Demonstration of the Γ law

A homemade Γ law was designed by us to take into account the fact that the aggregation cannot occur between two identical cells.

Actually, on the first aggregate strain A can only interact with strain D on the second aggregate, and the probability of interaction raises with the number of DARPin (U_{SD}) or allergens (U_{SA}) on the surface of cells:

$$\Gamma_1 = U_{SA} \frac{n_A}{n_A + n_D} \times U_{SD} \frac{n'_D}{n'_A + n'_D} \quad (1)$$

Likewise for the second part, on the first aggregate, strain D can only interact with strain A on the second aggregate, so:

$$\Gamma_2 = U_{SA} \frac{n'_A}{n'_A + n'_D} \times U_{SD} \frac{n_D}{n_A + n_D} \quad (2)$$

The sum and factorisation of the two terms Γ_1 and Γ_2 give our definitive form of the efficiency of collision:

$$\Gamma(n'_A, n_A, n'_D, n_D) = U_{SA} U_{SD} \frac{n_A n'_D + n_D n'_A}{(n_A + n'_A)(n_D + n'_D)} \quad (3)$$

with $U_{SA} U_{SD}$ the term representing the factor of efficacy of encounter of each cell. This law does not take into account any terms of shape, so we consider spherical aggregates and the surface of particles is proportional to the number of strains contained in aggregates.