

Reply to Commentary on Blood Cell Damage after *in vitro* Irradiation of Fresh Whole Blood with 630nm Laser Light, F. Fischer, et al.

As mentioned in the commentary there are at least two possible explanations for the change in red blood cells due to laser irradiation when blood temperature does not exceed 37 C. We favor the explanation that there is some additional effect involved. That could be a change in chemical structure of one or more red cell components or aggregation of red cell components due to the laser light or something else, which mimics heat damage or makes the red blood cells more vulnerable to heat damage even at lower temperatures.

We prefer this explanation, because the blood was irradiated for a relatively long time in the suprasil cell. The flow velocity of 10 ml/h and the aperture of the suprasil cell (17.5mm x 3.5mm x 1mm) led to an irradiation time for one red blood cell flowing through the cell of about 20 seconds. This time should be long enough to heat up the

whole blood, if there is a temperature rise to about 50 C in every red blood cell as suggested by B. Bull.

However, until there is clear confirmation by measurement other explanations are possible. One future experiment could be precooling of the blood before irradiation. If there is only heat involved, precooling of the red blood cells before irradiation should give a difference in blood counts compared to the results described in this paper. If there are other processes involved, precooling might not have a big influence on the blood count results after irradiation. Of course, the best way to verify the mechanism would be measurement of the temperature of one single red blood cell before, during and after irradiation. Unfortunately, we don't know of a device which is able to measure the temperature of a single red blood cell under these conditions.

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