Supporting information for:

**Physical-chemical properties of biogenic selenium nanostructures produced by *Stenotrophomonas maltophilia* SeITE02 and *Ochrobactrum sp.* MPV1**

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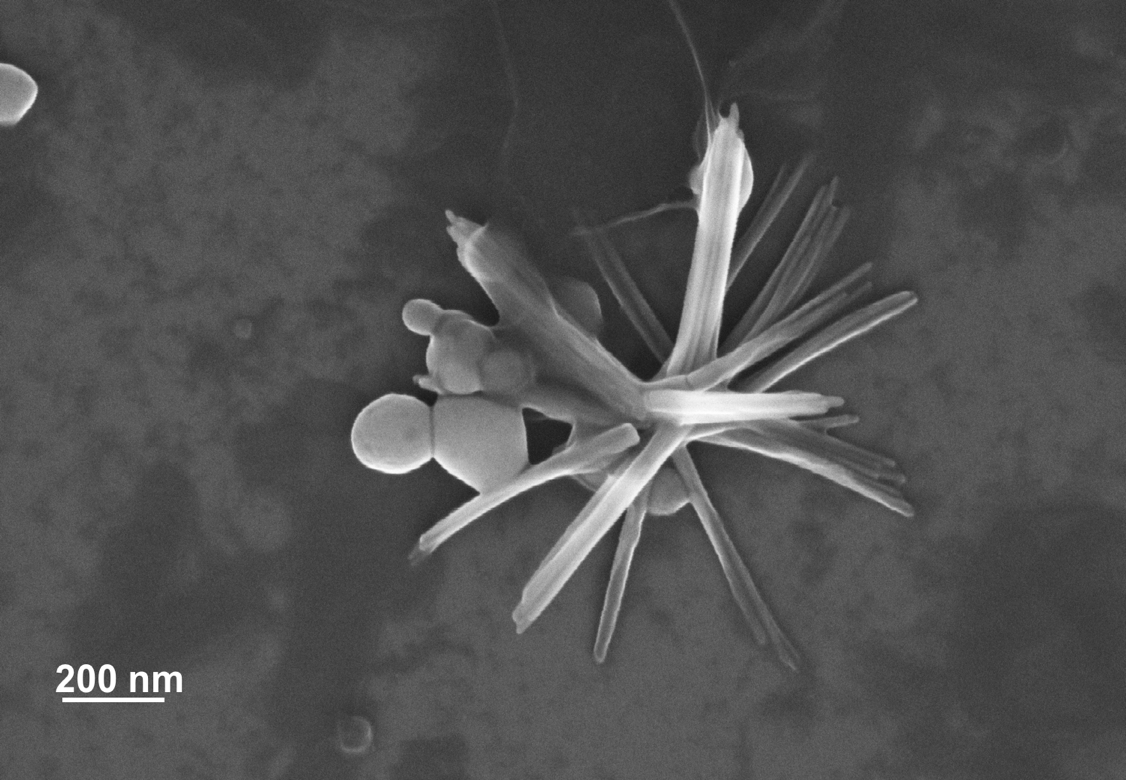
