

Supplemental File

Single-Time-Point Dosimetry Using Model Selection and Non-Linear Mixed-Effects Modelling: A Proof of Concept

Deni Hardiansyah^{1,2}, Ade Riana¹, Ambros J. Beer³, Gerhard Glatting^{3,4}

¹Medical Physics and Biophysics, Physics Department, Faculty of Mathematics and Natural Sciences, Universitas Indonesia, Depok, Indonesia

²Research Collaboration Center for Theranostic Radiopharmaceuticals, Bandung, Indonesia

³Department of Nuclear Medicine, Ulm University, Ulm, Germany

⁴Medical Radiation Physics, Department of Nuclear Medicine, Ulm University, Ulm, Germany

Fig. S1

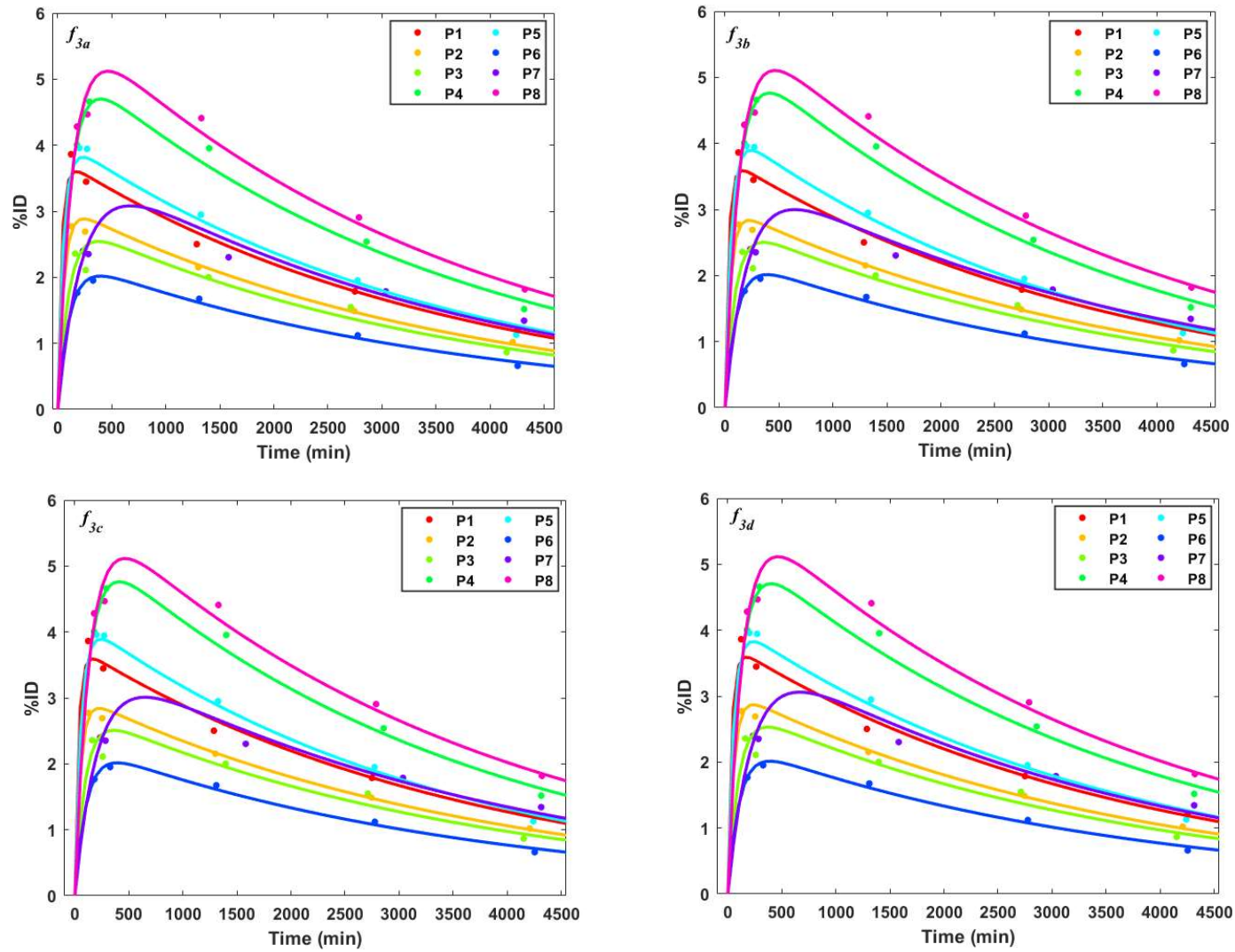


Fig. S1. Time-activity data and all-time-points (ATP) fit curves obtained using functions f_{3a} , f_{3b} , f_{3c} , and f_{3d} .

