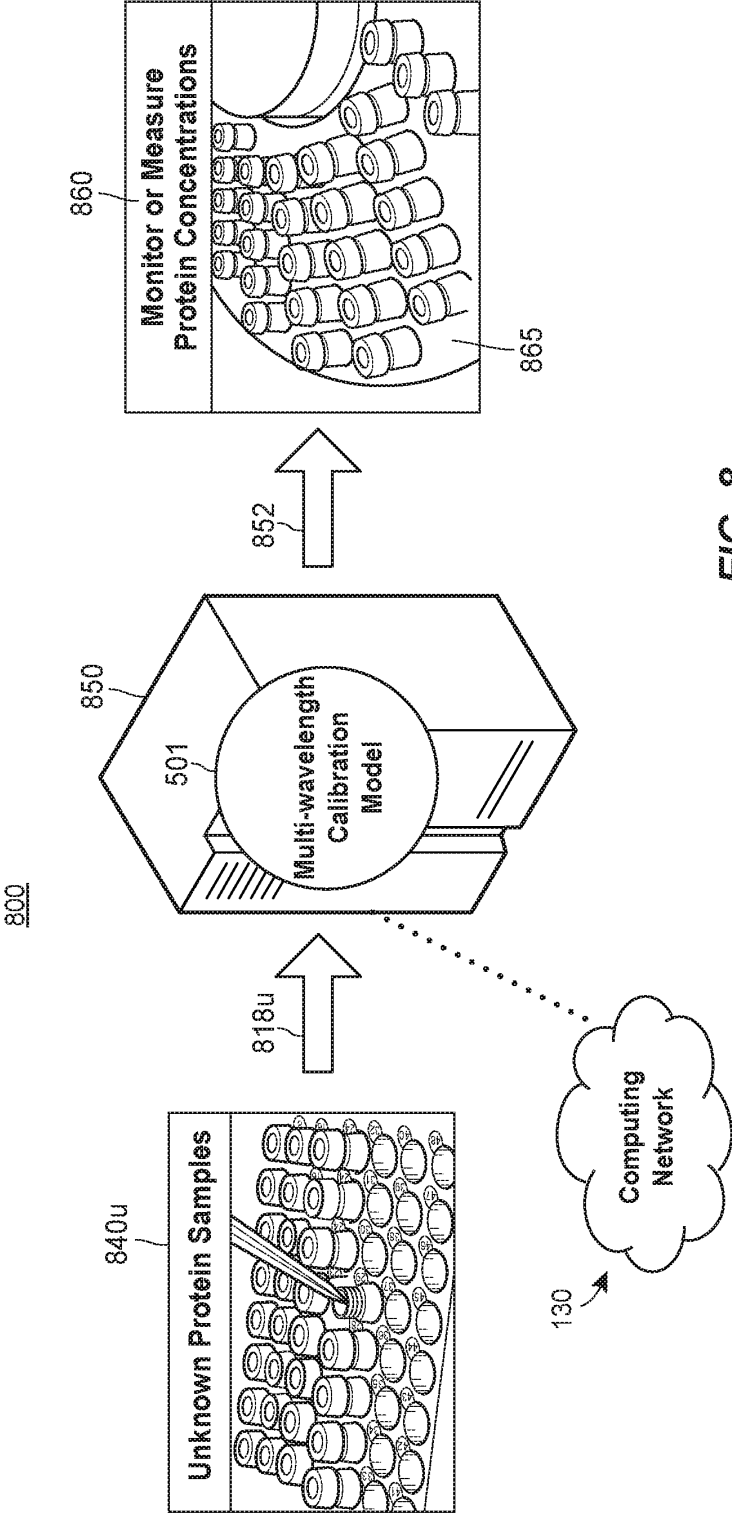


FIG. 8