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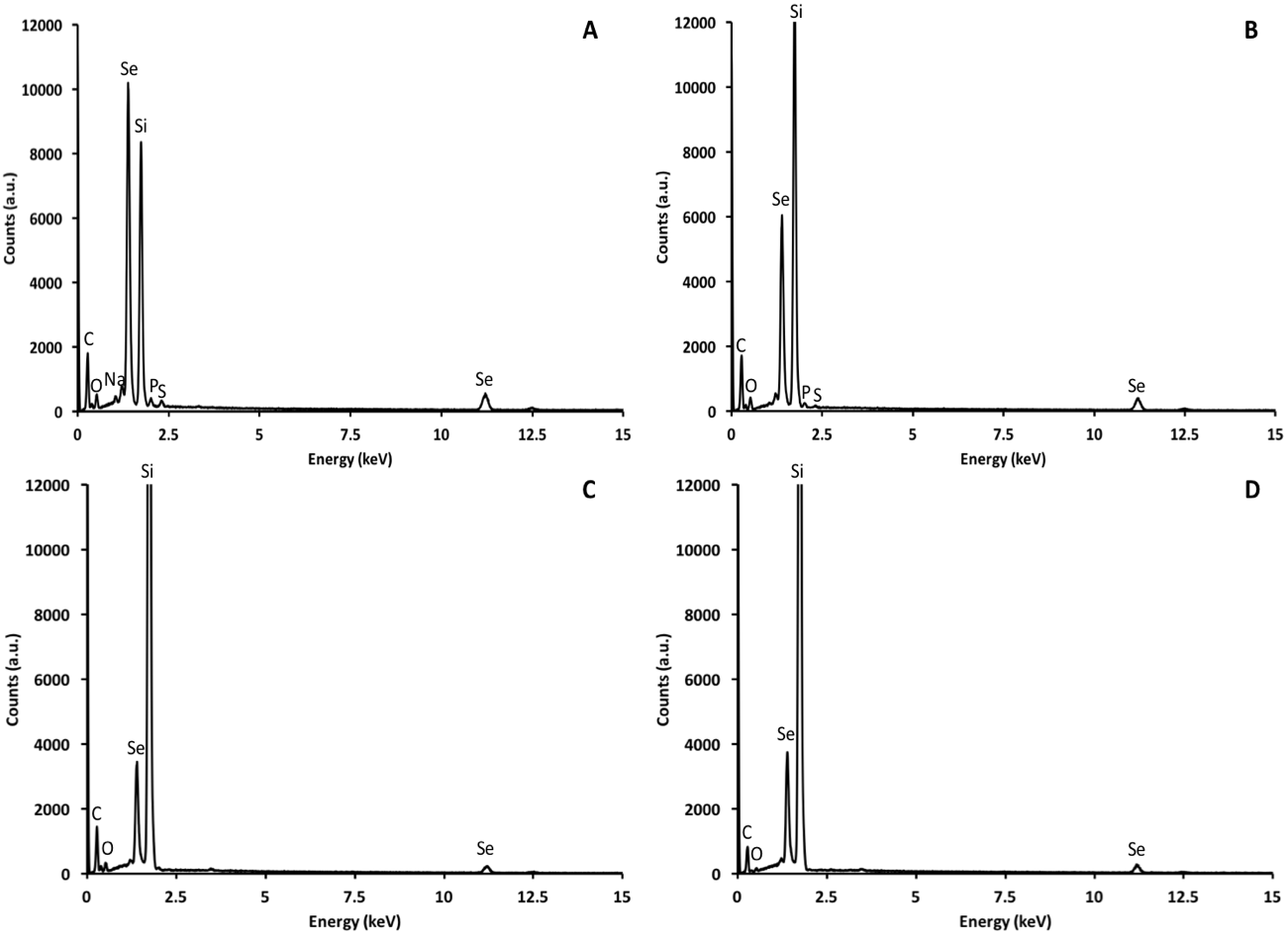
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**Figure S1:** Scanning electron micrograph ofSeNSMPV1-G\_e showing SeNPs and SeNRs.