Fig. S2

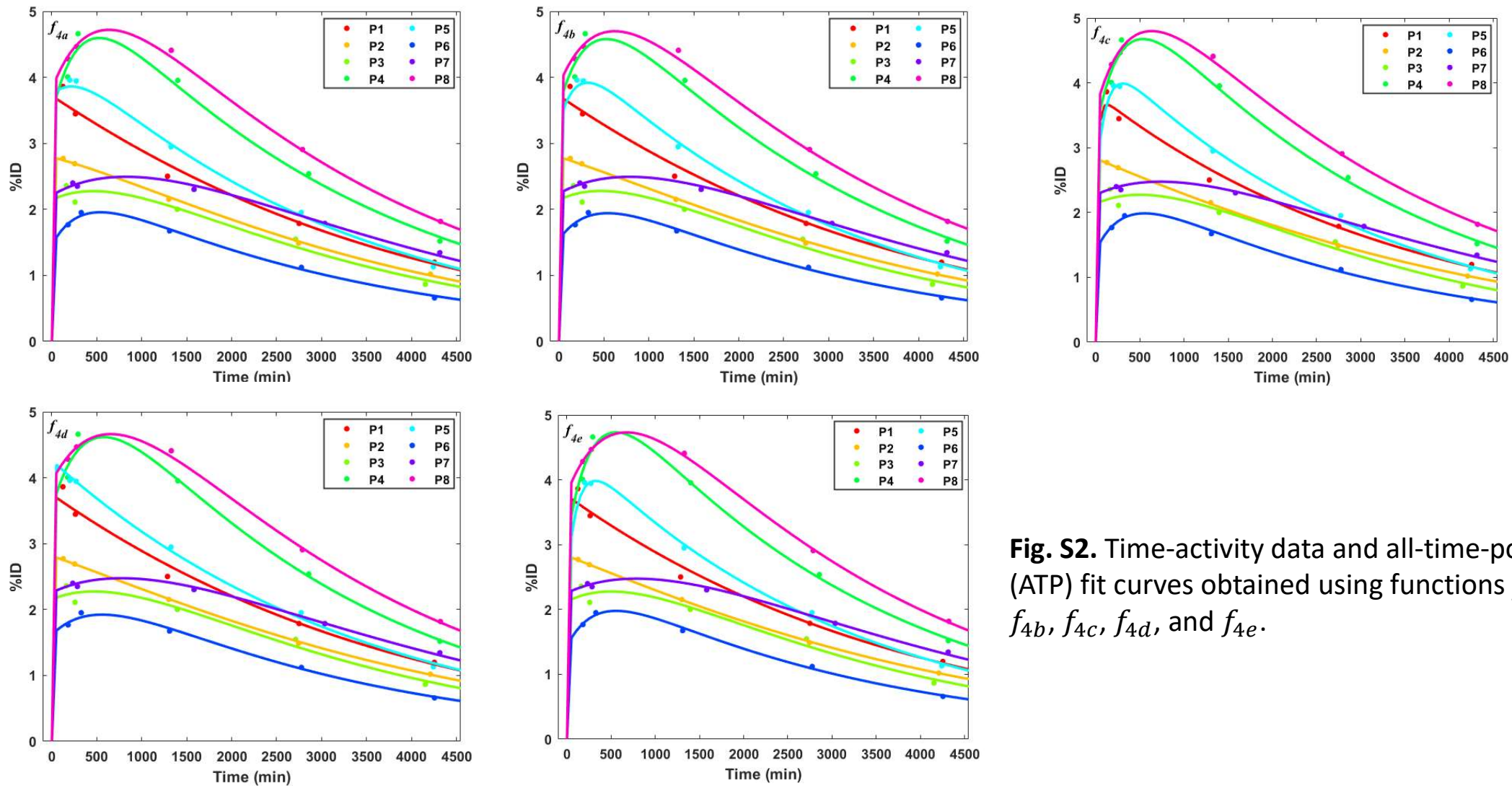


Fig. S2. Time-activity data and all-time-points (ATP) fit curves obtained using functions f_{4a} , f_{4b} , f_{4c} , f_{4d} , and f_{4e} .