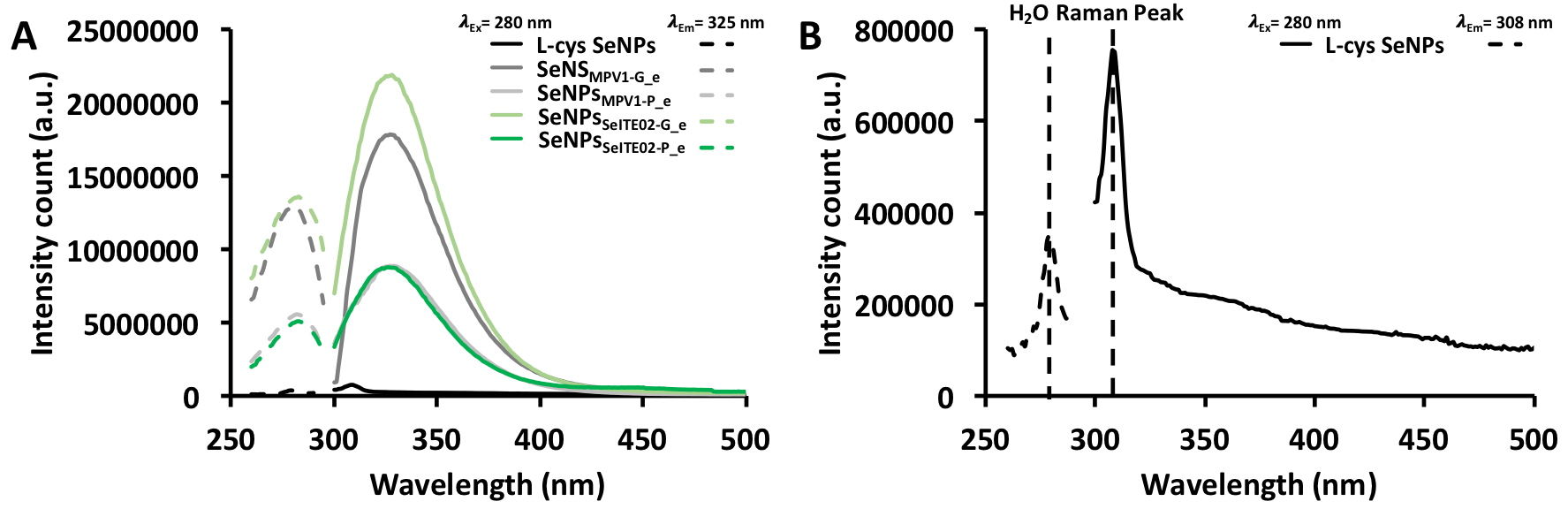


**Figure S2:** EDX spectra ofSeNPsSeITE02-G\_e (a), SeNPsSeITE02-P\_e (b), SeNSMPV1-G\_e (c), and SeNSMPV1-P\_e (d).

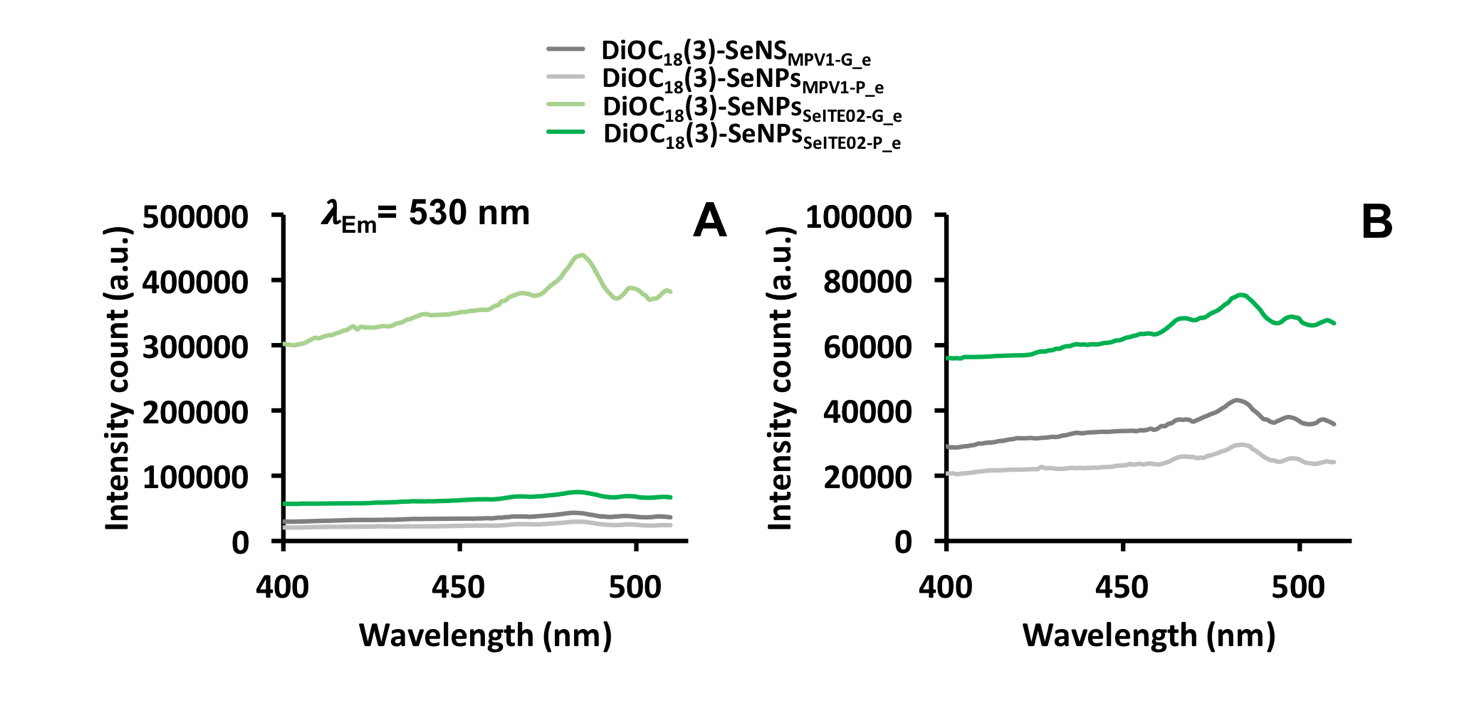
**Table S1:** growth conditions adopted to culture the environmental bacterial isolates to generate SeNS extracts and their acronym.