Fig. S3

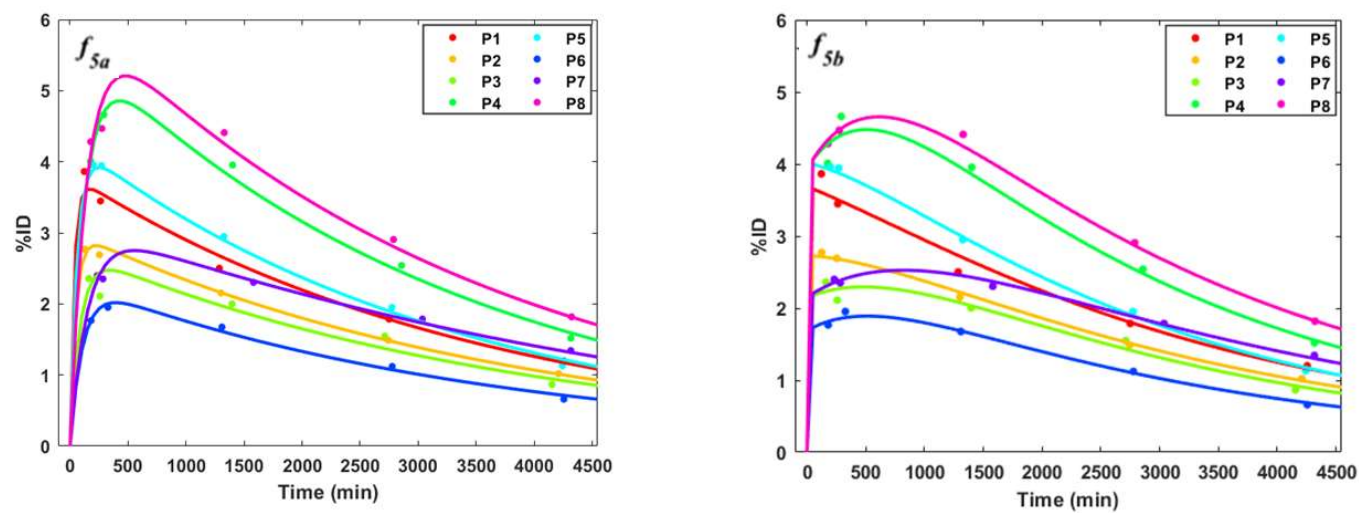


Fig. S3. Time-activity data and all-time-points (ATP) fit curves obtained using functions f_{5a} , and f_{5b} .

Tab. S1. RDs and RMSEs of TIAs obtained using a single time point fitting, and the best function of MS-NLME (f_{4d}) and the 3-parameter function f_{3d} with the second-highest Akaike weight (Table 1) of the 3-parameter functions (also used in ref. [8]). The RMSE of the STP method with the MS-NLME best function has a better performance than the RMSE of the STP method with function f_{3d} by a factor of two, which shows the superiority of the MS-NLME approach over the non-model-selecting NLME approach.

STP Methods	Timepoint (h)	RD (%)		RMSE of the %RD (%)
		mean (SD)	median [min, max]	
Function f_{4d}	T3 (22.8±1.6)	0 (8)	-1 [-13, 10]	7.8
Function f_{3d}		-6 (9)	-9 [-21, 5]	10.9
Function f_{4d}	T4 (46.7±1.7)	0 (5)	1 [-7, 9]	4.9
Function f_{3d}		-9 (6)	-8 [-19, -1]	10.7

RD ... Relative deviation; RMSE ... root mean square error; TIA ... Time-integrated activity; MS ... Model selection; NLME ... Non-linear mixed-effects modelling; STP ... single-time-point