|  |  |  |
| --- | --- | --- |
| **Bacterial strain** | **Growth conditions of production** | **Acronym of SeNS extracts** |
| *Stenotrophomonas maltophilia* SeITE02 | DM a medium amended with glucose (0.5% v/v) and SeO32- (0.5 mM) | SeNPsSeITE02-G\_e |
| DM a medium amended with pyruvate (0.5% v/v) and SeO32- (0.5 mM) | SeNPsSeITE02-P\_e |
| *Ochrobactrum* sp. MPV1 | DM a medium amended with glucose (0.5% v/v) and SeO32- (0.5 mM) | SeNSMPV1-G\_e |
| DM a medium amended with pyruvate (0.5% v/v) and SeO32- (0.5 mM) | SeNPsMPV1-P\_e |

a Defined Medium (Frassinetti et al., 1998)



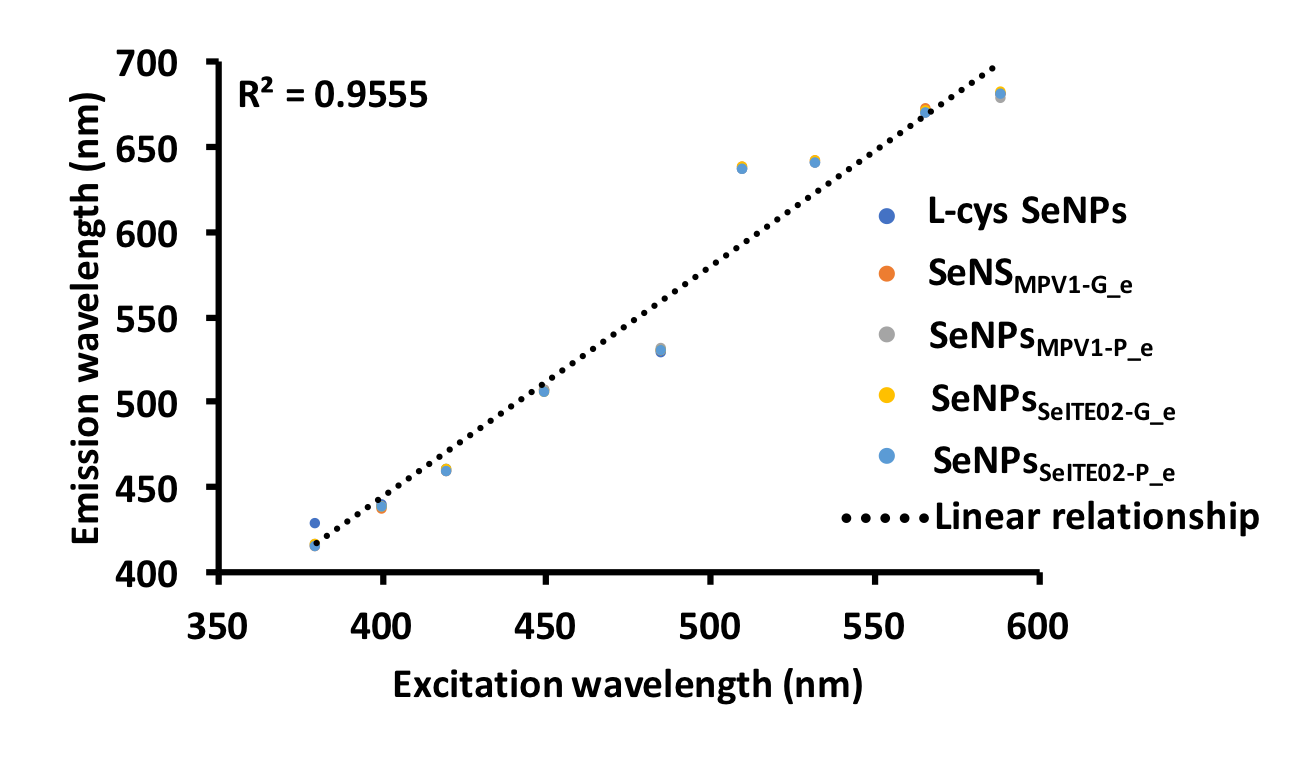
**Figure S3:** Fluorescence emission and excitation spectra of unlabeled biogenic SeNS extracts and chemically synthesized L-cys SeNPs (a), while, for clarity, in (b) is represented resolution of L-cys SeNPs spectra. The dashed black line indicates the water Raman peak.

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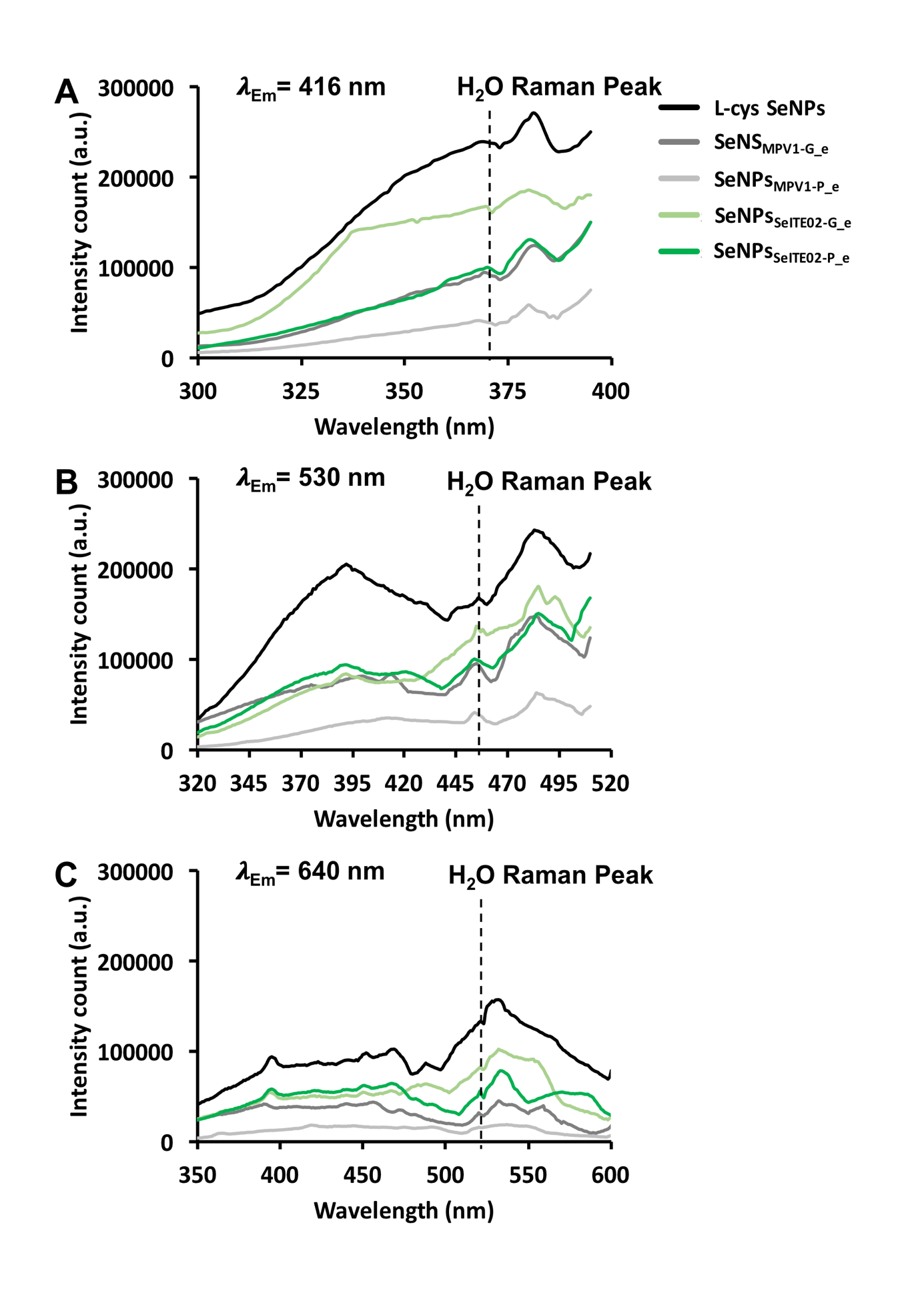
**Figure S4:** Fluorescence excitation spectra of the biogenic SeNS extracts labelled with the lipophilic tracer DiOC18(3) (a), while, for clarity, in (b) is represented a better resolution of those samples with low fluorescent signal.

**Table S2**: SeNS photoluminescence’s dependency on the excitation wavelength.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Emission wavelength (nm)** | | | | | |
| **λexc (nm)** | **L-cys SeNPs** | **SeNPsSeITE02-G\_e** | **SeNPsSeITE02-P\_e** | **SeNSMPV1-G\_e** | **SeNPsMPV1-P\_e** |
| 380 | 428 | 415 | 416 | 416 | 415 |
| 400 | 439 | 437 | 438 | 438 | 438 |
| 420 | 460 | 459 | 459 | 460 | 459 |
| 450 | 507 | 507 | 506 | 505 | 505 |
| 485 | 529 | 530 | 531 | 530 | 530 |
| 510 | 636 | 638 | 636 | 638 | 637 |
| 532 | 640 | 641 | 640 | 641 | 640 |
| 566 | 670 | 672 | 669 | 671 | 670 |
| 589 | 680 | 680 | 678 | 682 | 681 |
| **R2** | 0.96 | 0.96 | 0.96 | 0.96 | 0.96 |



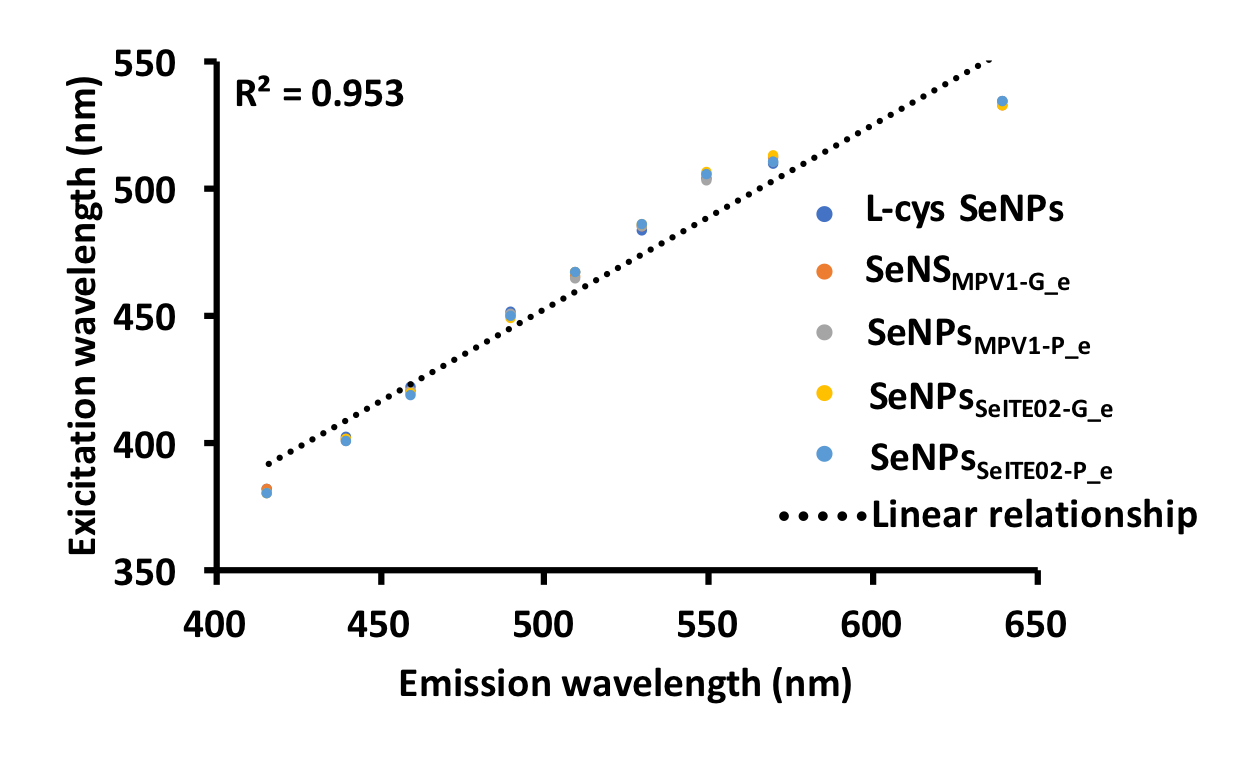
**Figure S5:** Linear relationship betweenthe photoluminescence emission wavelength and the excitation wavelengths.

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**Figure S6:** Photoluminescence excitation spectra of the unlabeled chemically and biogenically synthesized SeNS, setting the emission wavelength at 416 nm (a), 530 nm (b) and 640 nm (c). The dashed black line indicates the water Raman peak.

**Table S3**: SeNS photoluminescence excitation dependency on the emission wavelength.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Excitation wavelength (nm)** | | | | | |
| **λem (nm)** | **L-cys SeNPs** | **SeNPsSeITE02-G\_e** | **SeNPsSeITE02-P\_e** | **SeNSMPV1-G\_e** | **SeNPsMPV1-P\_e** |
| 416 | 381 | 380 | 380 | 381 | 380 |
| 440 | 402 | 401 | 400 | 401 | 400 |
| 460 | 421 | 419 | 418 | 420 | 420 |
| 490 | 451 | 448 | 449 | 449 | 450 |
| 510 | 466 | 466 | 466 | 465 | 464 |
| 530 | 483 | 485 | 485 | 484 | 484 |
| 550 | 503 | 506 | 505 | 505 | 502 |
| 570 | 509 | 512 | 510 | 511 | 510 |
| 640 | 533 | 532 | 533 | 532 | 533 |
| **R2** | 0.94 | 0.94 | 0.95 | 0.95 | 0.95 |



**Figure S7:** Linear relationship betweenthe photoluminescence excitation wavelength and the emission wavelengths.